

EXHIBIT 6

PREDEVELOPMENT WORK REQUIREMENTS

This Exhibit 6 sets forth MDOT's requirements for the delivery of the Work in connection with the Phase. The Phase Developer shall perform all Predevelopment Work. Unless agreed otherwise by MDOT, all Section Work shall be performed by Section Developers.

Without limiting any other provisions in this Agreement, the Phase Developer shall perform such Predevelopment Work in accordance with Good Industry Practice and as otherwise required in accordance with this Exhibit 6 to:

- (a) submit a Committed Section Proposal for each Section (including fixed pricing) and, subject to the Committed Section Proposal with associated Section P3 Agreement being approved by MDOT and MDTA (with BPW approval), achieve Commercial Close for each Section;
- (b) ensure that all Section Work is completed in accordance with Good Industry Practice; and
- (c) ensure that all Section Work will meet or exceed the requirements set out in this Agreement, including this Exhibit 6.
- (d) Terms used in this Exhibit 6 are defined in Appendix A. Additional definitions are as stated in the Agreement or the applicable Section P3 Agreement.

Unless otherwise specified, all Submittals or Deliverables in connection with the Predevelopment Work that the Phase Developer is required to provide to MDOT under this Exhibit 6 will be subject to review and acceptance by MDOT as part of the ongoing collaborative process described in this Exhibit 6. Where a Submittal or Deliverable is subject to review and acceptance or acceptance by MDOT, MDOT shall respond promptly to such Submittal or Deliverable and MDOT may accept, reject, provide comments or pursue any other course of action necessary. If this Exhibit 6 does not include requirements with respect to any particular Work, the Phase Developer shall propose for MDOT review and acceptance, appropriate requirements in accordance with Good Industry Practice to serve as the basis of the Work.

Upon Commercial Close of a Section, the Phase Developer will have no further obligations under this Exhibit 6 in respect of that Section.

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ARTICLE 1. Scope of Predevelopment Work

1.1 General

This Exhibit 6 Article 1 (Scope of Predevelopment Work) sets forth the predevelopment activities that the Phase Developer is required to perform to advance the delivery of two or more operationally and Financially Viable Sections within the Phase under two or more Section P3 Agreements.

The intent of the Predevelopment Work is to form a partnership between MDOT and the Phase Developer with the intent to mitigate risk, further develop and streamline the design process, improve the decision-making process with better, more fully developed information, and develop the Work in a manner that advances all P3 Program goals. Involvement of the Phase Developer is anticipated to help reduce risk for the P3 Program, maximize achievement of the P3 Program goals, and improve the overall delivery of the Work.

The activities and requirements in this Exhibit 6 Article 1 (Scope of Predevelopment Work) are minimum requirements and desired outcomes of the Predevelopment Work activities and must be performed by the Phase Developer prior to submitting a Committed Section Proposal, or prior to Commercial Close, as applicable, for each Section. The Phase Developer shall undertake and perform, all activities necessary to complete a Committed Section Proposal and achieve Commercial Close for each Section. Exhibit 6 Articles 2 through Article 27 (collectively "the Technical Provisions") contain detailed requirements specific to the Work. To the extent applicable, the Phase Developer shall perform the Predevelopment Work in accordance with Exhibit 6 Articles 2 through Article 27.

1.2 Phase Wide Objectives

In 2017, Governor Larry Hogan announced Maryland's Traffic Relief Plan. The I-495 & I-270 Public-Private Partnership Program (the "P3 Program"), the largest component of Maryland's Traffic Relief Plan, will be developed and delivered pursuant to the following overarching goals:

- Congestion Relief;
- Minimize Impacts;
- No Net Cost to State;
- Accelerated Delivery; and
- Shockingly Innovative.

The Phase Developer shall ensure that the Work is delivered on a consistent and coordinated basis across the Phase, in order to:

- (a) ensure exceptional service to the public across all Sections and minimize customer service issues from Users of the Priced Managed Lanes ("PMLs");
- (b) ensure tolling system interoperability across the Phase and the capability for the Section Developers to deliver consolidated Trip data for Trips across the Sections within Phase;
- (c) allow for simple and efficient interfacing with MDOT and MDTA for all Sections;
- (d) streamline MDOT's contract administration across all Section P3 Agreements;

- (e) streamline environmental permit acquisition and ensure coverage and compliance;
- (f) deliver the Work to reduce MDOT's potential for exposure to risk; and
- (g) ensure that Work is delivered in the most efficient and advantageous basis.

(together the "Phase Wide Objectives").

The Phase Developer shall, in collaboration with MDOT, develop an approach and contractual structures to manage and deliver the Phase Wide Objectives.

1.3 Phase Management

1.3.1 Organization

Maintain a current organizational chart of the Phase Developer's team. Provide within 15 days of the Effective Date, a roster of Phase Developer's staff performing Predevelopment Work including roles and contact information. Maintain the roster to keep it current and provide MDOT with updates within 5 days of any change.

1.3.2 Partnering and Collaboration

Partnering and collaboration are critical to the successful completion of the Predevelopment Work. The intent of the Predevelopment Work is to draw on the strengths of each organization through open communication, teamwork, collaboration, and cooperative action to identify and achieve mutual goals. The objective is to create an atmosphere of trust and honest dialogue between the Parties. The Maryland Quality Initiative manual Partnering: A Guideline for Project Teams (<https://www.mdqi.org/partnering-tools>) shall be used as the basis for establishing and realizing partnering for the Phase. Partnering and collaboration will not change the legal relationship of the Parties nor relieve any Party from any of the terms of this Agreement.

MDOT, MDTA and the Phase Developer's authorized representative will organize the Steering Committee (Phase P3 Agreement Section 8 (Steering Committee)) and implement a partnering process and a collaboration approach to the Predevelopment Work which includes:

- (a) MDOT and the Phase Developer accommodating and facilitating daily interactions between the Parties;
- (b) MDOT and the Phase Developer establishing an issues resolution ladder;
- (c) the Phase Developer accommodating and facilitating on-going Over-the-Shoulder reviews with MDOT and other Stakeholders;
- (d) MDOT and the Phase Developer establishing protocols for review of any formal Submittals by MDOT, MDTA and third parties, including durations and frequency of reviews; and
- (e) MDOT and the Phase Developer establishing and attending an on-going schedule of meetings such as phase management meetings, task force/discipline specific meetings, design quality control meetings, constructability review meetings, traffic and revenue meetings, financing meetings, Governmental Entity and third party meetings, and other

project coordination meetings as mutually deemed necessary to manage and deliver on the Phase Wide Objectives.

Formal partnering programs will be required throughout the duration of the Phase P3 Agreement and the Section P3 Agreement. A formal partnering program shall commence within 30 days of the Effective Date. Partnering meetings shall be held at regular intervals during the Predevelopment Work with the Phase Developer and the design and construction (“D&C”) Period and Operating Period with the Section Developer. Specific targeted partnering meetings shall be conducted at major transitions such as within 30 days following the Commercial Closing Date for each Section; with 30 days following the start of construction activities on each Section; and within 30 days of the start of the Operating Period for each Section. The intent of specific, targeted meetings is to “restart” the partnering program at these major demarcation points and ensure that staff new to the P3 Program becomes acclimated to the objectives of the P3 Program and the use of the partnering process.

1.3.3 Partnering and Collaboration Objectives

The objectives of the partnering process and collaboration approach are to:

- (a) develop the Work in a manner to maximize value to the State and the Phase Developer and deliver on the Phase Wide Objectives and P3 Program goals;
- (b) enable the Parties to work collaboratively and facilitate the Phase Developer in delivering the Predevelopment Work in a manner acceptable to MDOT;
- (c) identify potential problem areas, issues and different approaches early and to work constructively and efficiently toward resolving them;
- (d) achieve and maintain effective and efficient performance and completion of Work in accordance with this Agreement;
- (e) create mutual trust and respect for each Party’s respective roles and interests in the Phase while optimizing the risk allocation inherent in the Phase approach; and
- (f) identify risks and develop measures to eliminate, minimize, mitigate or manage risks.

1.3.4 Collaboration with Stakeholders:

In performing the Predevelopment Work, the Phase Developer shall in partnership with MDOT collaborate with all Stakeholders, communities, and property owners including but not limited to VDOT, the FHWA, the Maryland-National Capital Park and Planning Commission, Maryland Department of the Environment (“MDE”), National Park Service, Washington Suburban Sanitary Commission, Montgomery County, Frederick County, the City of Rockville, the City of Gaithersburg, adjacent communities, property owners, and the public to address concerns and reduce risks. The Phase Developer shall support MDOT in activities needed for periodic reporting, updates, briefings and meetings with federal, state, and local officials and the public. As part of this collaboration, the Phase Developer will advance design to avoid and minimize impacts to environmental resources, communities, properties, utilities, and other features.

1.3.5 Risk Mitigation

As an early activity of the Predevelopment Work, provide a draft risk management Plan, and then conduct facilitated risk workshops with MDOT to evaluate the potential risks to the Work and develop and prioritize potential methods of eliminating, minimizing, mitigating or managing these risks. Potential strategies may include:

- (a) collecting additional MDOT, Governmental Entity and third party background materials;
- (b) obtaining additional field data (surveys, borings, test holes, etc.);
- (c) performing additional studies and engineering analyses (constructability reviews, alternative evaluations, mitigation studies, innovative design or construction techniques, etc.);
- (d) developing portions of the design more completely than what may be only minimally required for a determination of price reasonableness to ensure a full understanding of all Work requirements;
- (e) determining the required Limits of Disturbance ("LOD") and ROW needs for all Work, any ROW needed, and required Governmental Approvals for any additional LOD and ROW identified;
- (f) commencing certain activities early (property acquisition, Utility Adjustments, etc.) subject to constraints including but not limited to NEPA constraints, right-of-entry to properties, permit conditions and Governmental Approvals;
- (g) developing protocols, standard operating procedures, specifications, agreements, and any other mechanisms or processes required to ensure environmental compliance and mitigate the risk of the permit acquisition process;
- (h) identifying Governmental Approvals and third party approvals with a potential to impact the schedule and collaborate with these parties on mitigative actions; and
- (i) applying lessons learned from similar work performed for MDOT and from other similarly complex projects.

Beyond the initial risk workshop, the identification, assessment, avoidance, minimization and mitigation of risk is a continuous activity and the responsibility of the Phase Developer throughout the Predevelopment Work with the goal of developing a Committed Section Proposal which effectively addresses all potential risks.

1.3.6 Meetings, Data Sharing and Deliverables

1.3.6.1 Meetings

The Phase Developer shall convene regular meetings to collaborate and discuss the progress of the Work. The Phase Developer shall conduct meetings as discussed above, as mutually deemed necessary to advance the Work, and as necessary. Meetings shall be held with MDOT, Governmental Entities and Stakeholders as necessary.

For all meetings the Phase Developer shall provide:

- (a) a record of meeting attendees;
- (b) meeting agendas at least 2 days before meetings;
- (c) draft meeting minutes for each meeting within 5 days of the meeting; and
- (d) final meeting minutes for each meeting at least 2 days in advance of any subsequent meeting or within 5 days after issuing draft meeting minutes, whichever is earlier.

Each meeting must have a specified purpose and stated objectives as part of the agenda.

In addition to other meetings, the Phase Developer shall convene monthly progress meetings that include:

- (a) a discussion of the overall progress of the Work relative to the planned schedule;
- (b) a discussion of the activities planned for the upcoming month;
- (c) a discussion of issues encountered, and the actions taken to resolve;
- (d) a discussion of any unresolved items from the previous meeting;
- (e) a discussion of any other new items; and
- (f) the development of an action item list with responsible parties and deadlines for follow-up action.

1.3.6.2 Data Sharing and Deliverables

The Phase Developer shall use an electronic document management system ("EDMS") for data and document sharing, records of the Work, Deliverables and formal communication. Materials provided to MDOT must be transmitted using MDOT's EDMS as noted in Exhibit 6 Article 2 (Technical Provisions). The Phase Developer shall maintain a separate system for their data which interface with the EDMS for sharing of documents and other correspondence.

Within 30 days of the Effective Date, the Phase Developer shall prepare a list of Deliverables to be submitted during the Predevelopment Work. The Phase Developer shall include with the list a description of each Deliverable identifying the contents and purpose, the planned schedule for submission, the anticipated level of review to be provided by MDOT and the duration of such review expected. The Phase Developer shall provide the list of Deliverables to MDOT for review and concurrence. The Phase Developer shall maintain the list of Deliverables, so it is current during the Predevelopment Work. At a minimum, Deliverables for Predevelopment Work shall include:

- (a) An initial Conceptual Design Submittal defining the full scope of the Section Work clearly depicting critical features such as limits of the Work, the LOD, ROW, environmental features, utilities, and major elements for all engineering disciplines provided within 90 days of the Effective Date; and
- (b) A Committed Section Proposal including the agreed Conceptual Design as described in Exhibit 6 Article 1 (Scope of Predevelopment Work) Section 1.14 (Design) and meeting other requirements as described in the Phase and Section P3 Agreements.

The Phase Developer shall engage with MDOT and all Stakeholders in a continual, collaborative process to progress the design, Section specifications, and all components of the Committed Section Proposal so informed decisions can be made by all affected entities based on risk, cost, schedule, operability, life cycle and other factors to produce an acceptable Committed Section Proposal in a timely, efficient manner.

1.3.7 Reporting on Progress of Predevelopment Work

The Phase Developer shall prepare a Monthly Progress Report identifying activities that have occurred over the previous month and Work anticipated in the upcoming eight weeks. The intent of the report is to formalize the discussions held at the meetings and the minutes of those meetings may be included in this report for this purpose. The following items must be addressed in the report:

- (a) the latest Predevelopment Work Schedule and the Phase Developer's progress against that schedule;
- (b) a summary of the Phase Developer's activities for the previous month;
- (c) an eight (8) week look-ahead of upcoming Work activities and meetings;
- (d) a summary of the results of any investigations, testing, or studies that have been completed;
- (e) a summary of all Stakeholder coordination activities, their status, and any required actions by MDOT;
- (f) a summary of all public outreach and community engagement activities conducted;
- (g) a summary of the ongoing risk assessments and mitigation activities performed;
- (h) the Phase Developer's subcontract report as required by Article 19.9(d) (Compliance) of the Agreement;
- (i) Monthly Prime DBE Payment Report / Monthly Subcontractor DBE Payment Report;
- (j) report on Allowed Costs incurred during the previous month;
- (k) the status of all required approvals by Governmental Entities and third parties;
- (l) a listing of any problems or issues encountered, steps taken to mitigate each problem or issue and any problems or issues resolved since the last report; and
- (m) identification of any decisions needed and the party responsible for that decision.

1.4 Schedule

1.4.1 The Predevelopment Work Schedule

Within 30 days of the Effective Date, the Phase Developer shall update the schedule for Phase South submitted with its Proposal and develop a schedule for Phase North to present a comprehensive schedule of the activities required to complete the Predevelopment Work (the

"Predevelopment Work Schedule"), subject to MDOT review and acceptance. The Phase Developer shall maintain this schedule as the Predevelopment Work is prepared so it accurately represents the status of the Work.

The Predevelopment Work Schedule must be prepared using software compatible with Primavera P6 and present relationships and interdependencies between the individual activities required to complete the Predevelopment Work.

The Phase Developer shall provide regular updates to MDOT on the progress of the Predevelopment Work and any changes to the Predevelopment Work Schedule. The Phase Developer shall update the Predevelopment Work Schedule in accordance with Exhibit 6 Article 1 (Scope of Predevelopment Work) Section 1.4.2 (Updates to the Predevelopment Work Schedule).

The Phase Developer shall ensure that at all times MDOT has electronic access to the current version and all earlier versions of the Predevelopment Work Schedule in both native format and portable document format ("PDF").

The Predevelopment Work Schedule must include the following details:

- (a) a detailed description of Predevelopment Work activities to be performed, including:
 - (i) a work breakdown structure ("WBS") capturing all the Predevelopment Work activities and Deliverables;
 - (ii) Milestones or hold points;
 - (iii) appropriate logic ties to show overall approach to sequencing, including logical relationships between activities logically tying all activities to avoid open ends;
 - (iv) activities used in lieu of lags wherever possible;
 - (v) cost-loading for each activity anticipated for reimbursement in accordance with Exhibit 15 (Allowed Costs);
 - (vi) a depiction of the required coordination with and Work to be performed by subcontractors, Utility Owners, Governmental Entities, and third parties; and
 - (vii) any MDOT, MDTA, Governmental Entity or third party approvals required and the dates by which such approvals are necessary;
- (b) Predevelopment Milestones and the corresponding Predevelopment Milestone Deadlines;
- (c) any activities to be completed to meet each Predevelopment Milestone by the applicable Predevelopment Milestone Deadline;
- (d) activities required for the development of the D&C Costing Model and the O&M Costing Model, including key milestones in the process for determining and agreeing upon the final D&C Price and O&M Price in accordance with Exhibit 6 Article 1 (Scope of Predevelopment Work) Section 1.20 (Section D&C Work Pricing) and Exhibit 6 Article 1 (Scope of Predevelopment Work) Section 1.21 (Section O&M Work Pricing);
- (e) activities required for the development of investment grade traffic and revenue projections, including key milestones through to delivery of those final projections;

- (f) activities required for the development of the Financing Plan, investment grade ratings, Lender and equity commitments, and financial model, including key milestones through to delivery of the model;
- (g) activities required for the development of the Section Technical Provisions by MDOT, including key milestones through to delivery of the final Section Technical Provisions;
- (h) activities required for tolling integration across the Sections;
- (i) target dates for the Commercial Closing Date and Financial Closing Date for each Section of the Phase; and
- (j) any other activities required to submit a compliant Committed Section Proposal and to achieve Financial Close of each Section of the Phase.

1.4.2 Updates to the Predevelopment Work Schedule

The Phase Developer shall update the Predevelopment Work Schedule at least on a monthly basis.

In addition to the above, the Phase Developer shall develop and submit to MDOT for review and acceptance updates to the Predevelopment Work Schedule, to take into account any significant event, including:

- (a) issuance of Phase North NTP;
- (b) any time there is a change to the proposed division of Sections under Exhibit 6 Article 1 (Scope of Predevelopment Work) Section 1.5 (Division of the Phase into Sections);
- (c) any extensions of time or relief granted in response to a Relief Event under Article 16 (Relief Events) of the Agreement;
- (d) any change orders that are agreed under Article 22 (Change Orders) of the Agreement;
- (e) any changes to the Financing Plan from the previous quarter under Exhibit 6 Article 1 (Scope of Predevelopment Work) Section 1.22.1 (Financing Plan); and
- (f) upon submission of a Committed Section Proposal.

1.4.3 Section Schedule

As part of the Predevelopment Work, the Phase Developer shall prepare a Section Schedule consisting of an update to the preliminary schedule for Phase South and a schedule for Phase North that together depict all design, construction and operations and maintenance ("O&M") activities for the Section Work following the requirements of Exhibit 6 Article 3 (Management and Administration of the Work). The schedule for Phase North must use the same approach as used for Phase South. The Phase Developer shall provide a reviewable copy of the Section Schedule to MDOT within 120 days of the Effective Date. The Phase Developer shall maintain the Section Schedule to reflect the ongoing Predevelopment Work and the planned Section Work. The Phase Developer shall provide MDOT with a copy of the Section Schedule upon request.

1.5 Division of Phase into Sections

- (a) The Phase Developer shall notify MDOT, subject to MDOT review and acceptance, of how the Phase Developer proposes to divide the Phase into two or more operationally and Financially Viable Sections to be delivered under two or more Section P3 Agreements. Unless otherwise agreed to by MDOT, the Phase Developer shall divide Phase South into Sections in accordance with its Proposal.
- (b) In dividing the Phase into Sections, the Phase Developer shall comply with the following (unless otherwise agreed to in writing by MDOT):
 - (i) each Section must have logical end points and be capable of stand-alone operation separate to other Sections within the Phase and other phases;
 - (ii) Phase South must be delivered first, and then Phase North;
 - (iii) the First Section must include the American Legion Bridge and must achieve Financial Close before (or concurrently with) any other Sections in the Phase;
 - (iv) Financial Close of the First Section must be achieved by the relevant date listed in Exhibit 5 (Predevelopment Milestones and Deadlines);
 - (v) the Financial Close of any Section must occur contiguously from the First Section northbound along the Phase;
 - (vi) Financial Close of all Sections of Phase South must be achieved by the relevant date listed in Exhibit 5 (Predevelopment Milestones and Deadlines);
 - (vii) Financial Close of all Sections in Phase North must occur no later than the relevant date listed in Exhibit 5 (Predevelopment Milestones and Deadlines);
 - (viii) Sections must be of a size and scope to maximize financial viability, construction market capacity and debt and equity market capacity;
 - (ix) Section limits must be logical from an operating and maintenance perspective;
 - (x) Section Substantial Completion should be contiguous from the First Section northbound along the Phase;
 - (xi) the PML design must include safe transitions to the General Purpose Lanes ("GPL") prior to all intermediate Tolling Points and at the limits of each Section and the Phase; and
 - (xii) Transit Service Improvements associated with each Section shall be delivered in accordance with each Transit MOU and as developed with MDOT.
- (c) The Phase Developer shall ensure that all Sections in the Phase are completed to the same standards and in a uniform manner, to ensure that from the perspective of MDOT, MDTA and the Users of the PMLs and GPLs there is a seamless transition between all Sections of the Phase, with adjoining Phases and with I-495 in Virginia including the Commonwealth of Virginia's Project NEXT;
- (d) The Phase Developer shall provide MDOT with the following information at the same time as the initial Conceptual Design is submitted to support its proposed Sections of the Phase:

- (i) preliminary traffic and revenue projections;
 - (ii) preliminary design-build and lifecycle cost estimates;
 - (iii) preliminary O&M cost estimates;
 - (iv) proposed contractual structures and preliminary Financing Plans; and
 - (v) geometric concepts and traffic operational analyses for each Section, including their interface with each other, the entire Phase, and with I-495 in Virginia including the Commonwealth of Virginia's Project NEXT (as applicable).
- (e) For each Section, the Phase Developer shall:
- (i) identify the terminus between its proposed Section and any adjacent Section or Phase;
 - (ii) provide to MDOT geometric concepts and traffic operational analyses presenting how the proposed Section and adjacent Section or Phase will function;
 - (iii) ensure that the proposed Section logically and safely operates with GPLs and PMLs previously constructed or planned; and
 - (iv) provide a sequence of operations should the terminus of the Section be constructed before the neighboring phase is built.
- (f) The Phase Developer shall notify MDOT if it proposes to change any of the previously accepted Sections of the Phase. Any such change will be subject to MDOT review and acceptance.
- (g) With respect to any Section(s) that include the interchanges between I-495 and I-270 (including the "I-270 East Spur" and the "I-270 West Spur") or the interchange at which the I-270 East Spur and the I-270 West Spur meet:
- (i) the maximum tolling limits for such Section along I-495 east of the I-270 West Spur shall be the interchange between I-495 and MD 187 (Old Georgetown Road);
 - (ii) the maximum tolling limits for such Section along the I-270 East Spur shall be the interchange between I-270 East Spur and MD 187 (Old Georgetown Road);
 - (iii) subject to (i) and (ii), the Phase Developer shall identify, subject to MDOT review and acceptance, the location of the tolling limits on the I-270 East Spur (the "East Spur Section Limit") and on I-495 east of I-270 West Spur (the "I-495 Section Limit"), which shall be the limits of the relevant Section for the Term of this Agreement and the term of the relevant Section P3 Agreement. The location of the East Spur Section Limit and I-495 Section Limit shall be as identified in the Proposal unless otherwise accepted by MDOT, provided that the final determination of the location of the East Spur Section Limit and I-495 Section Limit shall be no later than one year after the Effective Date. The Phase Developer shall maintain the physical separation between the PMLs and the GPLs to, at a minimum, the location of the East Spur Section Limit and the I-495 Section Limit;
 - (iv) Work may extend east of the East Spur Section Limit or the I-495 Section Limit as needed for geometric tie-ins of the General Purpose Lanes (GPLs) and termination of the Price Managed Lanes (PMLs) and for efficient traffic operations

and other ancillary work, provided that minimal to no Work shall be performed at the interchange between MD 355 (Rockville Pike), I-495 and I-270 East Spur;

- (v) Parts of the P3 Program located east of the East Spur Section Limit or the I-495 Section Limit are expected to be delivered pursuant to a future Phase of the P3 Program. Any improvements made east of East Spur Section Limit or the I-495 Section Limit may be altered in the future at the discretion of MDOT;
- (vi) The Phase Developer's design shall be compatible with the future extension of the PMLs east of the East Spur Section Limit or the I-495 Section Limit and shall not preclude construction of PML access east of the East Spur Section Limit or the I-495 Section Limit; and
- (vii) in order to ensure effective tie-in with any future Phase, the Phase Developer shall deliver the maximum number of Priced Managed Lanes shown in the preferred alternate on (a) I-495 between the I-270 West Spur and I-495 Section Limit and (a) on the I-270 East Spur between the interchange with the I-270 West Spur and the East Spur Section Limit.

1.6 Governmental and Third Party Approvals

1.6.1 Obligation to Obtain Governmental Approvals

The Phase Developer shall obtain all Governmental Approvals (other than MDOT-Provided Approvals) and MDOT acceptances required for the Predevelopment Work. The Phase Developer shall prepare a listing of all approvals needed and maintain and track the status of each. The Phase Developer shall document:

- (a) all Governmental Approvals and MDOT acceptances required to perform the Predevelopment Work and Section Work;
- (b) whether the Governmental Approvals or MDOT acceptances (other than MDOT-Provided Approvals) will be obtained by the Phase Developer or by the applicable Section Developer;
- (c) the process for obtaining Governmental Approvals (other than MDOT-Provided Approvals) and MDOT acceptances;
- (d) the anticipated schedule for obtaining Governmental Approvals (other than MDOT-Provided Approvals) and MDOT acceptances and identify those that are the critical path;
- (e) how MDOT will be provided updates on the status of Governmental Approvals;
- (f) how the Phase Developer intends to confirm and ensure the LOD determined during the Predevelopment Work is sufficient for the Section Work; and
- (g) how the Phase Developer intends to ensure continuous compliance with all Governmental Approvals and MDOT acceptances.

The Phase Developer shall at a minimum focus the Conceptual Design effort on Governmental Entities with the highest potential for cost and schedule impact to the Work. The Phase Developer shall conduct a review of the Conceptual Design with the affected Governmental Entity and obtain written confirmation the Conceptual Design is acceptable to MDOT and the

affected Governmental Entity. At a minimum, reviews must be conducted with Montgomery County, Frederick County, the City of Rockville, the City of Gaithersburg, VDOT, Maryland-National Capital Park and Planning Commission, National Capital Planning Commission, and the National Park Service.

The Phase Developer shall include in the Predevelopment Work Schedule and the Section Schedule all Governmental Approvals and MDOT acceptances. The Phase Developer shall provide sufficient time for review and approval, including the requirement for multiple submissions, if needed. The Predevelopment Work Schedule and the Section Schedule must also include adequate time for all D&C and O&M activities related to Governmental Approvals.

1.6.2 Coordination of Predevelopment Work with Third Parties

The Phase Developer shall identify any third parties affected by the Section Work and assist MDOT in relation to any third parties not already identified or included in other requirements of the Predevelopment Work. The Phase Developer shall at a minimum focus the Conceptual Design effort on third parties with the highest potential for cost and schedule impact to the Work. The Phase Developer shall conduct a review of the Conceptual Design with the affected third party and obtain written confirmation the Conceptual Design is acceptable to MDOT and the affected third party. At a minimum, reviews must be conducted with CSX Transportation ("CSXT") for affected portions of Phase North.

The Phase Developer shall include in the Predevelopment Work Schedule and the Section Schedule all Submittals to third parties and required approvals. The Phase Developer shall provide sufficient time for review and approval, including the requirement for multiple submissions if needed. The Predevelopment Work Schedule and Section Schedule must also include adequate time for all D&C and O&M activities related to third parties.

1.6.3 Permits/Approvals

The Phase Developer shall collaborate with MDOT during the Predevelopment Work to explore and identify opportunities to expedite the permitting and approval processes for the Section Work. The Phase Developer shall at a minimum focus the Conceptual Design effort on Permits and Approvals with the highest potential for cost and schedule impact to the Work. At a minimum the efforts shall address the following Permits and Approvals:

- (a) MDOT SHA Office of Highway Development Plan Review Division ("MDOT SHA OHD PRD") and MDE approvals as described in Exhibit 6 Article 13 (Drainage, SWM & ESC);
- (b) Environmental Summary/NEPA Re-evaluation (if required);
- (c) revisions to the USACE Section 404 Clean Water Act permit; and accompanying Section 401 Water Quality Certification and MDE Maryland Nontidal Wetland and Waterways permits;
- (d) Federal Emergency Management Agency ("FEMA") Conditional Letter of Map Revision ("CLOMR") approval;
- (e) National Park Service special use permits for Maryland and (if applicable) Virginia;

- (f) any required permits and approvals from the Maryland-National Capital Park and Planning Commission, the National Capital Planning Commission and the National Park Service; and
- (g) Maryland Department of Natural Resources ("DNR") forest conservation permits and approvals.

The Phase Developer shall conduct a review of the Conceptual Design with each of the above entities and obtain written confirmation the Conceptual Design is acceptable to those entities or document the review and notify MDOT immediately if the Phase Developer believes an entity will not provide confirmation before the Committed Section Proposal is to be submitted. Conceptual Design preparation, review and documentation shall be prepared in accordance with the applicable Technical Provisions and other sections of the Agreement.

As a Predevelopment Work activity, the Phase Developer shall prepare and preferably complete the water quality banking tracking system as noted in Exhibit 6 Article 13 Section 13.6.3 (Water Quality Bank).

1.6.4 Governmental Approval Applications

The Phase Developer shall prepare and submit to MDOT for review draft applications for each Governmental Approval (including Governmental Approvals relating to Section Work to the extent that these are being advance as part of the Predevelopment Work). The Phase Developer shall provide MDOT with a copy of each approval once the Governmental Approval is obtained.

1.7 Quality Management

The Phase Developer is responsible for the quality of all Predevelopment Work. The Phase Developer shall develop and implement a quality system that ensures such quality and compliance with the Agreement for all Predevelopment Work. The Phase Developer shall comply with the requirements of ISO 9001 and ISO 14001.

As part of the Predevelopment Work, the Phase Developer shall work with MDOT to develop the Quality Management System for the Section Work, including identifying all procedures and staffing required, that ensures quality and compliance with the Agreement for all Section Work.

1.8 Safety Management

The Phase Developer is responsible for managing safety and maintaining safe practices for all activities, including safeguarding the public or any other Person involved in the Predevelopment Work.

1.9 Public Outreach and Engagement

1.9.1 Public Face and Official Spokesperson

Unless MDOT elects otherwise, MDOT will remain the "public face" and serve as the official spokesperson for the Phase. As part of Predevelopment Work, the Phase Developer shall

support MDOT with public outreach and engagement by providing materials, attending meetings and other support.

1.9.2 Public Outreach and Engagement Activities and Responsibilities

Specific activities and responsibilities are discussed in Exhibit 6 Article 4 (Public Outreach and Engagement).

The Phase Developer will be responsible for robust public outreach and community engagement efforts in close collaboration and partnership with MDOT and MDTA. The Phase Developer will coordinate with MDOT and MDTA to facilitate an early and ongoing collaborative dialogue to engage Stakeholders, local communities, and property owners in the development process. The Phase Developer, working with MDOT and MDTA, will be responsible for Stakeholder outreach, including, but not limited to, meetings and events to inform and collaborate with Stakeholders, local communities, and property owners. The Phase Developer shall collaborate with MDOT and MDTA to develop strategies that focus on public information and involvement with the goal of maintaining an open and honest dialogue with all Stakeholders through exceptional customer service and responsive correspondence.

During the Predevelopment Work the Phase Developer shall create a Public Outreach and Engagement Plan for approval by MDOT and MDTA that includes specific initiatives as detailed in Exhibit 6 Article 4 (Public Outreach and Engagement) Section 4.5 (Stakeholder Outreach and Information) for public outreach, social media, crisis communications, community engagement, and marketing that will occur during the Predevelopment Work and establish protocols for clear lines of communication between the Phase Developer, Section Developer, MDOT and MDTA.

1.10 Environmental

1.10.1 Environmental Process

MDOT is seeking two separate NEPA approvals for the Managed Lanes Study (“MLS”) and the I-270 from I-370 to I-70 components of the Phase. A ROD for the MLS component of the Phase, which covers Phase South, is anticipated in Spring 2021. MDOT will inform the Phase Developer of the NEPA related commitments and conditions and the Phase Developer shall comply, and ensure the Section Developer complies, with all such commitments and conditions.

For the portion of the Phase on I-270 from I-370 to I-70, which covers Phase North, the NEPA class of action is expected to be an Environmental Impact Statement. In coordination with the Phase Developer, MDOT and FHWA will determine the schedule for initiation of the NEPA process. MDOT and FHWA will retain control and responsibility for the NEPA process.

It is anticipated the Phase Developer will assist and cooperate with MDOT as needed during the NEPA process for the I-270 from I-370 to I-70 component.

Phase Developer will not be asked to perform services that would violate conflict of interest rules under NEPA regarding the preparation, review, revision, and decisions on the scope and content of draft and final environmental review documents. The Phase Developer shall notify MDOT immediately if it identifies a conflict or potential conflict in relation to the NEPA approvals.

The Phase Developer shall, in accordance with 23 CFR §636.109(b), support MDOT with the environmental process for Phase North by:

- (a) preparing preliminary designs (as defined in 23 CFR §636.103); and
- (b) to the extent required by MDOT, perform design and engineering activities for the purposes of:
 - (i) defining the Phase North alternatives and completing the NEPA alternative analysis and review process;
 - (ii) complying with other related environmental laws and regulations;
 - (iii) supporting MDOT coordination, public involvement, permit applications, or the development of mitigation Plans; or
 - (iv) developing the design of the preferred alternative to a higher level of detail if the lead agencies agree that it is warranted under 23 USC §139(f)(4)(D).

1.10.2 Environmental Compliance

The Phase Developer shall ensure all Predevelopment Work is performed in compliance with all applicable environmental laws and commitments and further reduce impacts and adverse effects where practical when refining the design. The Committed Section Proposal must clearly demonstrate the environmental commitments can be met throughout the term of each relevant Section P3 Agreement. Prepare a Commitment Tracking Database (“CTD”) to be used with the Section Work following the requirements of Exhibit 6 Article 5 (Environmental Management) Section 5.4.5 (Commitment Tracking Database). Confirm that the Conceptual Design meets the conditions of the environmental commitments.

1.10.3 Minimum Predevelopment Work with Respect to Environmental Compliance

Specific activities and responsibilities are discussed in Exhibit 6 Article 5 (Environmental Management) and Exhibit 6 Article 13 (Drainage, SWM & ESC).

1.10.3.1 Noise

Specific activities and responsibilities are discussed in Exhibit 6 Article 6 (Noise Analysis and Mitigation).

During the Predevelopment Work, the Phase Developer shall evaluate noise mitigation measures to be employed both for temporary and permanent conditions. At a minimum, this evaluation shall include validation of the noise modeling used for the FEIS. The Phase Developer shall alert MDOT if errors or discrepancies are discovered in the FEIS noise models.

1.10.3.2 Environmental Impacts

The Reference Information Documents contain information relating to environmental features including wetlands, habitat, cultural and natural resources, rare threatened or endangered species, archaeological remains, etc. The Phase Developer shall verify this information is applicable for its intended use and perform all necessary additional studies, field verification, sampling, testing, or other investigations as required to mitigate and manage associated risks eliminate the potential for Unknown Archaeological Remains and Unknown Endangered Species

and submit a compliant Committed Section Proposal. The Phase Developer shall alert MDOT if errors or discrepancies are discovered in the MDOT provided Reference Information Documents.

The Phase Developer shall perform the Predevelopment Work necessary to confirm that the LOD as presented in the NEPA documents is sufficient for all Section Work. If, after evaluation of potential avoidance measures, the Section Work requires additional LOD beyond that identified in the NEPA documents, the Phase Developer shall conduct additional studies, field investigations, and coordination activities needed to obtain approval of Environmental Summary/NEPA Re-evaluations, permit revisions, and other permits/approvals as described in Exhibit 6 Article 5 (Environmental Management).

The Phase Developer shall report to MDOT on the status of the acquisition of additional data and coordination activities as the Work progresses.

Prior to the Phase Developer establishing the Design-Build Price, for a Section, the Phase Developer shall prepare an approach to the avoidance and minimization of impacts for the Section demonstrating efforts to further reduce impacts to environmental features.

1.10.3.3 Hazardous Materials

Additionally, the Phase Developer is alerted to the presence of the potential for Hazardous Materials to be located within the Phase. The Phase Developer shall verify Hazardous Material information provided with the Reference Information Documents is applicable for its intended use and shall perform additional data acquisition as needed to confirm the presence, locations and potential impact to or potential to cause a Hazardous Materials Release, minimize and manage the associated risk, and submit a compliant Committed Section Proposal. The Phase Developer shall alert MDOT if errors or discrepancies are discovered in the MDOT provided Reference Information Documents.

The Phase Developer shall conduct additional studies or investigations to confirm the presence, potential affect to, and quantity of potential Hazardous Materials which may be encountered when performing the Work to eliminate the potential for Unknown Hazardous Environmental Conditions and submit a compliant Committed Section Proposal. The Phase Developer shall report to MDOT on the status of the acquisition of additional data and coordination activities as the Work progresses.

Prior to the Phase Developer establishing the Design-Build Price, for a Section, the Phase Developer shall prepare documentation presenting the anticipated quantity of Hazardous Materials to be encountered, minimization efforts planned or undertaken, and the Plan and costs for remediation or safe and proper disposal of these Hazardous Materials.

1.11 Right-of- Way

The Phase Developer shall provide all ROW services necessary to develop accurate cost estimates and quantify impacts to property owners for all Section Work in sufficient detail to develop the D&C Costing Model and O&M Costing Model.

The Phase Developer shall determine, subject to MDOT's review and acceptance, all ROW and easement needs and ROW cost estimates for these needs. Specific activities and responsibilities are discussed in Exhibit 6 Article 8 (Right-of-Way).

As part of the Predevelopment Work, the Phase Developer shall undertake the preliminary activities necessary to advance the ROW acquisition process to the fullest extent allowable by law including coordinating with MDOT to obtain right-of-entry to properties for surveys, environmental testing, appraisals or other activities. During the NEPA work performed by MDOT, property owners were provided with notice of need to access property for non-invasive work, per Maryland law. If invasive work was needed, a right-of-entry ("ROE") agreement was obtained where possible. A listing of these properties, notices and ROE agreements is included in the Reference Information Documents. It is the Phase Developer's obligation to identify any additional access needed, however, MDOT will remain the point of contact with any property owner to obtain a ROE. Preliminary ROW activities may also include the development of Plans and discussions with property owners. The Phase Developer's obligation for obtaining ROW includes all ROW necessary to construct all Section Work.

As part of the Predevelopment Work, MDOT and the Phase Developer shall work collaboratively to identify the MDOT-Provided Parcels required for the relevant Section and the dates upon which MDOT shall be obliged under the Section P3 Agreement to provide access to each MDOT-Provided Parcel.

As the design is prepared, the Phase Developer shall present MDOT with its preferred ROW strategy and discuss various potential adjustments to the design or alternate construction techniques to avoid or minimize additional ROW acquisitions. The ROW strategy discussion shall address the associated risk and impacts on costs and schedule resulting from acquisition versus minimization or avoidance.

Prior to the Phase Developer establishing the Design-Build Price for a Section, the Phase Developer shall provide MDOT with the estimated cost, estimated schedule and any associated time or cost risk for the property acquisition needed for the Section. The Phase Developer shall provide the cost estimate, estimated schedule and any time or cost risk information on an individual parcel or property interest basis together with an overall summary for all property acquisitions. The Phase Developer shall indicate for any property what steps it has taken or will take to acquire the property and why and if the Phase Developer anticipates MDOT may need to invoke the use of eminent domain proceedings. For any properties that may require the use of eminent domain proceedings, MDOT and the Phase Developer shall agree to a Condemnation Process Schedule (as defined in Exhibit 6 Article 8 (Right-of-Way) Section 8.6.2.4 (Condemnation Support)) any time or cost risks associated with the acquisition of such properties.

Prior to the acceptance of the Committed Section Proposal, MDOT and the Phase Developer shall agree to an amount that the Section Developer shall place in escrow for payment of MDOT's internal and external costs to conduct the eminent domain proceedings related to that Section (the "Additional Properties Costs Amount"). Upon Financial Close of the relevant Section, the Section Developer shall fund an escrow account to be held by MDOT and deposit the Additional Properties Costs Amount into the escrow account (the "Additional Properties Costs Escrow Account"). Any funds remaining in the Additional Properties Costs Escrow Account after all property acquisition relating to that Section has been completed and MDOT has been reimbursed for all costs incurred conducting eminent domain proceedings for the relevant Section shall be shared between MDOT and the relevant Section Developer (with the respective share of MDOT and the Section developer to be agreed during the Predevelopment Work).

The Phase Developer shall prepare the initial ROW Acquisition Schedule as a Predevelopment Work Activity as discussed in Exhibit 6 Article 8 (Right-of-Way) Section 8.5.3 (Schedule and Review Procedures). The Phase Developer shall include in the ROW Acquisition Schedule and the Section Schedule the time needed to complete all property acquisition, including

condemnation proceedings if anticipated. The ROW Acquisition Schedule and Section Schedule must include sufficient time for review and acceptance by MDOT of all relevant submittals, including the requirement for multiple submissions, if needed. The Section Schedule must also include adequate time for all D&C and O&M activities related to ROW.

1.12 Utility Work

The Phase Developer is responsible for identifying Utility Work that will need to be performed to deliver the Phase, including design, construction and coordination. Specific requirements for Utility Work are in Exhibit 6 Article 7 (Utility Coordination).

MDOT will strive to enter into agreements with certain Utility Owners for the P3 Program or the Phase as applicable (the "Utility Framework Agreements") prior to the Effective Date of the Phase P3 Agreement. The Utility Framework Agreements set out a general approach to Utility Relocations. It is expected that additional agreements will need to be entered into with some or all of the Utility Owner setting out details of the relevant utility relocation work (each a "Utility Agreement") either to supplement the Utility Framework Agreement with additional detail or because no Utility Framework Agreements is entered into. The Phase Developer shall, assist MDOT in completing the negotiations to allow MDOT to execute a Utility Agreement with a majority of the affected Utility Owners prior to the Phase Developer establishing the Design-Build Price. At a minimum, the Phase Developer shall work with MDOT to complete Utility Agreements with WSSC, PEPCO, Washington Gas, Verizon, Century Link, Fiberlight, Crown Castle, AT&T, Zayo and City of Rockville DPW.

1.12.1 Utility Design

The Phase Developer shall engage with Utility Owners as necessary to obtain additional Utility information needed for the Predevelopment Work. Additional Utility information may involve identification and tracking of potential impacts, and the design and coordination of any unavoidable Utility impacts.

The Phase Developer shall obtain all required information sufficient to:

- (a) identify all potential impacts associated with the Section Work;
- (b) eliminate, minimize, mitigate or manage risk of potential Unknown Utilities or unforeseen field conditions that may impact schedule or cost; and
- (c) submit a compliant Committed Section Proposal.

If the Phase Developer uses data provided with the Reference Information Documents, the Phase Developer shall verify it is applicable for its intended use and perform additional data acquisition as needed. The Phase Developer shall alert MDOT if errors or discrepancies are discovered in the MDOT provided Reference Information Documents. Specific activities and responsibilities are discussed in Exhibit 6 Article 7 (Utility Coordination).

The Phase Developer shall develop in the Conceptual Design approaches for addressing impacted Utilities demonstrating avoidance, impact minimization, protection in place or relocation of Utilities as required. As the design advances, the Phase Developer shall:

- (a) obtain additional field data such as test pits or potholes to locate utilities;

- (b) adjust the design to further avoid and minimize impacts based on any new data;
- (c) meet and collaborate with the Utility Owner and MDOT; and
- (d) perform ongoing coordination with Utility Owners to ensure the Section Work is not adversely impacted or delayed.

The Phase Developer shall report to MDOT on the status of the acquisition of additional data and coordination activities as the Work progresses.

The Phase Developer shall, at a minimum, focus the Conceptual Design effort on Utilities with the highest risk and potential for cost and schedule impact to the Work including those Utilities owned and operated by WSSC, PEPCO, Washington Gas, Verizon, Century Link, Fiberlight, Crown Castle, AT&T, Zayo and the City of Rockville DPW. The Phase Developer shall conduct a review of the Conceptual Design with MDOT and the Utility Owners and obtain written confirmation the Conceptual Design is acceptable to MDOT and the Utility Owners.

The Phase Developer shall include in the Predevelopment Work Schedule and the Section Schedule all Submittals to Utility Owners and required approvals. The Phase Developer shall provide sufficient time for review and approval, including the requirement for multiple submissions if needed. The Predevelopment Work Schedule and Section Schedule must also include adequate time for all D&C and O&M activities related to Utility Owners.

Prior to the Phase Developer establishing the Design-Build Price, the Phase Developer shall provide MDOT with:

- (a) any additional field data such as test pit records or pothole logs;
- (b) an updated Utility Adjustment Matrix with the status of each potentially impacted utility;
- (c) minutes of all meetings with Utility Owners; and
- (d) confirmation the Phase Developers design has been reviewed by and is acceptable to MDOT and the affected Utility Owners.

1.13 Field Work During the Predevelopment Work

Specific field activities which may be needed, and the corresponding responsibilities are discussed in Exhibit 6 Article 6 through Article 24.

The Phase Developer shall determine the appropriate level of additional data acquisition needed for the Predevelopment Work and for the Section Work. The Phase Developer shall obtain all required data to a level sufficient to identify all potential impacts associated with the Section Work; eliminate, minimize, mitigate or manage risk of potential unknown or unforeseen field conditions that may impact schedule or cost; and submit a compliant Committed Section Proposal. Report to MDOT on the status of the acquisition of additional data and coordination activities as the Work progresses. If the Phase Developer has difficulty obtaining access to a particular location needed for studies or data acquisition, MDOT will work with the Phase Developer on obtaining access or developing potential mitigation approaches. If the Phase Developer uses data provided with the Reference Information Documents, the Phase Developer shall verify it is applicable for its intended use and perform additional data acquisition as needed. The Phase Developer shall alert MDOT if errors or discrepancies are discovered in the MDOT provided Reference Information Documents.

The Phase Developer shall perform all field work required including:

- (a) geotechnical testing and analysis including additional soil borings, sampling, in-situ and laboratory testing, analysis and design as necessary;
- (b) field surveys required for topographical surveys, boring stakeout. Utility locations, ROW, or other data gathering purposes;
- (c) pavement testing including coring, sampling, in-situ testing or laboratory analysis;
- (d) inventory or condition assessments of existing Assets;
- (e) conducting noise studies;
- (f) performing traffic counts or conducting studies; and
- (g) other investigations as needed for the proper development of the Predevelopment Work and minimization and mitigation of risk to MDOT, MDTA, Governmental Entities, third parties, the Phase Developer and Section Developer.

1.14 Design

Specific design activities which may be needed or may need to be evaluated to prepare the Conceptual Design and reach a Committed Section Proposal are discussed in the Technical Provisions.

The Phase Developer shall prepare design to support the Predevelopment Work. Design shall be sufficient for the Phase Developer to confidently reduce risk associated with the Section Work, submit a Committed Section Proposal that is acceptable to MDOT, and reach Financial Close for each Section.

The Phase Developer's Conceptual Design shall also be sufficiently detailed to allow MDOT to understand all Section Work required, perform independent cost validation in accordance with Exhibit 6 Article 1 (Scope of Predevelopment Work) Section 1.20 (Section D&C Work Pricing) and Section 1.21 (Section O&M Work Pricing), and garner the necessary approvals needed to reach Financial Close for each Section. The Phase Developer acknowledges that a greater level of design detail may be needed for open book pricing versus that needed when soliciting competitive bids for Section Work.

Design shall include Plans, reports, studies and other documents needed to quantify and describe the Section Work. The Phase Developer shall prepare a Conceptual Design (as identified in Exhibit 6 Article 1 (Scope of Predevelopment Work) Section 1.3.6.2 (Data Sharing and Deliverables)) to support the Committed Section Proposal. Design documents shall be in a format which best conveys the presented information such as roll plots, individual Plan sheets, a narrative report or a combination thereof. Electronic drawing format shall follow MDOT standards. The Conceptual Design shall reflect requirements for Preliminary Section Design Activities included in this Exhibit as well as the following:

- (a) collection of background materials such as survey, subsurface information, or Asset inventories not already provided in the Reference Information Documents;
- (b) establishing alignments and profiles for roadways with an emphasis on elimination of Design Exceptions and Design Variances;

- (c) preliminary earthwork quantities;
- (d) preliminary drainage;
- (e) concept level stormwater management ("SWM");
- (f) pavement investigations;
- (g) type, size and location studies for all structures including foundations;
- (h) preliminary layouts for ITS equipment, Tolling Points (including entrances and exits to PMLs) and signing;
- (i) mapping of all known utilities showing where utility investigations have been conducted or are planned and any utilities where a risk remains;
- (j) identification of required modifications to interstate access as provided in the Interchange Access Point Approval ("IAPA") letter;
- (k) concept lighting including identification of power sources;
- (l) development of landscape and aesthetics guidelines;
- (m) temporary Traffic Control Plans ("TCP") showing the detail of the planned sequence of construction including:
 - (i) proposed work zone locations and a logical depiction of how the Section Work will advance from inception to completion;
 - (ii) planned roadway, shoulder, ramp, and lane closures, and the expected duration of each;
 - (iii) description of detours associated with each closure;
 - (iv) traffic analysis to support the proposed detour;
 - (v) roadway typical section requirements;
 - (vi) accommodations for pedestrian and bike traffic including provisions for meeting American Disability Act Accessibility Guidelines;
 - (vii) access and coordination with transit systems;
 - (viii) coordination with first responders;
 - (ix) business and local/adjacent property owner access; and
 - (x) construction vehicle access, staging areas and haul routes;
- (n) locations of any new or modified traffic and pedestrian/bike signals;
- (o) identification and mapping of the LOD showing any changes required from the LOD included with the ROD;

- (p) a listing of properties where additional environmental assessments have or will occur including any properties where the status of environmental risk remains unknown;
- (q) ROW boundaries showing the ROW needs for the Section Work; and
- (r) A depiction of portions of the Work such as Utilities, Transit Service Improvements, railroads and other non-MDOT facilities.

The Reference Design was prepared by MDOT in support of the environmental approvals process and is included in the Reference Information Documents. If the Phase Developer's Conceptual Design requires construction of Elements outside the LOD as depicted in the Reference Design, it may require additional environmental evaluation under NEPA and other Applicable Laws and regulations. The process for preparation of an Environmental Summary/NEPA Re-evaluation is further discussed in Exhibit 6 Article 5 (Environmental Management).

1.15 Section Technical Provisions and Section Technical Proposal

- (a) MDOT will prepare Section Technical Provisions for each Section P3 Agreement consistent with the Technical Provisions (Exhibit 6 Articles 2 through 27) and any agreed upon deviations between MDOT and the Phase Developer. The Section Developer will be required to perform all Section Work in accordance with the Section Technical Provisions.
- (b) During its performance of the Predevelopment Work, the Phase Developer will produce a set of technical proposals (to be included in its Committed Section Proposal) that set out (in accordance with the requirements of this Exhibit 6) the Section Developer's proposals ("the Section Technical Proposal") for how it intends to meet the requirements of the Section Technical Provisions. The Section Technical Proposal shall include the Conceptual Design and may include designs, Plans, drawings, layouts, specifications, standards, and other requirements or provisions as the Phase Developer may consider appropriate to deliver the Section and account for all relevant requirements set out in the Section Technical Provisions and in the Agreement, in a manner satisfactory to MDOT. The Section Technical Proposal must include commitments with respect to design, construction, operation, maintenance, tolling, Handback and any other work to be performed by the Section Developer. The Section P3 Agreement will require the Section Developer to perform the Section Work in accordance with the Section Technical Provisions and the Section Technical Proposal and in the event that the Section Technical Proposal does not meet the requirements of the Section Technical Provisions, the Section Developer will be required (at its own risk) to revise its Section Technical Proposal in whatever manner required to meet the requirements of the Section Technical Provisions.
- (c) The Phase Developer may propose deviations from these Technical Provisions for consideration by MDOT when MDOT is drafting the Section Technical Provisions. Deviations shall not provide a reduction in the minimum requirements presented in this Agreement, unless MDOT agrees in writing to a deviation. Deviations shall be submitted in writing subject to review and acceptance by MDOT following the process set forth in Exhibit 6 Article 2 (Technical Provisions) Section 2.2 (Standards, References and Specifications).
- (d) The Phase Developer acknowledges that certain elements of the Section Work may need to be designed or constructed in compliance with standards and requirements produced by other Governmental Entities or third parties and that any modification of those

standards and requirements will require the consent of those Governmental Entities or third parties.

1.16 Community and Workforce Engagement

1.16.1 Opportunity MDOT

MDOT has established "Opportunity MDOT" as a comprehensive, innovative program to empower its citizens for economic growth. The Phase Developer shall participate and cause the Section Developer to participate in Opportunity MDOT.

During the Predevelopment Work, the Phase Developer shall:

- (a) work with MDOT as well as Stakeholders, and community leaders to develop community benefit agreements for communities and counties that are affected by the P3 Program. Community benefit agreements will include:
 - (i) the Phase Developer's commitment to hire socially and economically disadvantaged individuals, integrate local trades and unions, and provide job training in the delivery of the Predevelopment Work;
 - (ii) measurement and reporting of employment goals for local socially and economically disadvantaged State citizens;
 - (iii) positive impacts to communities affected by the Work; and
 - (iv) community assistance with programmatic implementation, agreement execution, and impact and goal monitoring;
- (b) facilitate outreach for the expansion of opportunities and inclusion of local, small, minority, disadvantaged and veteran-owned business to participate in the Work and include training and utilization of businesses in professional activities and services such as Equity Investment, financial, business, legal, technology services, logistics, communications, advertising and marketing solutions;
- (c) identify, perform outreach and respond to the developmental and training needs of the State workforce that maximizes their opportunities for economic success and long term career development;
- (d) provide workforce development initiatives to facilitate the expansion of local, small, minority, disadvantaged, and veteran-owned business participation in the Work, through employment training opportunities, and utilization of business services, professional activities and solution such as Equity Investment; financial, business, legal, technology services; logistics, communications, advertising and marketing solutions; and
- (e) facilitate and attend engagement activities, meetings, and events to identify and respond to the developmental and training needs of the State workforce that maximize opportunities for economic success.

1.16.2 Disadvantaged Business Enterprises

Without limiting Section 19.9 (Disadvantaged Business Enterprise) of the Agreement and the terms of the Section P3 Agreement, the Phase Developer is required to develop and execute policies, programs and activities that will:

- (a) remove barriers to the participation of DBEs in the contracting process at all tiers;
- (b) ensure that only MDOT certified DBE firms participate in the DBE program;
- (c) monitor all subcontractors to ensure that DBE participation credit is awarded for work, services or supplies provided by DBE firms only;
- (d) oversee all subcontractors to ensure DBE firms receive timely and prompt payments and report all DBE firm payments;
- (e) ensure compliance with all DBE requirements;
- (f) provide support in the development and implementation of programs to assist DBE firms to successfully compete in the marketplace outside of the DBE program;
- (g) ensure that all subcontractors receive technical assistance with regards to reporting DBE payments;
- (h) manage emerging risks associated with delivering a DBE program, including ensuring DBE firms are performing a commercially useful function;
- (i) ensure that all Good Faith Efforts that are used to achieve the DBE participation goals are documented;
- (j) provide monthly DBE contracting updates to the DBE community to ensure that the DBE community is informed about upcoming opportunities on the Phase;
- (k) maintain records of DBE participation and labor participation for review and accountability; and
- (l) ensure that, at a minimum, monthly meetings are conducted with MDOT to discuss all issues, concerns, and success regarding DBE participation activities during the Term and until Substantial Completion of each Section P3 Agreement.

1.16.3 Equal Employment Opportunity

Without limiting the requirements of Exhibit 16 (Federal and State Requirements) of the Agreement, or the terms of the Section P3 Agreement, the Phase Developer is required to develop and execute policies, programs and activities that will:

- (a) inform and educate all subcontractors of equal employment opportunity (“EEO”) requirements;
- (b) implement a strong EEO policy that is embraced at all levels of the organization, including executive leadership;
- (c) provide EEO and diversity training to all subcontractor’s managers, supervisors and employees on its contents;

- (d) provide enforcement of the EEO program within the organization and all subcontractors;
- (e) promote an inclusive culture in the workplace by fostering an environment of professionalism and respect for personal differences;
- (f) foster open communication and early Dispute resolution to minimize misunderstandings escalating into legally actionable EEO problems. An alternative Dispute-resolution program can help resolve EEO problems without the acrimony associated with an adversarial process;
- (g) establish neutral and objective hiring criteria to avoid subjective employment decisions based on personal stereotypes or hidden biases;
- (h) recruit, hire, and promote with EEO principles in mind, by implementing practices designed to widen and diversify the pool of candidates considered for employment openings, including openings in upper level management;
- (i) monitor for EEO compliance by conducting self-analyses to determine whether current employment practices disadvantage people of color, treat them differently, or leave uncorrected the effects of historical discrimination in the company;
- (j) analyze the duties, functions, and competencies relevant to jobs. Then create objective, job-related qualification standards related to those duties, functions, and competencies. Make sure they are consistently applied when choosing among candidates;
- (k) ensure selection criteria's do not disproportionately exclude certain racial groups unless the criteria are valid predictors of successful job performance and meet the employer's business needs. For example, if educational requirements disproportionately exclude certain minority or racial groups, they may be illegal if not important for job performance or business needs;
- (l) make sure promotion criteria are made known, and that job openings are communicated to all eligible employees;
- (m) ensure nondiscrimination when using an outside agency for recruitment, by making sure the agency does not search for candidates of a particular race or color;
- (n) in relation to compensation practices and performance appraisal:
 - (i) monitor compensation practices and performance appraisal systems for patterns of potential discrimination;
 - (ii) ensure performance appraisals are based on employees' actual job performance;
 - (iii) ensure consistency in compensation so that comparable job performances receive comparable ratings regardless of the evaluator; and
 - (iv) ensure that appraisals are neither artificially low nor artificially high;
- (o) develop the potential of employees, supervisors, and managers with EEO in mind, by providing training and mentoring that provides workers of all backgrounds the opportunity, skill, experience, and information necessary to perform well, and to ascend to upper-level jobs. In addition, employees of all backgrounds should have equal access to workplace networks;

- (p) protect against retaliation by providing clear and credible assurances that if employees make complaints or provide information related to complaints, the employer will protect employees from retaliation and consistently follow through on this guarantee; and
- (q) adopt a strong anti-harassment policy, periodically train each employee on its contents, and vigorously follow and enforce it. The policy should include:
 - (i) a clear explanation of prohibited conduct, including examples;
 - (ii) clear assurance that employees who make complaints or provide information related to complaints will be protected against retaliation;
 - (iii) a clearly described complaint process that provides multiple, accessible avenues of complaint;
 - (iv) assurance that the employer will protect the confidentiality of harassment complaints to the extent possible;
 - (v) a complaint process that provides a prompt, thorough, and impartial investigation; and
 - (vi) assurance that the employer will take immediate and appropriate corrective action when it determines that harassment has occurred.

1.16.4 On the Job Training

Without limiting Exhibit 16 (Federal and State Requirement) of the Agreement and the terms of the Section P3 Agreement, and to the extent applicable, the Phase Developer is required to develop and execute policies, programs and activities that will:

- (a) implement an on the job training management team and a structure to ensure that the on the job training program is strategically planned and implemented and adequately staffed;
- (b) create on the job training teams including an inexperienced employee, an experienced employee, and a supervisor/third party;
- (c) establish learning outcomes and ensure employee awareness, buy-in and commitment to the program;
- (d) ensure that training opportunities are provided in a non-discriminatory manner;
- (e) ensure procedures are in place to meet the training goal and monitor and evaluate efforts to meet the training goal;
- (f) conduct periodic process reviews and evaluations to identify areas where process improvements and changes are needed; and
- (g) collect data on participants and submit the data to MDOT during the established timeframe at agreed intervals.

1.16.5 Workforce Development

To the extent applicable, the Phase Developer is required to develop and execute policies, programs, and activities that will:

- (a) implement a workforce development program;
- (b) take the necessary measures to raise awareness about the workforce development program, including:
 - (i) partnering with MDOT to utilize, promote and guide job seekers to the dedicated informational landing page for the program where job seekers can enroll directly from the Site; and
 - (ii) sending email announcements to potential job seekers or other Stakeholders;
- (c) print and post print materials in high-traffic areas, and host informational webinars to increase overall awareness;
- (d) prompt word-of-mouth exchanges to increase momentum;
- (e) utilize word of mouth, posting print content, email campaigns, social media, and press releases to announce the workforce development program to the various ethnic communities;
- (f) emphasize ongoing learner support to generate continued enrolment in the program by displaying to job seekers that the Phase Developer is dedicated to job seeker success;
- (g) celebrate the success of learners who complete the program by sharing the success of graduates on social media platforms and announcing graduates via internal messages; and
- (h) collecting and submitting weekly certified payrolls for all subcontractors using trade services (including laborers, carpenters, and electricians).

1.17 Transit Service Improvements

The Phase Developer shall work with MDOT to develop the Transit Service Improvements and ensure they are delivered under the relevant Section P3 Agreements in accordance with each Transit MOU.

The Phase Developer shall ensure that each relevant Section Developer is responsible for funding the capital costs of the Transit Service Improvements.

1.18 Operations & Maintenance, Handback

1.18.1 Activities during Predevelopment

Specific O&M and Handback Work activities which may be needed or may need to be evaluated to reach a Committed Section Proposal and the corresponding responsibilities for these activities are discussed in the Technical Provisions. Together with MDOT, and subject to MDOT's review

and acceptance, the Phase Developer shall determine which of these activities and responsibilities are part of the Predevelopment Work and which are part of the Section Work.

The Phase Developer shall develop a Plan for O&M and Handback Work to support the Predevelopment Work in a sufficient manner for the Phase Developer to confidently reduce risk associated with the Section Work, submit a Committed Section Proposal that is acceptable to MDOT, and reach Financial Close for each Section.

The O&M and Handback Work Plan must also be sufficiently detailed to allow MDOT to perform independent cost validation and garner the necessary acceptances needed to reach Financial Close for each Section.

At a minimum, the Phase Developer shall perform the following:

- (a) develop an Asset O&M Responsibility Matrix and confirm with MDOT (and MDTA as appropriate);
- (b) perform an existing Asset condition assessment for Assets the Section Developer will be responsible for maintaining during the D&C Period. Identify the condition of Assets MDOT will hand over to the Section Developer. Confirm Asset condition with MDOT;
- (c) develop O&M Limit Drawings for D&C Period and draft O&M Limits for Operating Period;
- (d) confirm calibration of noncompliance table with point values;
- (e) provide a draft O&M Plan for D&C Period and agreed upon with MDOT;
- (f) provide draft protocols for Incident Management and snow and ice control;
- (g) collaborate with MDOT with respect to MDOT's preparation of the Section Technical Provisions;
- (h) perform pre-construction video(s) to capture existing condition of Assets;
- (i) confirm design and Residual Life table;
- (j) provide a draft of planned Renewal Work and Handback activities; and
- (k) confirm the location the of Phase Developer's maintenance and operations center and confirm MDOT space requirements in said facility.

1.18.2 O&M Limit Drawings

The Phase Developer shall prepare and submit O&M Limit Drawings, subject to review and acceptance by MDOT, showing the delineation of the portions of the Phase to be operated and maintained by each Section Developer and any other entity.

The O&M Limit Drawings must identify differences in limits between the D&C Period and the Operating Period for each Section, if applicable.

1.19 Tolling

The Phase Developer is responsible for all tolling Work needed to deliver the Phase (other than those functions being retained by MDTA under the Section P3 Agreement and Tolling Services Agreement ("TSA")), including design, construction, coordination and providing a Toll Systems Integrator and Toll Systems Operator. Specific requirements for tolling Work are in the Technical Provisions.

Develop an approach to tolling for the Work and include it in the Conceptual Design for review by MDOT and MDTA. Included with the Conceptual Design shall be:

- (a) the draft Concept of Operations ("ConOps") for the tolling system;
- (b) additional internal business rules to be used for tolling operations; and
- (c) the Phase Developer's Plan for providing image review and consolidated Toll Transactions and Trip data to MDTA.

The Phase Developer shall include in the Section Schedule all MDTA approvals of the tolling system, including design submissions, construction submissions, integration and testing. Provide sufficient time for review and approval, including the requirement for multiple submissions if needed.

1.20 Section D&C Work Pricing

1.20.1 D&C Price and Price Reasonableness

The Phase Developer and MDOT shall collaborate in accordance with this Exhibit 6 Article 1 (Scope of Predevelopment Work) Section 1.20 (Section D&C Work Pricing) to agree to a firm, fixed price for the Section D&C Work for each Section (the "Design-Build Price").

The Parties acknowledge that, in accordance with 23 CFR 636.119, MDOT must make a determination as to price reasonableness of the Design-Build Price.

1.20.2 The D&C Costing Model

The Phase Developer and MDOT will develop and agree to a D&C Costing Model that accounts for all elements, risks and assumptions (including the schedule for performance of the Section D&C Work for each Section) associated with the Section D&C Work for each Section (in its final form, the "D&C Costing Model").

The Phase Developer shall develop the D&C Costing Model in collaboration with MDOT (and MDTA, where applicable). The D&C Costing Model will be based on mutually agreed upon methodology to facilitate Design-Build Price validation and Open Book Basis discussions within an agreed-upon schedule. The D&C Costing Model will be used to develop the Design-Build Price by the Phase Developer regardless if the Work will be self-performed, subcontracted with competitive pricing, or competitively solicited. The Phase Developer shall initiate the collaborative process to discuss methodology within 10 Business Days of the Effective Date.

The Phase Developer shall continually update and refine the D&C Costing Model in collaboration with MDOT as the scope of the Section Work and its design is progressed. The final D&C Costing Model for each Section will:

- (a) be based on mutually agreed risk evaluation, mitigation, and management assessment;
- (b) be based on the agreed terms and conditions of the Section P3 Agreement;
- (c) include a separate line item for the D&C General Conditions Costs derived from the D&C General Conditions Cost Percentage;
- (d) include a separate line item for the Contractor Markup Costs derived from the Contractor Markup Percentage in the Phase Developer's Financial Proposal;
- (e) be based on a mutually agreed final scope of work, including appropriate Section boundaries, agreed to by MDOT;
- (f) be based on a construction schedule, design drawings and supporting information which are sufficiently detailed so that quantities, LOD, ROW, utility impacts, environmental resource impacts, constructability issues, risk and contingencies can be developed and assessed as needed for the Phase Developer to establish a Design-Build Price that can be developed and independently verified by MDOT;
- (g) be based on mutually agreed quantities, units of measurement, and price reconciliation, agreed to with MDOT;
- (h) be based on mutually agreed contingencies to establish budgets for items foreseen at the time of submitting a Committed Section Proposal but not detailed enough for inclusion in the Committed Section Proposal; and
- (i) include all assumptions underlying the D&C Costing Model.

Mutually agreed contingencies included in the D&C Costing Model must not be used to adjust the D&C General Conditions Cost Percentage or the proposed Contractor Markup Percentage.

The Phase Developer shall submit to MDOT all books, records, documents, Plans, specifications, subcontractor quotes, and other data and information reasonably requested by MDOT at agreed upon timeframes to support the D&C Costing Model as it is developed. Any information provided by the Phase Developer or any subcontractor on machine-readable media must be provided in a format accessible and readable by MDOT.

1.20.3 D&C Independent Estimates

MDOT will use the D&C Costing Model to develop an independent estimate of the Design-Build Price (the "D&C Independent Estimate") that it may use as part of determining the price reasonableness of the Phase Developer's proposed Design-Build Price.

MDOT will not provide its D&C Independent Estimate or related information to the Phase Developer.

1.20.4 Agreement to Design-Build Price / Price Reasonableness Determination

The Phase Developer shall collaborate with MDOT in developing a proposed Design-Build Price, including to reconcile any differences with MDOT's D&C Independent Estimate so as to enable MDOT to make a price reasonableness determination and to enable MDOT and the Phase Developer to reach agreement on the Design-Build Price for each Section of the Phase by the relevant Predevelopment Milestone Deadline.

In developing its proposed Design-Build Price, the Phase Developer shall identify, for each line item of Work described in the D&C Costing Model, whether it will be self-performed, subcontracted with competitive pricing, or competitively solicited.

MDOT shall determine the price reasonableness of the Phase Developer's proposed Design-Build Price by reference to MDOT's D&C Independent Estimate together with:

- (a) open book pricing discussions under Exhibit 6 Article 1 (Scope of Predevelopment Work) Section 1.20.5 (Open Book Basis Discussions); and
- (b) where applicable, competitive market pricing through multiple subcontractor bids or competitive market solicitations under Exhibit 6 Article 1 (Scope of Predevelopment Work) Section 1.20.6 (Market Pricing).

1.20.5 Open Book Basis Discussions

The Phase Developer shall prepare and submit to MDOT its proposed Design-Build Price based on the D&C Costing Model, together with documentation supporting its Design-Build Price on an Open Book Basis, in each case as the D&C Costing Model is refined.

MDOT will review the Phase Developer's proposed pricing and supporting documentation as it develops relative to its own D&C Independent Estimate as it develops.

The Phase Developer shall comply with the following requirements with respect to Open Book Basis Pricing:

- (a) any pricing provided to MDOT on an Open Book Basis must be fair, reasonable and reflect commercial arm's length pricing;
- (b) pricing and supporting documentation must be consistent with industry practice and policies; and
- (c) pricing and supporting documentation must be based on a D&C approach complying with the Agreement.

MDOT and the Phase Developer will seek to agree upon a final Design-Build Price based on the Open Book Basis discussions.

If MDOT and the Phase Developer do not agree upon a final Design-Build Price based on the Open Book Basis discussions, MDOT may require the Phase Developer to obtain the final Design-Build Price for all or part of the Section Work through a competitive market pricing outlined in Exhibit 6 Article 1 (Scope of Predevelopment Work) Section 1.20.6 (Market Pricing).

1.20.6 Market Pricing

If:

- (a) Open Book Basis discussions are not utilized to determine the Design-Build Price for any portion of the Section Work; or
- (b) the Phase Developer and MDOT are unable to agree to a Design-Build Price,

then the Phase Developer shall obtain market pricing via multiple subcontractor bids or competitive solicitation.

Prior to obtaining market pricing, MDOT and the Phase Developer shall agree to:

- (a) the terms of the relevant D&C Contract; and
- (b) the terms and conditions that will apply to the market pricing process.

MDOT will have oversight over all competitive solicitations, which may include MDOT's applicable solicitation rules (and any applicable FHWA rules).

1.20.7 FHWA Concurrence

If MDOT issues a finding of price reasonableness following validation as contemplated in Exhibit 6 Article 1 (Scope of Predevelopment Work) Section 1.20.4 (Agreement to Design-Build Price / Price Reasonableness Determination) such finding will, to the extent required under federal regulations, be reviewed by FHWA for its concurrence.

1.21 Section O&M Work Pricing

1.21.1 O&M Costs

The Phase Developer and MDOT shall collaborate in accordance with this Exhibit 6 Article 1 (Scope of Predevelopment Work) Section 1.21 (Section O&M Work Pricing) to mutually agree on the costs of the Section O&M Work that are to be included in the Initial Base Case Financial Model for each Section (the modelled costs being "O&M Costs").

1.21.2 O&M Costing Model

The Phase Developer and MDOT will develop and agree to an O&M Costing Model accounting for all elements, risks and assumptions (including the schedule of planned and unforeseen maintenance, renewal and Handback Requirements) associated with the Section O&M Work for each Section (in its final form, the "O&M Costing Model").

The Phase Developer shall develop the O&M Costing Model in collaboration with MDOT. The O&M Costing Model will be based on mutually agreed upon methodology to facilitate O&M price validation and Open Book Basis discussions. The Phase Developer shall initiate the collaborative process to discuss methodology within 10 Business Days of the Effective Date.

The Phase Developer shall continually update and refine the O&M Costing Model as the scope of the Section Work and its design is progressed. The final O&M Costing Model will:

- (a) be based on a mutually agreed final scope of Section Work, including appropriate boundaries based on the O&M Limit Drawings agreed to with MDOT (and MDTA, where applicable);
- (b) include a separate line item for the Renewal Work General Conditions Costs derived from the Renewal Work General Conditions Cost Percentage in the Phase Developer's Financial Proposal;

- (c) be based on anticipated inventory of Assets to be maintained, anticipated work load related to those Assets, O&M activities and percentages to be self-performed and those that will be subcontracted, staffing Plan and fleet complement, assumptions for Routine Maintenance, non-routine maintenance and Emergency or unforeseen maintenance activities, Snow and Ice Control Plan, Incident Management Plan for operations, expected materials on hand, dedicated facilities (operations/maintenance center), renewal assumptions based on life cycle and Performance Measures and all assumptions effecting the cost of O&M which are sufficiently detailed so that benchmarking to similar facilities and similar performance based contracts can be evaluated by MDOT (and MDTA where applicable);
- (d) be based on mutually agreed contingencies to establish budgets for items foreseen at the time of submitting a Committed Section Proposal but not detailed enough for inclusion in the Committed Section Proposal; and
- (e) include all assumptions underlying the O&M Costing Model.

Mutually agreed contingencies included in the cost model may not be used to adjust the Renewal Work General Conditions Cost Percentage.

The Phase Developer shall submit to MDOT (and MDTA, where applicable) all books, records, documents, Plans, specifications, and other data and information reasonably requested by MDOT at agreed upon timeframes to support the O&M Costing Model as it is developed.

Any information provided by Phase Developer or any subcontractor on machine-readable media must be provided in a format accessible and readable by MDOT (and MDTA, where applicable).

1.21.3 O&M Independent Estimates

MDOT will use the O&M Costing Model to develop an independent estimate of the O&M Costs (the "O&M Independent Estimate").

MDOT will not provide its O&M Independent Estimate or related information to the Phase Developer.

1.21.4 Open Book Basis Discussions

The Phase Developer will prepare and submit to MDOT its proposed O&M Costs based on the O&M Costing Model, together with documentation supporting its O&M Costing Model on an Open Book Basis, in each case as the O&M Costing Model is refined.

MDOT will review the Phase Developer's proposed O&M Costs and supporting documentation as it develops relative to its own O&M Independent Estimate as it develops.

The O&M Costs shall be agreed following Open Book Basis discussions.

The Phase Developer shall comply with the following requirements with respect to Open Book Basis Pricing:

- (a) any pricing provided to MDOT on an Open Book Basis must be fair, reasonable and reflect commercial arm's length pricing;
- (b) is consistent with industry practice and policies; and

(c) is based on the O&M Plan complying with the Performance Measures

MDOT and the Phase Developer will seek to agree upon the final O&M Costs to be included in the Initial Base Case Financial Model based on the Open Book Basis discussions.

1.22 Financing Workstream

1.22.1 Financing Plan

The Phase Developer shall develop a Financing Plan for each Section and provide the following (or cause the Section Developer to provide the following) subject to review and acceptance by MDOT:

(a) Phase South A:

SUBMISSION	TIMING
Schedule of activities and approach to develop the Financing Plans to achieve Financial Close for each Section of Phase South A. Submission must include details as to the level of development for each component for each draft.	Within the first month of the Effective Date
Initial draft of the Financing Plan for each Section of Phase South A.	Within three months of the Effective Date
Updates to the draft Financing Plan for each Section of Phase South A including discussion of progress relative to the initial schedule.	Within three months of delivery of prior draft Financing Plan.
Further detailed refinements and updates to the draft Financing Plan for each Section of Phase South A	Starting three months prior to the Phase Developer's expected submission of a Committed Section Proposal for that Section and occurring until Commercial Close of that Section, submitted at least monthly with increased frequency required either as new information is available or as assumptions change. The Section Developer shall be responsible for updates following Commercial Close.

(b) Phase South B

SUBMISSION	TIMING
Schedule of activities and approach to develop the Financing Plans to achieve Financial Close for each Section of Phase South B. Submission must include details as	Within the first month of the Effective Date

SUBMISSION	TIMING
to the level of development for each component for each draft. ¹	
<p>An initial assessment, as referenced in the <u>Phase P3 Agreement Section 14 (Section Viability)</u>, of whether Phase South B is Financially Viable which:</p> <ul style="list-style-type: none"> a. may not include any Maryland Funding or local funding, whether received directly, via federal aid or otherwise; b. shall include the sequencing of individual Sections within Phase South B, relevant technical, cost and revenue inputs and a discussion of the key financial terms and assumptions and how they compare to those with recent, comparable transactions; and c. shall include a discussion of the challenges and opportunities relative to the development of Phase South B. 	Within three months following receipt of the ROD.
Initial draft of the Financing Plan for each Section of Phase South B.	Within one month of completing the initial financial viability analysis for Phase South B indicated in <u>Phase P3 Agreement Section 14 (Section Viability)</u>
Updates to the draft Financing Plan for each Section of Phase South B including discussion of progress relative to the initial schedule.	Within three months of delivery of prior draft Financing Plan
Further detailed refinements and updates to the draft Financing Plan for each Section of Phase South B	Starting three months prior to the Phase Developer's expected submission of a Committed Section Proposal for that Section and occurring until Commercial Close of that Section, submitted at least monthly with increased frequency required either as new information is available or as assumptions change. The Section Developer shall be responsible for updates following Commercial Close.

¹ Phase Developer shall note that any costs for work associated with this deliverable are to be applied against Allowed Costs for Phase South B, and may not be included in the breakdown of costs associated with the Phase P3 Agreement Section 14(b)(iii)

(c) Phase North:

SUBMISSION	TIMING
Schedule of activities and approach to develop the Financing Plan(s) to achieve Financial Close for each Section of Phase North.	Within one month following receipt of Phase North NTP
<p>An initial assessment, as referenced in the <u>Phase P3 Agreement Section 14 (Section Viability)</u>, of whether Phase North is Financially Viable which:</p> <p>a. may not include any Maryland Funding or local funding, whether received directly, via federal aid or otherwise;</p> <p>b. shall include the sequencing of individual Sections within Phase North, relevant technical, cost and revenue inputs and a discussion of the key financial terms and assumptions and how they compare to those with recent, comparable transactions; and</p> <p>c. shall include a discussion of the challenges and opportunities relative to the development of Phase North.</p>	<p>Within the earlier of:</p> <p>a. six months following Phase North NTP; or</p> <p>b. three months following completion of the initial traffic and revenue assessment of Phase North.</p>
Initial draft of the Financing Plan for each Section of Phase North.	Within three months following delivery of the Phase North initial feasibility assessment described in <u>Exhibit 6 Article 1 (Scope of Predevelopment Work) 1.22.1(b) (Phase North)</u> .
Updates to the draft Financing Plan for each Section of Phase North including discussion of progress relative to the initial schedule.	Within three months of delivery of prior draft Financing Plan
Further detailed refinements and updates to the draft Financing Plan for each Section of Phase North	Starting three months prior to the Phase Developer's expected submission of a Committed Section Proposal for that Section and occurring until Commercial Close of that Section, submitted at least monthly with increased frequency required either as new information is available or as assumptions change. The Section Developer shall be responsible for updates following Commercial Close.

1.22.2 Financing Plan Contents

The Phase Developer's Financing Plan must:

- (a) demonstrate that the applicable Section is financially feasible including submission of a financial model meeting the requirements of Exhibit 6 Article 1 (Scope of Predevelopment Work) Section 1.22.3 (Financial Model). The financial model shall show that there are sufficient Toll Revenues throughout the term of the Section P3 Agreement to finance the costs of the planned Section Work including appropriate contingencies for potential and unforeseen circumstances including Benchmark Interest Rate movements;
- (b) include a detailed discussion of the key financial terms and assumptions and how they compare to those with recent, comparable transactions;
- (c) include detailed discussion of the benefits of the Financing Plan to achieve the P3 Program goals;
- (d) not include any Maryland Funding or local funding, whether received directly, via federal aid or otherwise; and
- (e) meet all commitments provided with the Proposal.
- (f) under the Financing Plan:
 - (i) Sections of the Phase may be financed with private equity, private placements, bank debt, TIFIA, Private Activity Bonds, other types of debt or any combination; and
 - (ii) the Commonwealth of Virginia may provide funding pursuant to the Capital Beltway Accord.

1.22.3 Financial Model

The Phase Developer shall develop and submit as part of the Financing Plan (including any draft or update) a financial model that complies with the requirements set out in Exhibit 7 Section 1.6 (Initial Base Case Financial Model), subject to the conditions below.

Financial model deviations from the requirements set out in Exhibit 7 Section 1.6 (Initial Base Case Financial Model) must be:

- (a) only related to a lack of available inputs;
- (b) include reasonable assumptions as approximations for unavailable inputs;
- (c) any approximations of Allowed Costs are mutually agreed between MDOT and the Phase Developer and consistent with the Predevelopment Cost Cap; and
- (d) explicitly noted as deviations and indicated as to the basis of the assumption in the Assumptions Book.

The Phase Developer shall provide an updated financial model reflecting the most recent revenue, costs and other assumptions upon request from MDOT.

The Phase Developer shall make reasonable updates to the financial model upon request of MDOT to add functionality, calculations or outputs which MDOT finds beneficial, but that do not alter the underlying structural fundamentals of the Financing Plan, except as reserved in this Exhibit 6 Article 1 (Scope of Predevelopment Work) Section 1.22 (Financing Workstream).

1.22.4 Credit Rating

The Phase Developer shall develop a credit rating work Plan that details the process to obtain at least one indicative investment grade credit rating for each Section in accordance with this Exhibit 6 Article 1 (Scope of Predevelopment Work) Section 1.22.4 (Credit Rating).

The Phase Developer shall contract with at least one credit Rating Agency to obtain a preliminary or indicative investment grade credit rating to support the Phase Developer's Financing Plan for the relevant Section.

The debt service profile(s) submitted for the indicative rating shall represent the Phase Developer's work to maximize the Upfront Payment, utilizing assumptions for debt term sheets that are consistent with similar transactions and the then current status of the capital markets (e.g., debt service coverage ratios, interest rates, credit spreads, etc.). MDOT reserves the right to request additional rating scenarios for alternative finance structures if the proposed structure included in the Financing Plan is inconsistent with relevant precedent transactions.

The debt service profile(s) and all other documentation to be provided to rating agencies shall be provided to MDOT in advance within a reasonable timeframe for MDOT to review, and MDOT shall be copied simultaneously on all correspondence to rating agencies.

1.22.5 TIFIA Financing

The Phase Developer shall develop a TIFIA financing work Plan that details the process for engaging and securing TIFIA financing with the Build America Bureau in accordance with this Exhibit 6 Article 1 (Scope of Predevelopment Work) Section 1.22.5 (TIFIA Financing).

The Phase Developer shall complete all required steps in the TIFIA process for each Section, through to Financial Close, as specified in the Build America Bureau's Credit Programs Guide (<https://www.transportation.gov/buildamerica/financing/program-guide>.) Negotiate a draft TIFIA Loan Agreement that:

- (a) optimizes the TIFIA loan debt service profile to maximize the Upfront Payment;
- (b) allows for the timely completion and closing of the TIFIA loan in line with required milestones; and
- (c) includes terms consistent with, or more favorable than, precedent TIFIA loan agreements for similar projects.

MDOT may, at its own discretion, participate in all meetings with the Build America Bureau. All information submitted to the Build America Bureau shall be provided to MDOT in advance within a reasonable timeframe for MDOT to review, and MDOT shall be copied simultaneously on all correspondence to the Build America Bureau.

1.22.6 Non-TIFIA Debt Competition

The Phase Developer shall develop a non-TIFIA debt competition work Plan that details the process to undertake and complete a competition for any non-TIFIA debt instrument(s) included in the relevant Financing Plan in accordance with this Exhibit 6 Article 1 (Scope of Predevelopment Work) Section 1.22.6 (Non-TIFIA Debt Competition).

The Phase Developer shall undertake a competitive process for any non-TIFIA debt it intends to include in its financing for each Section. The work the Phase Developer will undertake will:

- (a) include a competitive process to select the non-TIFIA debt provider(s);
- (b) be reasonably likely, in MDOT's opinion, to result in the selection of debt providers that will provide the most favorable pricing for the non-TIFIA debt instrument(s);
- (c) minimize any non-TIFIA debt provider fees;
- (d) select debt providers that can achieve financial close in line with required milestones; and
- (e) be shared with MDOT in advance within a reasonable timeframe for MDOT to review.

MDOT may, at its own discretion, participate in the competitive selection process. Such participation may include an express approval of the Phase Developer's selection documents, participation as a member of the observation of evaluation team process and final acceptance of the Phase Developer's selection recommendation.

1.22.7 Equity Commitments

The Phase Developer shall develop an equity commitments work Plan that details the process to secure all equity commitments required to meet the total equity contributions of the Financing Plan for each Section.

1.23 Traffic and Revenue

1.23.1 Traffic and Revenue Forecasts

The Phase Developer shall develop traffic and revenue forecasts (including equity and Lenders' case) for the Phase and each Section, subject to review and acceptance by MDOT. Prior to commencing the development of the traffic and revenue projections, the Phase Developer shall prepare a Plan setting out its proposed approach to such work subject to review and acceptance by MDOT. The Plan must include the traffic and revenue assumptions.

The Phase Developer shall produce a study of traffic and revenue for each Section that incorporates appropriate program-level assumptions, including the use of Toll Rates within the approved MDTA Toll Rate ranges for the P3 Program.

The study scope and technical approach should be reflective of industry standards, be of sufficient detail and use reasonable assumptions to support the traffic and revenue forecast for each Section. The Phase Developer shall demonstrate the reasonableness of the assumptions and how they compare with relevant precedent transactions. The study results must include, at a minimum, a forecast for the length of the concession by Section of annual Trips and revenue

by payment type and vehicle class, HOV traffic, and a schematic of the assumed access points and locations of Tolling Points. The study results must also include average weekday traffic and revenue results by time period and Tolling Point for a projected schedule of average per mile Toll Rates, including a breakout of paying and free traffic as applicable. Annual traffic and revenue forecasts must be provided for the assumed opening year, excluding and including any ramp-up impacts, at least one intermediate year, and the outer modeling year.

The Phase Developer shall make the results described in the previous paragraph available to MDOT together with the list of assumptions and a report documenting the supporting calculations, assumptions, backup materials, and any underlying studies and data that had been used to develop the traffic and revenue study.

1.23.2 Traffic and Revenue Report

The Phase Developer shall develop a traffic and revenue report for each Section subject to review and acceptance by MDOT that includes the report elements described in Exhibit 6 Article 1 (Scope of Predevelopment Work) Section 1.23.1 (Traffic and Revenue Forecasts).

The traffic and revenue report must be acceptable to rating agencies and, if applicable, the US Department of Transportation.

The traffic and revenue report must be acceptable to be included in an official statement to support Section financing.

The traffic and revenue report must be prepared by the same firm that prepared the traffic and revenue forecasts.

The traffic and revenue report must be submitted with the Committed Section Proposal.

1.23.3 Updates to the Traffic and Revenue Forecasts

The Phase Developer shall update the traffic and revenue forecasts for the Phase, subject to review and acceptance by MDOT when material changes to the base case assumptions occur, such as but not limited to Section expansions or timing, changes in access or egress locations, Tolling Points, Toll Rates or tolling policy changes, economic changes, or new regional transportation projects affecting travel demand in the Phase. The impacts of these changes should be documented, including submission of revised traffic and revenue forecasts for the term of the Section P3 Agreement subject to review and acceptance by MDOT.

ARTICLE 2. Technical Provisions

2.1 General Requirements

The Technical Provisions (Exhibit 6 Articles 2 through 27) are to be used as the basis for the Predevelopment Work. To the extent applicable, the Phase Developer shall perform the Predevelopment Work in accordance with the Technical Provisions.

To achieve the goals of the P3 Program, MDOT desires to enter into a cooperative and collaborative process with the Phase Developer as the Phase Developer prepares the Predevelopment Work. This collaborative process will extend to the Section Work with the Section Developer, following the completion of the Committed Section Proposal and Commercial Close of the relevant Section.

The Technical Provisions allocate responsibilities, actions, and obligations to the Phase Developer or Section Developer. Allocations have been made to the Phase Developer where it is assumed that the relevant responsibilities, actions, and obligations will arise as part of the Predevelopment Work or as part of both the Predevelopment Work and Section Work. Allocations have been made to the Section Developer where it is assumed that the relevant responsibilities, actions, and obligations will arise as part of the Section Work only. Irrespective of the allocation to the Phase Developer or the Section Developer, the Phase Developer shall perform the Predevelopment Work in accordance with the Technical Provisions (to the extent applicable to the Predevelopment Work) and the Section Developer shall perform the Section Work in accordance with the Section Technical Provisions.

All Elements of the Phase are to be designed, constructed, operated and maintained in compliance with the requirements of the Phase P3 Agreement. The completion of the Work requires obtaining and satisfying all commitments, permit obligations and approvals required, performing all Work in accordance with Good Industry Practice, review and acceptance by MDOT, other Governmental Entities, Utility Owners and third parties of the Phase Developer's Design Deliverables, management Plans, constructed works, and other related items. Collaboration, coordination and communication with MDOT, all third parties, and all Governmental Entities is necessary for the successful execution of the Work.

The Phase Developer may incorporate existing physical infrastructure in the design, construction, and reconstruction of the Assets, provided the Work meets the performance requirements of the Phase P3 Agreement. The Phase Developer is alerted that portions of I-495 and I-270 were built in in the 1950s and 1960s and since the original construction, the roadways have undergone numerous improvements and as such, not all Elements within the Phase meet current standards or are in acceptable condition. Any Element impacted by the Work wholly or in part, shall be reconstructed or rehabilitated by the Phase Developer so it meets current standards and to ensure a safe and acceptable condition at the end of the D&C Period. Elements within the Phase not impacted by the Work and not included within the O&M Limits, shall, at the end of the D&C period, have a minimum Residual Life as identified in Exhibit 6 Article 26 (Handback) Table 26-2 (Residual Life); as otherwise identified in these Technical Provisions; or an alternate approach as mutually determined with MDOT during Predevelopment Work. Reconstructed Elements with proper documentation of the reconstruction activities will be deemed to meet the Residual Life requirements. Rehabilitation or reconstruction will be required for any Element if the Section Developer cannot demonstrate to MDOT that the Residual Life criteria can be met for the existing Element in its current condition or if these Technical Provisions stipulate reconstruction or rehabilitation is otherwise required.

Any existing land, infrastructure, or other physical Assets to remain in place after such Work is completed which are disturbed, impacted, or damaged, during the Work, whether inside or outside the ROW, shall be repaired or otherwise restored to the original condition as soon as possible.

Work includes protection of MDOT's and third party Assets within and outside the ROW from all damages or impacts caused by the Work. Any such damage caused by the Work shall be repaired promptly by the Phase Developer or Section Developer.

A design of the Work was prepared by MDOT in support of the environmental approvals process. This design is provided for the Phase Developer's use (referred to as the "Reference Design") and is included in the Reference Information Documents. When using the data provided with the Reference Information Documents, verify it is applicable for the intended use and perform additional data acquisition as needed for the Work. Inform MDOT if errors or discrepancies are discovered in the MDOT-provided information.

The overall design is to take into consideration existing lane configurations, traffic flow patterns, grade separations, vertical and horizontal clearances, ROW, utilities, environmental features, and access points to provide for a functional and safe system of PMLs and GPLs. Design documents are to include all Work on the Phase and accommodate existing Assets to remain in place and Section Work constructed including any improvements to ramps and cross streets, as specified in the Agreement.

Portions of the Phase are in Maryland and portions are in Virginia. In using these Technical Provisions, references to requirements are to be construed to refer the pertinent jurisdiction for where the Element is located.

2.2 Standards, References, and Specifications

This Exhibit 6 outlines the process to be used by the Phase Developer when performing Predevelopment Work and creating the required standards and references for the Section Work as part of the Predevelopment Work. At a minimum, Work shall comply with Applicable Law. The Technical Provisions have been prepared reflecting the use of MDOT or VDOT standards, specifications policies and procedures. MDOT and VDOT standards, specifications policies and procedures also include standard MDOT SHA Special Provisions, Special Provision Inserts, standard details, VDOT Special Provisions, Copied Notes and similar documents. The Phase Developer is also advised that Work on Elements owned or maintained by local jurisdictions may also need to be designed and constructed to standards, specifications, policies and procedures issued by the local jurisdiction. The Phase Developer may propose to use alternate standards or specifications, subject to review and acceptance by MDOT. Any alternate standards, specifications policies or procedures proposed by the Phase Developer shall perform equal to or better than the pertinent MDOT or VDOT standards, specifications policies and procedures. A list of potential references, standards, codes and guidelines is included as Appendix B to this Exhibit 6. The list of documents is provided for the Phase Developer's convenience and is not to be considered comprehensive. As part of the Predevelopment Work, provide any alternate standards, specifications policies and procedures that the Phase Developer proposes are applied to the Work, subject to review and acceptance by MDOT.

All standards and references used for Section Work shall:

- be current versions of these documents as of the Setting Date for the pertinent Section; and
- meet the same requirements for equal or better if alternate standards are proposed.

The Section Technical Proposal shall identify the standard specifications to be used for the Work. When using standard specifications, the terms used in the standard specifications may need to be further clarified or revised to make the standard specifications align with the P3 Program. For example, if using the MDOT SHA Standard Specifications for Construction and Materials references to the contractor, the bidder, the engineer or the inspector would need modification for clarity to align with the P3 Program. Changes to the Section specifications as the Design Work advances shall be submitted and are subject to review and acceptance by MDOT. If using a state standard

specification as the basis of the Section specifications, provide a redline version to assist in the review.

In addition to the Section specifications, as the design advances, the Section Developer shall prepare additional supplemental specifications needed to define requirements for the Section Work or refine the selection and use of specific materials.

2.3 Agreements with Governmental Entities and Other Third Parties

MDOT has entered into memoranda of understanding or agreements and MOUs with various Governmental Entities and other Third Parties (such as Railroads, Utility Owners, etc.) regarding the Work. These agreements are provided in the Reference Information Documents. An understanding of the requirements of these agreements and MOUs as they pertain to the Work including requirements for design and construction standards which may be contained therein is a requirement of the Work. If additional Third Party facilities require relocation, or an additional Third Party is impacted by the Work, support shall be provided to MDOT in the negotiation of an agreement with the effected Third Party.

2.4 Coordination with Adjacent Projects

At all times, Phase activities shall be coordinated with any adjacent projects or work being conducted by MDOT, other Governmental Entities or third parties. Prepare a list of all adjacent projects and keep the list current for the duration of the Work. The List of adjacent projects shall be available for review by MDOT upon request. Other contractors or entities needing access to the Phase will be directed by MDOT to the Phase Developer to coordinate access.

2.5 Staffing

The Technical Provisions include requirements for various staff positions anticipated for the Work. lead engineers shall be provided for each major discipline required to complete the Design Work. The discipline lead oversees the development of design for his or her discipline and is in responsible charge of that aspect of the Design Work. The discipline lead may be the Engineer of Record for a portion of the design but is not required to be so. Discipline leads shall have the following qualifications:

- a minimum of 10 years' experience in design relating to their particular discipline;
- preferred experience with design-build delivery and large and complex highway and transportation projects;
- preferred experience with projects in Maryland; and
- a licensed engineer or architect (as applicable to the discipline) in the State of Maryland.

Discipline leads positions must be filled for the duration of the Section D&C Work; the Person holding such position is expected to be on-site in the Section Office as needed and be committed full time.

Engineers in responsible charge who are signing and sealing Design Deliverables or Construction Deliverables shall be a registered professional engineer in the state in which the Element or Elements are located.

In these Technical Provisions where the Phase Developer or the Section Developer is required to submit the qualifications for staff, the provisions of Section 19.1 (Key Personnel), Section 19.2

(Removal or Replacement of Phase Developer-Related Entity Personnel) and Section 19.3 (Key Participants) shall apply.

2.6 Independent Quality Firm

The Committed Section Proposal shall identify an Independent Quality Firm (“IQF”) who shall operate autonomously from production Work and monitor the Section Developer’s adherence to the requirements of the Section P3 Agreement and the Quality Management System. The responsibilities of the IQF include but are not limited to:

- ensuring and documenting that all Section Work is completed in compliance with the Section P3 Agreement;
- preparing, maintaining and updating the Quality Management System used for the Section Work;
- training Section personnel in the proper use of the Quality Management System;
- providing all staffing with the appropriate credentials as required to implement the Quality Management System;
- reviewing all Deliverables for completeness, intent of purpose and compliance with the requirements of the Section P3 Agreement;
- confirming all IQF comments, third party or Governmental Entity comments or MDOT audit findings on Submittals have been resolved and addressed;
- attending meetings to discuss quality, review and resolve comments on Deliverables and as needed or requested by MDOT;
- participating in Over-the-Shoulder design reviews;
- performing quality assurance of Design Work;
- performing quality acceptance testing during construction;
- attending and witnessing testing and verifications performed by the Section Developer or their subcontractors;
- preparing periodic reports on the performance of the quality program;
- maintaining quality records and allowing MDOT uninhibited access to those records;
- documenting any Nonconforming Work or Noncompliance Events including reporting on actions taken by the Section Developer to cure;
- observing the business operations of the Section Developer and its subcontractors to assess the accuracy of Books and Records;
- observing the compliance of the Section Developer with safety programs and procedures used for the Work and reporting to MDOT these observations; and
- providing notice to MDOT, including an opinion of a solution, if a provision of this Agreement is believed to be inconsistent, erroneous, creates a potentially unsafe condition, or is or becomes inconsistent with Good Industry Practice.

The Section Developer shall be responsible for quality control for Section D&C Work and Section O&M Work.

MDOT will perform quality verification testing and independent audits of the Work and FHWA may, at their discretion, do the same. Audits may be conducted on any aspect of the Work at any time and will be of a form and a frequency as determined by MDOT.

2.7 Design Submittals/Deliverables

It is the expectation of MDOT the Section Work will progress in a cooperative and collaborative manner such that all design will be shared and reviewed on a continual basis. Additionally, it is the desire of MDOT to have the Section Developer foster open communications and all Parties continually work together to meet the P3 Program goals and encourage and empower staff at all levels to continually seek opportunities to improve efficiency, while meeting the requirements of the Agreement.

All Deliverables for Section Work are to be submitted for review by the IQF and made available to MDOT prior to official submission, unless otherwise specified. Any Deliverable required for submission to MDOT for review or subject to review and acceptance by MDOT shall be reviewed by the IQF to verify the Deliverable meets the requirements of the Section P3 Agreement prior to the official submission to MDOT for MDOT to begin their review. With the official submission, include written confirmation of the review by the IQF including. Documentation of the IQF's review, review findings, and the resolution of the findings shall be included in the Section Developer's Quality Management System recordkeeping. All Deliverables are to be accurate, complete and in a form and level of detail satisfying the Section P3 Agreement. In addition to the electronic files required by the Technical Provisions, provide any documents in an acceptable or native format when requested by MDOT.

2.7.1 Over-the-Shoulder Reviews

Over-the-Shoulder reviews are informal collaborative reviews of design documents during the design development. Over-the-shoulder reviews are typically used for a more in-depth look at an Element or a portion of the Work. Over-the-Shoulder reviews shall be conducted as desired by MDOT, the IQF or the Section Developer. The content, duration of the review, and the format of review comments are to be set by mutual agreement.

2.7.2 Staged Design Deliverables

If not completed as part of the Predevelopment Work, the requirements for preliminary designs presented in these Technical Provisions shall be prepared as a Preliminary Section Design Activity and submitted for review.

If the Section Developer chooses to submit the design for review in stages as the design progresses, complete all Design Deliverables for the corresponding level of the submission and include all information and material required, including supporting information necessary for the IQF, MDOT, a Governmental Entity or a third party to conduct a review. For clarity, a Design Deliverable containing a portion or portions of an Element of Work may need to be accompanied by additional information depicting the entire Element or additional portions of the Section, so the Deliverable can be reviewed in context. Failure to provide necessary information to support the review may result in the Deliverable being returned for revision without review.

A Section may be further subdivided or staged for the convenience of submitting the design and facilitating construction. Further subdivisions or staging of the Design Deliverables are to follow a logical progression of the work. The Section Developer remains obligated to complete all Work necessary for a complete and functioning Section regardless of the choice to subdivide Section Design for the convenience of delivery.

If a Design Deliverable is provided for review and comment, which is inaccurate or incomplete, the IQF or MDOT may require revision to the Submittal to address the inaccuracies or to provide additional information, as needed, before the design can be advanced.

2.7.3 Final Design Deliverables

Independent of any staging of Design Deliverables, prepare Final Design Deliverable for review and comment when the design for a given Element, collection of Elements, or Section is 100% complete. The Final Design Deliverable shall include Plan sheets, specifications, technical memos, reports, studies, calculations, and other pertinent data, as applicable to completely convey the intent of the Submittal. Prior to making the submission of the Final Design Deliverable, address any comments resulting from any previous submissions.

2.7.4 Released for Construction Deliverables

After all comments from the Final Design Deliverable have been addressed and appropriately incorporated, submit Released for Construction Deliverables to the IQF for review and to MDOT for Information. Sign and seal all Release for Construction ("RFC") documents (Plans, reports, specifications, etc.) by the Engineer of Record responsible for that portion of the design. Provide RFC documents to the IQF and MDOT to allow sufficient time for confirmation by the IQF that the RFC Deliverable is complete prior to beginning construction of the corresponding Work. No Construction Work may be performed on any portion of the Section until the corresponding RFC Deliverables have been issued and accepted by the IQF.

2.7.5 Design Deliverable Submission Requirements

Transmit each Deliverable to MDOT using MDOT's EDMS. Accompany each Design Deliverable by a letter of transmittal including the date of the Deliverable, a description of documents submitted, a request for what action (if any) is expected by MDOT or other reviewers, and the desired date for completion of that action. Review comments, correspondence or other information regarding the Deliverable shall also be provided through the EDMS. A report of findings from any MDOT audit will be provided through the EDMS. If needed, MDOT will provide training to the Phase Developer's designee(s) on the use of MDOT's EDMS.

Design Deliverable descriptions are to be intuitive and include an identifier for the Section or Element; an identifier for the discipline involved in the Submittal; and the stage of design being submitted at a minimum. Each Plan sheet in the RFC Plan set is to have a unique file name and identifier.

Design files, calculations, reports, documentation, etc. as needed for the review and associated with the Deliverable are to be submitted in both their original file formats and in PDF format.

Deliverables for federal agencies, MDOT SHA divisions, other State agencies (such as the MDE or MDTA) or any other third parties shall be submitted to MDOT who will forward the Deliverable unless otherwise directed (refer also to Section 7.2 (MDOT SHA as MDTA's Agent)). Deliverables for review by a third party may be submitted directly to third parties if direct submission is deemed acceptable by MDOT. If a Deliverable is provided directly to a third party, a copy of the Deliverable shall be provided to MDOT at the same time the Deliverable is provided to the third party.

For each Deliverable the IQF shall provide a signed and dated certification in form and substance reasonably acceptable to MDOT that such Deliverable is complete, is suitable for the purpose for which it is submitted and meets the requirements of the Section P3 Agreement.

2.7.6 Review of Section Design Deliverables

The IQF shall review Deliverables for conformance with requirements of the Section P3 Agreement and the Quality System. The IQF shall provide the Section Developer with written comments on

the Deliverable, documenting compliance or non-compliance with the requirements. A copy of these comments shall be provided to MDOT. Comments shall be provided using a consistent format and clearly identify the Deliverable being reviewed.

A comment resolution meeting shall be held, if warranted. Prior to the comment resolution meeting, the Section Developer shall provide MDOT and the IQF with written responses to the comments. Following the meeting, responses shall be revised if needed based on the discussions at the resolution meeting. The IQF shall maintain the record of the final responses and confirm comments have been properly addressed in any subsequent issuance of the design.

MDOT, in its sole discretion, may choose to conduct an audit of any Design Deliverable at any time. The audit will review the Deliverable for compliance with requirements of the Section P3 Agreement and the Section Developer's Quality System. MDOT will provide the IQF with a written report of its audit findings. The IQF shall conduct a comment resolution meeting with MDOT and the Section Developer, if warranted. Prior to the comment resolution meeting, the IQF shall provide MDOT with written responses to the comments. Following the meeting, responses shall be revised if needed based on the discussions at the resolution meeting. The IQF shall maintain the record of the final responses and confirm comments have been properly addressed in any subsequent issuance of the Deliverable or a revised issuance of the Deliverable including revisions required for RFC documents. Comment resolution meetings for MDOT audits shall be conducted within 10 days of receipt of the report of audit findings or as mutually agreed.

2.8 Construction Deliverables

Prepare a listing of all anticipated Construction Deliverables prior to beginning Construction Work, including the sequence and schedule of such Deliverables for use in monitoring the Work. Provide MDOT with a copy for their information of each Construction Deliverable showing the Deliverable has been reviewed and approved by the IQF. Update the list monthly at a minimum or more frequently as the Work requires and provide updates to MDOT for information. MDOT may perform an audit of any Construction Deliverable at any time. Should MDOT determine the Work is advancing ahead of the IQF's approval of Construction Deliverables, the IQF or MDOT may, at their discretion, issue a notice to the Section Developer to stop work on the Element or Section until such time as the Construction Deliverables have been properly approved.

2.9 As-Built Drawings

Produce As-Built Drawings of the Work after completion. As-Built Drawings are to contain supporting reports documenting the location of the as-built alignments and profiles of each permanent Element of the Section built, installed, or relocated and survey control monument placement. Include descriptive statements for the survey methods used to determine the as-built location of the feature being surveyed, as well as the coordinate types (x, y, and z) and feature codes in the same format the preliminary construction data was generated in the supporting reports.

Include design certificates, design calculations, quality records, specifications, and punch lists in the As-Built Drawings and supporting documentation to constitute an organized, complete record of Plans and supporting design materials accurately representing and describing each Element as designed and constructed. Properly organize the As-Built Drawings, including an index of all Plans and documents. Separate the As-Built Drawings by feature and owner, so MDOT Retained Elements, third party maintained Elements, and Section Developer maintained Elements of the Section are included in separate reports and Plans.

Submit As-Built Drawings for the Section in accordance with MDOT's procedures. Furnish electronic copies in PDF and native format to the IQF and MDOT including:

- As-Built Drawings;
- signed and sealed as-built Bridge load ratings for any new or modified Bridge;
- any revised Final Design or construction documentation;
- notice of completion for all permits; and
- quality assurance/quality control records.

Submit As-Built Drawings as a composite set of Plans for the Section. Sign, seal and certify all documents by the Engineer of Record. The IQF shall review the As-Built Drawing Submittal and certify the Deliverable is complete, accurate, and all Work complies with the requirements of the Section P3 Agreement.

No later than 10 Business Days after the completion of the punch list for each Section, submit to MDOT a complete set of draft As-Built Drawings for the applicable Section. Prior to Final Completion, incorporate MDOT comments and make any amendments necessary to the draft As-Built Drawings and documentation, then submit the final As-Built Drawings and documentation subject to review and acceptance by MDOT. Ensure the As-Built Drawings and documentation reflect the actual, true, and accurate conditions of the constructed Work and incorporate all comments made by the IQF and MDOT.

2.10 Deliverables

Table 2-1 – General Technical Provision Submittals

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
Alternate standards, specifications, policies and procedures	As part of the Predevelopment Work or as a Preliminary Section Design Activity
Section specifications	As part of the Predevelopment Work or as a Preliminary Section Design Activity
Supplemental specifications	As needed
Preliminary Design Deliverables	As part of the Predevelopment Work or as a Preliminary Section Design Activity
Staged Design Deliverables	In accordance with the proposed schedule for the pertinent portion of the Work
Final Design	In accordance with the proposed schedule for the pertinent portion of the Work
RFC Design	In accordance with the proposed schedule for the pertinent portion of the Work
Over-the-Shoulder Reviews	As needed
Listing of Construction Deliverables	A minimum of 60 days prior to the start of construction on the first portion of the Work
Draft As-Built Drawings	10 Business Days after the completion of the punch list for the Section

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
Final As-Built Drawings	Prior to Final Completion

3.1 Section Management Plan

For each Section, a Section Management Plan ("SMP") shall be prepared to describe responsibilities for the administration and management of all Section Work. The SMP is to be updated as needed.

The SMP is an umbrella document describing managerial approaches, strategies, and quality procedures to design, build, operate, maintain and comply with the Handback Requirements at the end of the term of the Section P3 Agreement in order to achieve all requirements of the Phase P3 Agreement. The SMP is a collection of Section Plans referred to as "Sub- Plans." Each Sub-Plan is part of the SMP but is also a standalone Plan describing the management of components of the Section Work. If desired, the SMP and the Sub-Plans may be submitted as staged Deliverables.

Include a discussion of the approach to overall Section management and coordination of the Section Work. Discuss the coordination of design disciplines, construction trades and related entities, use of DBE firms to meet the DBE goal, and how the Section Developer will interact with MDOT and MDTA and all Stakeholders. Further, address how design, construction and O&M personnel will interact during the term of each Section P3 Agreement. Include details of the interface protocols and systems to be used, including document management, scheduling, reporting and meetings. The SMP is subject to review and acceptance by MDOT.

The SMP contains the following Sub-Plans:

- Administration Plan;
- Operations and Maintenance Plan;
- Quality Management Plan ("QMP");
- Change Management Plan;
- Public Outreach and Engagement Plan;
- Disaster Recovery Plan ("DRP");
- Safety Management Plan ("SaMP");
- Hazardous Materials Management Plan ("HMMP");
- TMP;
- Tolling Strategy Plan;
- Environmental Compliance Plan ("ECP");
- Utility Work Plan;
- Section DBE Participation Plan; and
- Handback Work Plan.

When updated, the SMP and Sub-Plans shall be submitted to MDOT for review. Each SMP update shall include a discussion of lessons learned and why changes were made to the document.

3.1.1 SMP Sub-Plans Required as a Condition Prior to Design Work

In addition to the SMP, the following SMP Sub-Plans shall be subject to review and acceptance by MDOT prior to commencement of any Section Design Work:

- Administration Plan;

- Document and Data Management Plan (“DDMP”);
- The QMP and Design Quality Management Plan (“DQMP”) as a component of the QMP;
- Change Management Plan;
- DRP;
- Utility Work Plan;
- ECP;
- HMMP;
- SaMP; and
- Section DBE Participation Plan

3.1.2 SMP Sub-Plans Required as a Condition Prior to Construction Work

The following SMP Sub-Plans shall be subject to review and acceptance by MDOT prior to commencement of any Section Construction Work:

- the Construction Quality Management Plan (“CQMP”) as a component of the QMP; and
- TMP

3.1.3 SMP and Sub-Plan Updates

Updates to the SMP and, as applicable, affected Sub-Plans shall be provided and shall be subject to review and acceptance by MDOT in the event of the following:

- changes to personnel, schedule, administration policies or procedures;
- events or occurrences which trigger SMP updates pursuant to the Phase P3 Agreement; or
- as otherwise directed by MDOT.

3.2 Administration Plan

3.2.1 Staffing

As part of the SMP and a component part of the Administration Plan, provide a description of proposed staffing describing roles and responsibilities, reporting lines, and authority of the Section Developer’s personnel. Include details on how the various firms and organizations within the Section Developer’s team will interact. Include in the staffing description, details of management structures and management systems to be used for design management, construction management, and O&M management.

Provide the following with the Committed Section Proposal:

- names of individuals proposed for the various significant roles in the Section Developer’s organization;
- the anticipated duration the position will be required for the Section Work;
- the planned location of the position (i.e. in the Section Office); and
- a statement from the Section Developer identifying the time commitment for each individual engaged in the Work.

3.2.2 Meetings

As part of the SMP describe and identify all necessary meetings required for the Work. Identify the anticipated attendees, meeting location, frequency of the meetings, and anticipated topics of discussion. For all meetings, provide agendas to all attendees a minimum of two days in advance of the meeting and minutes following the meeting, in accordance with the timing and format identified in the SMP. Sufficient Section Developer staff with the appropriate decision authority shall be in attendance at every meeting.

At a minimum, the meetings shall include:

- work initiation (kick-off) meeting;
- DBE usage and status meetings;
- design initiation meeting;
- design development meetings;
- comment review meetings;
- Utility meetings;
- ROW meetings;
- construction initiation meeting;
- safety meetings;
- construction hold point meetings;
- pre-activity meetings; and
- progress/partnering meetings.

3.2.3 Deliverables

The Administration Plan shall include a discussion of the planned approach to Deliverables submitted to MDOT and other Stakeholders. Deliverables shall meet the requirements identified in [Exhibit 6 Article 2 \(Technical Provisions\)](#) and the other relevant portions of this [Exhibit 6](#). Include in this discussion the use of the Governmental Approvals Plan prepared during the Predevelopment Work.

3.2.4 Monthly Progress Report

Submit to MDOT a Monthly Progress Report each month during the term of the Section P3 Agreement, beginning with the first full month after the Commercial Closing Date. Monthly Progress Reports shall be submitted within 10 Business Days following the prior month's end. One electronic copy of the entire Monthly Progress Report shall be submitted to MDOT.

The Monthly Progress Report is intended to document the work performed, work anticipated in the upcoming month, and alert MDOT to any issues encountered in the execution of the Work. The Monthly Progress Report shall contain photographs and a narrative, which shall include:

- a description of the overall progress of the Work;
- a schedule narrative discussing progress for major Elements of the Work relative to the planned schedule;
- a discussion of the status of any nonconforming Work including issues resolved;

- a listing of any Relief Events or Compensation Events identified or executed during the period and their status;
- an identification of Work activities planned for the upcoming month;
- an identification of problems and issues arising during the period and issues remaining to be resolved; summary of resolution of problems and issues raised in previous Monthly Progress Reports or resolved during the period;
- the status of Buy America;
- an identification of Critical Path issues and proposed resolutions;
- an inclusion of a monthly expenditure projection curve;
- the Section Developer's progress toward achieving the DBE goals;
- an identification of requested or required MDOT actions for the next month;
- an inclusion of digital progress photographs accurately depicting progress of the Work as outlined in the Monthly Progress Report narrative provided on the basis that MDOT is free to use the pictures as MDOT determines without restriction or cost to MDOT and that digital photographs shall be included and provided as separate files with logical file names for easy access; and
- the Monthly Schedule Update.

Make all corrections to the Monthly Progress Report, if requested by MDOT, and resubmit within 5 days. Provide written notice of disagreement to any MDOT comments within seven days from the receipt of MDOT comments.

3.2.5 Schedule

3.2.5.1 Section Schedule General Requirements

As part of the SMP and a component part of the Administration Plan, the Section Schedule shall be created and used for planning and monitoring the progress of the Section Work. The purpose of the Section Schedule is to ensure 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 Section Schedule shall also be used for coordinating the Work, identifying Work to be performed, evaluating changes, and as a tool for measuring and communicating progress.

The Baseline Schedule, the Revised Baseline Schedule, Monthly Schedule Updates, and Recovery Schedules are collectively referred to as the Section Schedules. All Section Schedules shall be in accordance with the following guidelines:

- be generated and developed in accordance with the guidance of "Part 7.2—Schedule Planning and Development" of the Association for the Advancement of Cost Engineering's ("AACE") Total Cost Management Framework and the associated Recommended Practices;
- apply the Critical Path Method of network calculation to generate the schedule (the Critical Path shall be based on the longest network path through the Work) and prepare the schedule using the Precedence Diagram Method to establish relationships and interdependencies between the individual activities required to complete the Work;
- specify the longest path for defining critical activities and care shall be taken to distinguish between the Critical Path and near-Critical Paths;

- be compatible with MDOT’s scheduling software (currently Primavera P6) and implement any new operating practices as a result of MDOT’s amendments to any such software, standards, and procedures throughout the life of the Section P3 Agreement;
- use scheduling software with the capability to import and export data in the Primavera Proprietary Exchange Format (“XER”);
- include a WBS, the development of which is based on a Deliverable-oriented methodology capturing all the Section activities and has each schedule activity mapped to one, and only one, of the WBS Elements;
- show Milestones or hold points;
- show planned phasing of all the Work;
- divide all Work into activities with appropriate logic ties to show overall approach to sequencing, including logical relationships between activities reflecting the actual intended sequence of work and logically tie all activities to avoid open ends;
- avoid imposed constraint dates to begin or complete any activity unless such dates are called for specifically in the Section P3 Agreement;
- only constrain activities of a Section Schedule representing any milestone schedule deadlines with a “start on or before” or “finish on or before” constraint;
- depict the required coordination with and Work to be performed by other subcontractors and design consultants, Utility Owners, Governmental Entities, engineers, architects, and Suppliers;
- identify Governmental Approvals required and the dates by which such approvals are necessary; and
- provide unique activity identification numbers consistent for every activity identification numbers with respect to textual descriptions and codes for all Section Schedules.

Each schedule activity shall have a detailed, concise description of the Section Work represented by the activity title. The activity identification numbers relating to a specific activity title or description shall remain unchanged and connected to the original activity title or description throughout the duration of the Section Work. Payment activity identification numbering should contain one or more characters uniquely identifying them as payment activities Any Section Schedule activity descriptions may only be changed to clarify scope.

All Section Schedules shall include a listing of all Section Submittals, including activity durations for MDOT or other Governmental Entity reviews, as required by the Phase P3 Agreement. All Section Schedules shall include allowance for major permits, other permits required for the design and for MDOT and third party processes, review processes, review and return of Deliverables, samples, and drawings. All Section Schedule Submittals shall use the default settings compatible with Primavera P6 version 7.1.

Activities shall be used in lieu of lags where an activity is appropriate, i.e., use a concrete curing activity in lieu of a 7-day or 28-day lag to achieve strength for a subsequent activity. If lag relationships are used or altered, they shall be identified explicitly in a narrative report. Avoid the use of non-typical relationships that cannot be shown to demonstrate a true dependency. Resource-driven and elective logic as well as relationships shall be specifically listed in the narrative report. Any added or deleted logic and relationships based on presumed resource dependency or other elective (i.e., nonphysical) restraints shall be identified with each schedule update, revision, or Submittal. Non-typical relationships may require explanation and delay the review and acceptance of the schedule. Use of relationships and lags to position an activity at certain dates shall not be permitted.

Float available in the schedule, at any time, shall not be considered for the exclusive use of either MDOT, for the Phase Developer or the Section Developer. During the Predevelopment Work and

the Section Work, any Float generated due to the efficiencies of any party is not for the sole use of the party generating the Float, rather it is a shared commodity to be reasonably used by each party. A Section Schedule showing Section Work completing in less time than the Final Completion and accepted by MDOT, shall be considered to have Float. Float shall be a resource available to MDOT, the Phase Developer and the Section Developer. Float sequestering techniques shall not be an acceptable practice. MDOT reserves its right to have the Phase Developer or the Section Developer demonstrate the calculation of its durations and costs based on quantities, resource-loading, and productivities.

All Section Schedules and accompanying report requirements shall be submitted subject to review and acceptance by MDOT. MDOT acceptance of any Section Schedule will not relieve the Section Developer from its responsibility to complete all Section Work within the Section Schedule. In addition, MDOT's acceptance of any Section Schedule creates neither a warranty, expressed or implied, nor an acknowledgment of the reasonableness of the activities, logic, durations, or cost-loading of the Section Schedule.

3.2.5.2 Section Schedule Submittals and Report Requirements

Include the following with the Section Schedule Submittal:

- a transmittal letter to MDOT identifying the Submittal date and the type of Section Schedule being submitted;
- a unique file name used to identify the Section, type of Section Schedule Submittal, number, item, and Data Date of the Submittal;
- the Section title and date;
- a legend which indicates symbols used and their meanings;
- a written narrative to include a list of the changes made to the schedule, why those changes were necessary, all potential delays and problems and their estimated effect on the Section Schedule and overall completion, an explanation of the WBS and all activity codes used, a description of Specialty Calendars used and whether the Section Work is on, ahead of, or behind schedule (note the written narrative does not satisfy the need for notification which may be required by the Phase P3 Agreement);
- a backup electronic copy of the Section Schedule in a XER file format as well as other required electronic file Submittals;
- a schedule calculation log;
- a time-scaled bar-chart plot of the Section Schedule in PDF file format legible and including the schedule organized by WBS showing each of these activities:
 - activity identification;
 - activity name;
 - original duration;
 - remaining duration;
 - start date;
 - finish date;
 - activity percent complete; and
 - total Float.

- an electronic file copy of the bar-chart plot clearly identifying the Critical Path of the Section Work; and
- tabular predecessor and successor report in PDF file format to show the predecessors and successors for each activity. The report shall be sorted by WBS and in ascending order by activity identification and shall show for each activity:
 - activity identification;
 - activity name;
 - original duration;
 - remaining duration;
 - early start;
 - early finish;
 - late start;
 - late finish;
 - free Float;
 - total Float;
 - critical (yes/no); and
 - for each predecessor/successor activity, show the activity identification, activity name, relationship type lag, free Float, total Float, driving (yes/no), and critical (yes/no).

3.2.5.3 Baseline Schedule

Prepare a Baseline Schedule from the schedule developed for the Committed Section Proposal. A separate Baseline Schedule is anticipated for each Section. The Baseline Schedule shall outline the proposed Plan to accomplish the Section Work, shall be in the same general format as the schedule developed for the Committed Section Proposal, and shall include:

- any specialty calendars;
- a complete WBS addressing 100 percent of the scope;
- codes for organizing activities such as "area" (location of Section Work), "responsibility" (MDOT, Phase Developer, Section Developer, subcontractor, third party, Utility, etc.) and "crew type";
- definable work packages requiring manpower, materials, and equipment to perform;
- detailed activities depicting the sequence and dates for any Section Work including applicable Milestones, reviews by MDOT, MDTA, FHWA, and other Governmental Entities as well as permits, design, ROW, utility Work and any other relevant activities;
- all major activities of the Section Work in sufficient detail to enable MDOT to monitor and evaluate design and construction; and
- cost-loading for each activity for which receipt of payment is expected assigned to a "material" resource type.

When applying cost-loading, a material resource shall be defined for each item, and each proposed material resource shall indicate the resource ID, resource name, unit of measure, and unit price. In addition, cost-loading shall include:

- marking the "auto compute actuals" and "calculate costs from units" boxes for each material resource; and

- defining the budgeted units and cost for each assigned resource to indicate the quantity and dollar value of Section Work the activity represents.

The aggregate sum of the budgeted costs for all activities shall equal the current total Design-Build Price. The current total Design-Build Price will be considered to mean the current amount, including the original Design-Build Price and any authorized changes to the Work. Anticipated payments or payments for adjustments such as asphalt, fuel, steel, retainage, incentives, disincentives, etc., shall not be included.

The schedule shall include a break down into work packages and Deliverables generally completed in not less than one day but no more than 20 days (unless such Deliverable is a procurement or other non-construction activity). No activity on the Critical Path shall have a duration greater than 20 days.

All calendars used in the Section Schedule shall be designated as a Section calendar by a unique naming system. At a minimum, the Baseline Schedule shall include standard calendar day and a Business Day calendars. Other Specialty Calendars (for weather-sensitive work, permit stream restrictions, etc.) may be used, if necessary, to Plan the Section Work. The Business Day calendar shall include restrictions preventing work as defined in the Phase P3 Agreement. Business Day restrictions include as a minimum weekend, holidays, day before and day after holidays, and an estimate of anticipated inclement weather days each month.

Activities that are temperature sensitive (e.g., placement of hot mix asphalt, concrete placement/curing, painting/staining, plantings, vegetation establishment, temporary/permanent roadway markings, etc.) shall be assigned to Specialty Calendars consistent with their calendar imposed and seasonal temperature restrictions for the regional location of the Section Work.

Resource-loading to indicate the labor (manpower), material (reusable materials), and equipment (machinery or equipment) required to accomplish each activity representing a major operation. The Baseline Schedule shall be resource-loaded per the following:

- labor resources using "labor" resource type as defined in the scheduling software shall be defined and assigned to indicate labor classification, trade, or crew performing the Work;
- material resources using "material" resource type as defined in the scheduling software shall be defined and assigned to indicate reusable material used to perform the Work;
- equipment resources using "non-labor" resource type as defined in the scheduling software shall be defined and assigned to indicate equipment or machinery used to perform the Work;
- maximum units and maximum time shall be defined for each resource type (labor, material, equipment) to establish the daily availability limits; and
- budgeted units shall be defined for each assignment to establish the total units of time required to perform the activity.

With the schedule, prepare a separate narrative report which generally describes the following:

- proposed methods of operation for designing and constructing the Work required by the Phase P3 Agreement;
- the general sequence of design and construction;
- the proposed Critical Path of the Section;
- milestones and key events such as start/finish dates for each major Element of the Work;
- the proposed overall sequence of Work, including where the Work shall begin and how the Work shall progress;
- a description of the Critical Path (based on the longest path);

- scheduling assumptions including, the proposed means and methods, anticipated daily production rates, and general procedures for accomplishing major operations expected to drive the Baseline Schedule;
- a log identifying any constraints used in the Baseline Schedule and any reason for using each constraint;
- resource Plan indicating the number of crews, crew make-up, and major equipment needed to accomplish the Work as planned. The resource Plan shall also describe Plans on meeting resource requirements;
- a log of the applicable DBE participation activities in the Baseline Schedule intended as claimed credit for attaining the DBE goals required in the Agreement. The list shall indicate the proposed start/finish dates and durations of the DBE participation activities; and
- any known or foreseeable issues that may impact the Baseline Schedule. Also, describe how the issues shall impact the Baseline Schedule and any actions taken or needed to avoid or mitigate the impact.

Submit a draft Baseline Schedule within 30 days of the Commercial Closing Date for the Section. Submit a final Baseline Schedule prior to the start of Construction Work. The Baseline Schedule is subject to review and acceptance by MDOT.

3.2.5.4 Revised Baseline Schedule

Baseline Schedule revisions may be made by written request. In such an event, submit a Revised Baseline Schedule subject to review and acceptance by MDOT. Once accepted, this Revised Baseline Schedule shall then become the Baseline Schedule.

Submit to MDOT a Revised Baseline Schedule within 14 days of any extensions of time or relief granted in response to a Relief Event under Article 16 (Relief Events) of the Agreement or any change orders that are agreed under Article 22 (Change Orders) of the Agreement. All approved Relief Events and Compensation Events shall be incorporated into the originally planned execution of the Section Work. MDOT will confirm in writing the acceptance of each Revised Baseline Schedule. The latest accepted Revised Baseline Schedule shall remain in force until a subsequent Revised Baseline Schedule is accepted by MDOT.

MDOT may elect to require revisions to the Baseline Schedule. MDOT will make such requests in writing. The Phase Developer shall respond in writing within seven days after receiving MDOT's request, either agreeing with MDOT's proposed revision, and henceforth providing a Revised Baseline Schedule, as required by MDOT, or providing justification why the requested revisions should not be accomplished.

Submit the Revised Baseline Schedule within 14 days of receiving MDOT's request. The Revised Baseline Schedule shall reflect the current status of the completed and ongoing activities and actual earnings to date as of the current Data Date. The Section Developer may request in writing from MDOT an additional five days to complete such revisions.

Once accepted by MDOT, the Revised Baseline Schedule shall replace any previously accepted Baseline Schedule for the remainder of the Section Work and then become the Baseline Schedule. At no time shall any item not accepted by MDOT be reflected in the updates to the Baseline Schedule.

3.2.5.5 Monthly Schedule Update

Submit to MDOT a Monthly Schedule Update to reflect the current status of Section Work including Recovery Schedules or revisions to any Section Schedule due to changes in the Work. The Monthly Schedule Update shall be submitted as part of the Monthly Progress Report. Software settings shall not be changed or modified, for any Section Schedule, without prior written MDOT acceptance. The Monthly Schedule Update shall be based upon the current Baseline Schedule or current Revised Baseline Schedule, whichever is current. The Data Date for use in calculating the Monthly Schedule Update shall be the first day of the following month and shall be submitted on or before the 15th of the month following the reporting period.

The Monthly Schedule Update includes the following:

- updated progress to the status date, actual start and actual finish of completed Section Activities, forecast finish for in-progress Section Activities, and reforecast early dates and late dates for remaining Section Activities;
- a narrative explanation if any actual dates are changed or corrected in any following month;
- certification that the latest schedule is currently being used to execute and perform the Section Work and used as the basis for the Monthly Schedule Update;
- a percent complete for ongoing activities based on the quantity of Section Work completed relative to the total amount of Section Work planned for the activity (i.e., measured or estimated units of Section Work in place as compared to the amounts estimated at the RFC design stage);
- the remaining duration for ongoing activities. Remaining duration for unfinished activities shall be based on the amount of time required to complete the remaining Section Work as of the new Data Date;
- modification of activity relationships for the remaining activities to correct out-of-sequence progress for ongoing activities or to reflect the current Plan for completing the remaining Section Work;
- a workable Plan for recovery of the Section Schedule addressing the cause of delays whenever the Monthly Update Schedule shows negative float;
- a Gantt chart:
 - sorted by Work areas indicating the physical status of all Section Activities as of the date of the update and comparing progress to planned progress;
 - showing all critical Section activities, sorted by early start dates;
 - providing a 90 day look ahead showing all upcoming Submittals and acceptances required by MDOT, the IQF, Utility Owner, a third party, or other Agency Having Jurisdiction ("AHJ");
 - with a 90 day look ahead grouped by WBS and sorted by early start dates; and
 - clearly identifying the longest path sorted by early start dates.
- a description of the status of the Section Work in detail, including the following:
 - the current status of Milestones describing deviations from the dates specified in the Section P3 Agreement;
 - an explanation of why Milestone(s) is(are) forecasted to occur late and a description of any actions taken or proposed;
 - the current status of the Section Work in terms of progress earnings percent complete based on the actual total earnings to date relative to the current Design-Build Price as

well as any progress deficiencies relative to planned progress as indicated on the Baseline Schedule. If progress is falling behind, describe reasons for the deficiency and any actions taken or proposed to correct the progress deficiency;

- the current Critical Path and any deviations from the current Progress Schedule;
- the Work performed since the previous Monthly Schedule Update and any deviations from Scheduled Activities;
- identification of Schedule Activities planned for the upcoming month. Identification of requested or required MDOT actions for the next month;
- a list of any Relief Events or Compensation Events identified or executed during the period and their status;
- any major changes in the Section Work Plan in terms of sequence of construction, shifts, means, and methods, manpower, equipment, or materials;
- any changes to the current Monthly Schedule Update shall be documented in the Monthly Update Narrative. Such changes include additional, revised or deleted activities, durations, calendar assignments, lag, or logic ties;
- number of days lost due to adverse weather or other factors during the current update period including a list of the lost days, description and start/finish times of the weather event or factor, activities affected and how the activities were affected, and any impacts on the Critical Path or Milestones along with a description of any actions taken or proposed;
- the status of pending issues such as access, permits, conflicts with other related or adjacent Work, work orders, time extension requests, etc.; and
- a summary of any outstanding potential issues, any Relief Events or Compensation Events and the measures adopted (or to be adopted) to overcome such issues.

3.2.5.6 Monthly Schedule Progress Meetings

Five Business Days prior to the Monthly Schedule Update hold a Monthly Schedule Progress Meeting with MDOT representatives, the Section Developer's scheduler, and other representatives as required or requested by MDOT. During the Monthly Schedule Progress Meeting, discuss with MDOT the progress of the Work on the Section and updates to any Section Schedules. Any changes to sequencing or any other changes to any Section Schedule discussed and accepted during this Monthly Schedule Progress Meeting shall be reflected in the next Submittal of the Monthly Schedule Update.

3.2.5.7 Progress Evaluation

Progress will be evaluated by MDOT at the time of the monthly progress estimate relative to the current Section Schedule. Actual progress shall be considered unsatisfactory if any one of the following conditions occurs:

- the actual total earnings to date percentage for Work completed, based on progress payment estimate, falls behind the planned cumulative late dates earnings percentage. Payments for stored materials, materials on hand, or adjustments (asphalt, fuel, etc.) shall not be included in the actual progress earnings;
- the calculated completion date of an interim milestone is later than the specified completion date by more than 30 days; or
- the calculated Section completion date more than 60 days later than specified date.

3.2.5.8 Recovery Schedule

Whenever the Section Schedule shows the actual progress is unsatisfactory, within ten Business Days of notification by MDOT of unsatisfactory performance, submit to MDOT a Recovery Schedule demonstrating the proposed Plan to regain lost time. Recovery Schedule Submittals shall include a list of all activities changed, added, or deleted along with all logic changes, any mitigation efforts, and an accompanying narrative explaining the nature of the changes. The Recovery Schedule Submittal shall meet all the general requirements of a Section Schedule.

3.2.5.9 Time Impact Analysis

All Parties shall agree to address any Section Schedule issues as quickly and as contemporaneously as possible per AACE International Recommended Practice No. 45R-08 "Scheduling Claims Protection Methods." All Parties shall address delay issues using guidelines outlined in "AACE International Recommended Practice No. 29R-03 "Forensic Schedule Analysis" and "AACE International Recommended Practice No. 52R-06 "Time Impact Analysis – As Applied in Construction."

If a Time Impact Analysis is required, submit to MDOT a written Time Impact Analysis illustrating the influence of each claimed Relief Event or Compensation Event, and:

- include a Fragmentary Network (Fragnet) demonstrating how the change, delay, or the request has been incorporated into the current Section Schedule update;
- base the Time Impact Analysis on the date on which the alleged delay is determined to have occurred, or, in the event of a Relief Event or Compensation Event, the date on which the implementation of such event is proposed to be commenced;
- show the current status of the Section Work using the current Section Schedule update prior to the initiation of the events in question. The time computation of all affected activities shall be shown in the Time Impact Analysis along with a demonstration of steps used to mitigate impacts;
- include a Fragnet to demonstrate incorporation of the impact into the most recent Section Schedule update prior to the initiation of the events in question (the Fragnet is subject to the same requirements as the Section Schedule);
- demonstrate the calculation of the duration of an alleged delay with a Fragnet provided with resource-loading and productivities, identifying the predecessors to the new activities and demonstrating the impacts to successor activities;
- submit an impacted Section Schedule prepared by inserting the Fragnet into the most recent Section Schedule (updated prior to the initiation of the alleged delay);
- include a narrative report describing the effects of new activities and relationships to Agreement milestones and the Final Completion with each Time Impact Analysis with:
 - description of the delay, including time, date, and location of the event, if appropriate;
 - explanation of why the delay constitutes a change to the Section P3 Agreement, including references to applicable portions of the Phase P3 Agreement;
 - description the activities affected and any impact on the Section's Critical Path, Milestones, or completion date of the Section, as applicable; and
 - description any shifts in the Critical Path and the reasons for the shifts for each successive Section Schedule update relative to the preceding schedule update, as applicable.

Provide a Time Impact Analysis summary showing the Data Date and calculated completion dates for all applicable milestones and the Section completion date for each successive Time Impact

Analysis Schedule, including, as applicable, the Baseline Schedule, pre-delay non-impacted schedule, any contemporaneous Monthly Schedule Updates, and the post-delay impacted schedule. The Time Impact Analysis summary also is to show any incremental schedule gains or slippages on the Section completion date for each Time Impact Analysis Schedule and categorizes the schedule gain/slippage as excusable compensable, excusable non-compensable, or non-excusable. With the summary, include a description of any revisions made to the Time Impact Analysis Schedules since the pre-delay Time Impact Analysis Schedule update, including added or deleted activities, and changes in logic, activity durations, calendars, and constraints as well as the reasons for the revisions, any actions taken or needed to avoid or mitigate the delay impacts and any additional information the Phase Developer believes is needed to justify the request or facilitate timely resolution of the issue.

All Time Impact Analysis or requests for extension of time shall also address concurrent and predecessor delays in the determination of excusable/ inexcusable and compensable/non-compensable events. MDOT reserves its right to identify and generate Fragnet for inclusion in the most current accepted Section Schedule should it become aware of Section Developer caused delays.

The Section Developer shall provide the Time Impact Analysis to MDOT. The Time Impact Analysis report together with an electronic file (in a XER file format) of the Baseline Schedule impact analysis shall be submitted to MDOT. Upon acceptance, a copy of the Time Impact Analysis signed by MDOT will be returned and incorporated into the next update to the Baseline Schedule.

3.2.6 Document and Data Management Plan

As part of the SMP and a component part of the Administration Plan, prepare a DDMP. The DDMP sets out Document Management System(s) for maintaining all records and documents associated with the Section Work and defines the approach for data management of MDOT Systems as set forth in Exhibit 6 Article 27 (Data Management for MDOT Systems). The DDMP:

- uses data systems, software, standards, procedures, and formats compatible with those required by the Phase P3 Agreement and implement any new operating practices to any such data systems, software, standards, procedures, and formats;
- provides a mechanism for the secure electronic transfer of data to MDOT using MDOT's EDMS for submission to MDOT;
- provides MDOT staff with training in any Phase Developer or Section Developer systems needed by MDOT;
- requires that all Section Deliverables are electronically searchable and legible;
- describes the methods by which all Section records and documentation are uniquely coded, controlled, stored, distributed, shared and retrieved;
- details storage and backup procedures until five years after the end of term of the Section P3 Agreement; and
- discusses how, when requested by MDOT, the Phase Developer or Section Developer provides MDOT copies of any such data or records.

3.2.7 Phase and Section Offices and MDOT Facilities

Phase and Section Offices, including MDOT facilities, are described in Exhibit 6 Article 23 (Construction).

3.3 Operations and Maintenance Plan

Requirements for the O&M Plan are included in Exhibit 6 Article 25 (Operations and Maintenance).

3.4 Quality Management System

The IQF will be responsible for implementing a Quality Management System to be used to ensure the quality of all aspects of the Section Work are met. The Quality Management System includes quality control procedures performed by design and construction staff to be used to verify, check, and review the quality of all Section Work and quality assurance procedures performed by IQF staff to ensure the Work is completed in compliance with the Section P3 Agreement and to confirm quality control and quality assurance procedures are being followed.

The Quality Management System shall comply with the requirements of ISO 9001:2015 and ISO 14001. For avoidance of doubt, the Section Developer and the Quality Management System are not required to be certified per ISO 9001:2015 and ISO 14001.

There shall be only one Quality Management System for the Work covering all Phase Developer and Section Developer activities. Individual quality systems for different D&C entities, subcontractors or other Affiliates shall not be permitted.

The Quality Management System includes procedures to report to MDOT and for MDOT to monitor the status of, and close out of, all nonconforming Work and Noncompliance Events throughout the term of the Section P3 Agreement. The Quality Management System shall include procedures for investigations and surveys undertaken as part of the preparation and design of the Work.

3.4.1 Staffing

3.4.1.1 Section Quality Manager

The Section Quality Manager oversees the implementation the Section Developer's QMP and has authority and responsibility for all quality-related activities for the Work, is employed by the IQF and has the authority to stop Work. The Section Quality Manager shall have the following qualifications:

- relevant quality management experience on urban highway or other design-build projects;
- current training in the use and application of Quality Management Systems including the application of ISO 9001:2015;
- a minimum of 20 years' experience with design or construction of transportation facilities;
- experience as a design lead, project manager or similar leadership position on at least one complex roadway project similar in nature to the Section with a construction cost of at least \$250 million;
- a bachelor's degree or equivalent; and
- preferably a registered professional engineer in the State.

The Section Quality Manager position must be filled for the term of the Section P3 Agreement; the Person holding such position is expected to be on-site in the Section Office and be committed full time. Qualifications shall be subject to review and acceptance by MDOT. If a replacement is needed to fill the position, the qualifications for the replacement shall be submitted and are subject to review and acceptance by MDOT.

3.4.1.2 Design Quality Manager

The Design Quality Manager is responsible for implementing the Section Developer's DQMP, is employed by the IQF, and has the authority to stop the Design Work. The Design Quality Manager shall have the following qualifications:

- at least twenty years of progressively responsible, successful experience leading or supporting design activities for P3 or design-build projects;
- a bachelor's degree in science; and
- registered as a professional engineer in the State and Commonwealth of Virginia.

The Design Quality Manager position must be filled for the duration of the Section D&C Work; the Person holding such position is expected to be on-site in the Section Office and be committed full time. Qualifications shall be subject to review and acceptance by MDOT. If a replacement is needed to fill the position, the qualifications for the replacement shall be submitted and are subject to review and acceptance by MDOT.

3.4.1.3 Construction Quality Manager

The Construction Quality Manager is responsible for implementing the Section Developer's CQMP, including all quality assurance testing, is employed by the IQF, and has the authority to stop Construction Work. The Construction Quality Manager shall have the following qualifications:

- a minimum of 20 years' experience in construction;
- leadership experience on large and complex highway and transportation projects, with preferably at least one projects in Maryland;
- preferably registered as a professional engineer in the State and Commonwealth of Virginia; and
- experience with oversight of construction activities for P3 or design-build projects.

The Construction Quality Manager position must be filled for the duration of the Construction Work; the Person holding such position is expected to be on-site in the Section Office and be committed full time. Qualifications shall be subject to review and acceptance by MDOT. If a replacement is needed to fill the position, the qualifications for the replacement shall be submitted and are subject to review and acceptance by MDOT.

3.4.1.4 O&M Quality Manager

The O&M Quality Manager is responsible for implementing the Section Developer's O&M Quality Management Plan ("O&M QMP") for all aspects of the Section O&M Work and has the authority to stop the Section O&M Work. The O&M Quality Manager shall have the following qualifications:

- a minimum of 15 years' experience in maintenance and asset management including relevant and progressive experience in the daily O&M activities on a congested urban highway;
- experience with oversight of construction activities for P3 or design-build projects; and
- have a bachelor's degree or equivalent.

The O&M Quality Manager position must be filled for the duration of the Section O&M Work; the Person holding such position is expected to be on-site as needed in the Section Office; and be committed as needed to perform the required duties. If the Section Developer chooses to use the IQF for the Operating Period, the O&M Quality Manager shall be employed by the IQF. Qualifications

shall be subject to review and acceptance by MDOT. If a replacement is needed to fill the position, the qualifications for the replacement shall be submitted and are subject to review and acceptance by MDOT.

3.4.2 Quality Management Plan

The QMP, which shall form part of the SMP, sets out the procedures, roles, responsibilities, and requirements to be met to achieve quality in all aspects of the Section Work performed during design, construction, O&M, and Handback. The QMP describes the quality control procedures to be used to control, verify, check, and review the quality of all Section Work and the quality assurance procedures to confirm quality control procedures are being properly followed.

The Section Developer shall prepare the QPM and its component parts and submit for review and acceptance by the IQF. The QMP is also subject to review and acceptance by MDOT.

The QMP shall include relevant use and application of quality management, but is not limited to, the following:

- quality assurance and quality control Plans, processes, and procedures including IQF compliance certification of all Work;
- document control procedures including control of quality records;
- quality management roles and quality responsibilities;
- training and certification;
- IQF reviews of the Work including design Deliverables;
- certifications;
- changes to RFC drawings;
- revisions to As-Built Drawings;
- construction inspection, verification, checking, control, and testing;
- materials inspection, verification, checking, control, and testing;
- laboratory testing;
- quality assurance performed by the IQF on Construction Work;
- Section O&M Work including tolling, Routine Maintenance and Renewal Work;
- quality assurance performed by the IQF on Section O&M Work (if the IQF is retained for the Operating Period);
- communication and interface protocols;
- reporting protocols; and
- IQF audit frequency and reporting requirements for audits.

The QMP contains detailed descriptions of the Inspection and testing procedures, including the timing and frequency of testing, used to assess the Section Work. These descriptions are to include both the requirements for quality control and quality assurance.

MDOT shall be provided with full access to all Quality management System records. An acceptable structure for the QMP shall minimally include the parts cited below.

3.4.2.1 Design Quality Management Plan

As part of the SMP the Section Developer shall prepare and submit to the IQF and MDOT a DQMP defining the approach to achieving design quality. Acceptance of the DQMP by the IQF is a required condition prior to commencement of any Section D&C Work. The DQMP includes:

- design quality control process to include policy, procedures and specific roles and responsibilities;
- methods by which all Design Deliverables will be reviewed for completeness, clarity, and accuracy and verified for constructability;
- procedures and responsibilities for preparing and checking Plans, drawings, specifications, estimates, calculations, computer application input data, notes, and other Deliverable components;
- procedures and responsibilities for verifying design documents comply with the Section P3 Agreement, Governmental Approvals, Applicable Law, design standards, and design criteria;
- minimum qualifications of staff involved in checking, reviewing and auditing the Design Work;
- how the IQF will interface with design activities;
- procedure for resolving and tracking resolution of all review comments;
- process for stopping Design Work or elevating an issue;
- a discussion of how the Section Developer, O&M and the Contractor will interface with design activities;
- procedures for documenting compliance and non-compliance with quality procedures;
- tracking and distribution of Plan revisions;
- training;
- recordkeeping; and
- scope and frequency of audits, including timing and distribution of results.

3.4.2.2 Construction Quality Management Plan

As part of the SMP, the Section Developer shall prepare a CQMP and submit to the IQF and MDOT. The CQMP describes how the construction process and the quality of construction will be managed throughout the term of the Section P3 Agreement, including Renewal Work performed. The CQMP includes the organizational structure, staffing requirements, roles, and responsibilities and describes the relationships among design, construction, maintenance, and quality personnel. Acceptance of the CQMP by the IQF is a required condition prior to commencement of any Construction Work. The CQMP includes:

- construction quality control process to include policy, procedures and specific roles and responsibilities;
- methods by which all Construction Deliverables will be reviewed for completeness, clarity and accuracy;
- procedures and responsibilities for Inspection and testing of materials and constructed portions of the Section Work;
- procedures and responsibilities for verifying Construction Work complies with the Section P3 Agreement;

- minimum qualifications of staff involved in inspecting, testing and auditing the Construction Work;
- minimum qualifications for fabricators, Suppliers, and vendors supporting the Section Work and procedures for confirming and tracking qualifications;
- procedures for ensuring the timeliness of ordering and inspecting materials including scheduling of Inspections and testing at off-site facilities;
- procedures for the use of items not listed on MDOT SHA Qualified Products List;
- how the IQF will interface with construction activities;
- how the IQF will interact with MDOT's quality verification and auditing activities;
- process for stopping Construction Work or elevating an issue;
- a discussion of how the Section Developer, O&M and the designer will interface with construction activities;
- procedures for documenting compliance and non-compliance with quality procedures;
- procedure for resolving and tracking resolution of all non-conforming Work;
- tracking and distribution of design revisions;
- procedures for and the use of Requests for Information;
- approach to training;
- schedule for notifying MDOT of all activities, especially at an off-site facility such as a fabricator's or Supplier's facility;
- recordkeeping; and
- scope and frequency of audits, including timing and distribution of results.

3.4.2.3 O&M Quality Management Plan

Requirements for the O&M QMP are included in [Exhibit 6 Article 25 \(Operations and Maintenance\)](#).

3.4.3 Internal Audit

Establish in the QMP the approach and schedule for internal audits. At a minimum, undertake internal audits of the Section Work at least once every three months until Final Completion. Thereafter perform internal audits of the Section Work at least once every six months until the end of term of the Section P3 Agreement. MDOT may determine based on the execution of the Section Work that more frequent audits are necessary.

3.4.4 External Audit

Establish in the QMP the approach and schedule for external audits. The quality process shall incorporate planned and systematic activities undertaken by an independent party, who that

independent party is (such as the IQF) the frequency of such activities, method of correlating such activities and how such activities will be used to improve internal processes and procedures.

3.5 Change Management Plan

Prepare a Change Management Plan presenting how the Section Developer will monitor changes to the work, procedures for preparation of change notices, required notices, meetings or other aspects needed to correctly monitor and address changes to the Work.

3.6 Public Outreach and Engagement Plan

Requirements for the Public Outreach and Engagement Plan are included in [Exhibit 6 Article 4 \(Public Outreach and Engagement\)](#).

3.7 Disaster Recovery Plan

As part of the SMP, prepare a DRP to establish systems and procedures for limiting disruption to the Work in case of disaster. The DRP shall:

- identify relevant systems and their level of criticality to continuing operation of the Section;
- categorize the different types of data per their criticality;
- identify the levels of redundancy, security, verification and any other precautions required to protect and restore critical systems;
- describe the level of redundancy/backups required for each type of data including, but not limited to frequency and schedule, retention periods, location, verification and levels of physical and electronic security; and
- identify potential disaster and major hazards to the Work and actions and procedures in response to each necessary to restore Work operation after such an event.

Provide MDOT staff with training in the relevant disaster recovery procedures and systems used as needed. The DRP shall be revised as needed.

3.8 Safety Management Plan

As part of the SMP prepare and submit to the IQF a SaMP defining the approach to maintain a safe and healthy Work environment. The SaMP shall meet construction safety and health standards, including federal and state regulations, and detail the requirements for performing all Work activities in a safe manner. Include provisions for maintaining the safety of the Phase Developer's and Section Developer's staff, subcontractors, MDOT's staff, and the general public.

Included in the SaMP, identify the duties of the Safety Manager. The Safety Manager is the Person with the authority and responsibility to enforce compliance with the SaMP. The Safety Manager shall have the following qualifications:

- a minimum of 15 years' experience in Construction Work including for large and complex highway and transportation projects, with preferably at least one project in Maryland; and
- be either a Certified Safety Professional or a Certified Industrial Hygienist;
- have demonstrated experience in the development of comprehensive safety programs, policies and procedures including the development and implementation of employee safety training programs; and

- have demonstrated experience in occupational safety accident investigation, accident report writing, and Occupational Safety and Health Administration (“OSHA”) accident reporting.

The Safety Manager position must be filled for the duration of the Section D&C Work; the Person holding such position is expected to be on Site in the Section Project Office; and be committed full time.

3.9 Hazardous Materials Management Plan

Requirements for the HMMP are included in Exhibit 6 Article 5 (Environmental Management).

3.10 Transportation Management Plan

Requirements for the TMP are included in Exhibit 6 Article 22 (Maintenance of Traffic).

3.11 Environmental Compliance Plan

Requirements for the ECP are included in Exhibit 6 Article 5 (Environmental Management).

3.12 Utility Work Plan

Requirements for the Utility Work Plan are included in Exhibit 6 Article 7 (Utility Coordination).

3.13 Disadvantaged Business Enterprise Participation Plan

Include with the SMP the Section DBE Participation Plan which was prepared with the Committed Section Proposal. Update the DBE Participation Plan as needed prior to commencing Design Work and submit the updated Plan. The DBE Participation Plan is subject to review and acceptance by MDOT.

3.14 Tolling Strategy Plan

Requirements for the Tolling Strategy Plan are included in Exhibit 6 Article 25 (Operations and Maintenance).

3.15 Handback Work Plan

Requirements for the Handback Work Plan are included in Exhibit 6 Article 26 (Handback).

3.16 FHWA Reporting Requirements

Submit to MDOT any information required by FHWA regarding the Work within the schedule required for the request for such information.

3.17 Certification

Through the Quality Management System provide a technical approval and certification system. At a minimum, certification shall be included with the Final Design and the Released for Construction

design. Certifications shall state that Deliverables for Final Design and Released for Construction meet the requirements of the Section P3 Agreement. Certificates shall be prepared, signed by the Section Developer's lead design engineer, and provided to MDOT with the Design Deliverables. Following the IQF's review, if a Deliverable is found to be in compliance with the requirements of the Section P3 Agreement, the IQF shall provide a certificate stating compliance. Copies of certificates shall be kept with the quality records and made available to MDOT.

3.18 Deliverables

Table 3-1 - Management and Administration Submittals

DELIVERABLE/ SUBMITTAL	REQUIRED TIMING
SMP	Within 60 days after the Commercial Closing Date
Administration Plan	Prior to commencing any Section Design Work
Meeting Minutes	As indicated in the SMP
Monthly Progress Report	Monthly, within 10 Business Days following the prior month's end
Draft Baseline Schedule (Section Schedule)	within 30 days of the Commercial Closing Date for the Section
Final Baseline Schedule (Section Schedule)	Prior to the start of Construction Work
Revised Baseline Schedule	Within 14 days of execution of each Relief Event, or Compensation Event
Monthly Schedule Update	As part of the Monthly Progress Report
Recovery Schedule	Within 10 Business Days of notification by MDOT of unsatisfactory performance
Written Time Impact Analysis	Within five Business Days after any alleged delay
DDMP	Prior to commencing any Section Design Work
Section Quality Manager qualifications	With the Committed Section Proposal
Design Quality Manager qualifications	With the Committed Section Proposal
Construction Quality Manager qualifications	With the Committed Section Proposal
O&M Quality Manager qualifications	With the Committed Section Proposal
QMP	Prior to commencing any Section Design Work

DELIVERABLE/ SUBMITTAL	REQUIRED TIMING
DQMP	Prior to commencing any Section Design Work
CQMP	Prior to commencing any Section Construction Work
Change Management Plan	Prior to commencing any Section Design Work
DRP	Prior to commencing any Section Design Work
SaMP	Prior to commencing any Section Design Work
Section DBE Participation Plan	With the Committed Section Proposal and updated prior to commencing any Section Design Work
FHWA Reporting Requirements	As required

ARTICLE 4. Public Outreach and Engagement

4.1 Phase Developer's Role in Public Outreach and Engagement

MDOT has a responsibility to the public for proactive communications and outreach relating to the P3 Program. To assist with this responsibility, collaborate with MDOT for activities related to public outreach and engagement including performing Stakeholder outreach, attending community meetings, promoting the P3 Program at informational booths and community events to explain the benefits of the PMLs, and providing responses to inquiries and general questions.

MDOT is committed to continually improving public engagement and outreach efforts through open and transparent interaction and communications. It is critical that clear, consistent communications to all Stakeholders is a part of the Phase Developer's standard operating process. MDOT and the Phase Developer are jointly responsible for public engagement and outreach efforts, and it is essential there is collaboration on maintaining an open dialogue with travelers, citizens, businesses, communities, local groups and organizations, residential communities, elected officials, first responders and others. The objective of these joint efforts is to develop a long-term relationship between the Phase Developer and communities based on open and honest communication, trust, and respect.

4.2 Public Outreach and Engagement Objectives

Public outreach and engagement for the Phase shall be a collaborative effort among MDOT, MDTA and the Phase Developer, which include procedures, strategies, and communication to include the following activities:

- developing strategies and tactics to best reach identified target audiences (Stakeholders);
- establish dialogue with Stakeholders such as:
 - Maryland-National Capital Park and Planning Commission;
 - Washington Suburban Sanitary Commission;
 - Maryland Department of the Environment;
 - National Park Service;
 - National Capital Planning Commission;
 - Montgomery County;
 - Frederick County;
 - the City of Rockville;
 - adjacent communities, limited English proficiency communities and environmental justice communities;
 - property owners;
 - local businesses: and
 - the public;
- maximizing public awareness of the benefits of PMLs;
- educating travelers on how PMLs function and how to use them;
- communicating information about the schedule for opening of the PMLs to traffic, what tolls the Phase Developer can charge; the use of Transponders (and any changes to the

Transponders accepted on the PMLs) and tolling on the facility to facilitate a smooth ongoing operation; and

- ensuring a smooth and seamless transition of responsibilities between the Phase Developer and the Section Developers.

4.3 Interface and Liaison with MDOT

MDOT will remain the “public face” of the P3 Program and serve as the official spokesperson. In MDOT’s role, MDOT will:

- handle media and public inquiries;
- provide protocols for responding to media inquiries on the P3 Program and specific activities;
- approve all staffing and materials prior to speaking with media; and
- share Stakeholder mailing lists and databases established previously for use in printing and distributing newsletters, emails, and news releases and other public engagement activities; and
- perform quality assurance of all information and communication activities prior to release or distribution.

4.4 Public Relations Coordinator

The Public Relations Coordinator for the Phase Developer and for the Section Developer shall have the following qualifications:

- a minimum of 10 years’ experience in public relations including for large and complex highway and transportation projects, with preferably at least one project in Maryland managing public involvement, Stakeholder coordination and community engagement;
- have a bachelor’s degree or equivalent;
- preferably hold an accreditation in public relations as issued by the Public Relations Society of America;
- have strong writing and verbal communications and community outreach skills; and
- have demonstrated experience in crisis communications and handling sensitive and controversial issues.

The Public Relations Coordinator position must be filled for the term of the Section P3 Agreement including the Predevelopment Phase; the Person holding such position is expected to be on Site in the Project Office or Section Office; and be committed full time during the Section D&C Work. Qualifications shall be subject to review and acceptance by MDOT. If a replacement is needed to fill the position, the qualifications for the replacement shall be submitted and are subject to review and acceptance by MDOT.

Responsibilities of the Public Relations Coordinator will include but not be limited to:

- drafting responses to correspondence, emails and other inquiries, including MDOT Customer Care Management System (“CCMS”) assignments;
- assisting with website content management and development;
- researching inquiries from the public, elected officials, or media and developing responses; and

- developing metrics for gauging the effectiveness of the outreach efforts and modifying the efforts to improve effectiveness where needed;
- collaborating and supporting MDOT and MDTA with:
 - scheduling, coordinating and conducting all Stakeholder outreach efforts;
 - monitoring media and social reports on the Work and the P3 Program;
 - disseminating information about the status of the Work among all applicable communication channels such as mainstream media, social media and website postings; and
 - coordinating special events, media events, briefings to elected officials, etc. by providing material preparation and logistics;
- ensuring a smooth and seamless transition of responsibilities between the Phase Developer and the Section Developers.

4.5 Stakeholders Outreach and Information

During the Predevelopment Work, the Phase Developer shall, with MDOT, identify and establish relationships with Stakeholders, attend Stakeholder events, provide updates on the P3 Program status and develop the Public Outreach and Engagement Plan. The Public Outreach and Engagement Plan details how the Phase Developer will perform all aspects of public outreach and engagement as described in these Technical Provisions. The Public Outreach and Engagement Plan shall be submitted and is subject to review and acceptance by MDOT and MDTA.

As part of the Predevelopment Work, begin implementing the outreach initiatives outlined in the Public Outreach and Engagement Plan. Prepare and maintain a schedule of all planned community engagement activities that reflect the robust and ongoing outreach and engagement expected for the P3 Program. Monthly, report to MDOT on the status of these community engagement activities. Weekly, or upon request, provide MDOT with a current copy of the schedule of planned activities.

During the Section Work the Section Developer shall build on the Predevelopment Work and maintain good relations with existing Stakeholders, identify and establish good relationships with new Stakeholders, attend Stakeholder events, provide updates on the status of the Section Work and implement the outreach initiatives outlined in the Public Outreach and Engagement Plan. The Section Developer shall continue to provide a schedule of community engagement activities to be tracked and reported to MDOT reflecting the continuation of an agenda of robust and ongoing outreach and engagement.

Stakeholder outreach and information shall include development of collateral educational materials, newsletter development, social media, attending community meetings (such as homeowner's association meetings), managing and staffing informational booths and providing information at community events. Provide printed and electronic copies of all materials and information as required for use in all Stakeholder outreach efforts including, but not limited to graphs, charts, maps, schedules, and progress photos. High-resolution images shall be provided in electronic format to track progress and any significant activity (such as when a Milestone is reached).

4.5.1 Public Information and Involvement

During the Predevelopment Work, the Phase Developer will identify key outlets for information sharing, establish ongoing opportunities for information sharing with Stakeholders, provide updates on progress of the Work such as changes in traffic patterns, detours, closures, property and utility impacts and major milestones.

Public information and involvement shall maintain an open and honest dialogue with Stakeholders, particularly daily commuters and travelers likely to use the PMLs on I-495 and I-270. Efforts are to include communicating with interested Stakeholders in the ways in which they want to receive information, including e-newsletters, email, social media, broadcast media, and website content. these efforts shall include:

- developing and maintaining Stakeholder mailing lists and databases;
- establishing and maintaining continuing liaison with residents, community groups and businesses who could be affected by the Work;
- establishing and maintaining a consistent system for documenting all contact with business owners, residents, media and property owners; and
- developing signage describing the P3 Program for installation at the limits of the Section along I-495 and I-270, at intersecting highways where appropriate, at the Section Office and Phase Office, and construction trailers.

During the Section D&C Work, public outreach and involvement shall provide the public and other affected Stakeholders with information on:

- the expected construction impacts and ways to avoid them;
- the expected construction activities and sequencing/phasing;
- changes to traffic patterns, detours, special events, or other impacts;
- appropriate driving and travel behavior through work zones;
- alternate travel options;
- ways to modify travel habits to reduce or avoid congestion; and
- any other information deemed beneficial to the public about the Work.

4.6 Public Education and Awareness Program

During the Predevelopment Work, the Phase Developer shall begin a public education process that targets key Stakeholders, advocates, community leaders, media and the public. The public education effort shall incorporate both traditional and non-traditional marketing approaches to increase awareness of the P3 Program. Education efforts shall include:

- maximizing public awareness of the P3 Program and the benefits of PMLs;
- educating travelers on how PMLs function and how to use them;
- communicating information about the schedule and the Toll Rate setting process;
- identifying effective training and educational approaches including developing strategies messaging appropriate to reach specific audiences; and
- evaluating the effectiveness of training and modifying the education program based on feedback from Stakeholders and other evaluations to provide the most effective education program.

A minimum of 180 days prior to Final Completion, the Section Developer shall implement with MDOT a public facing marketing campaign (the "Public Education and Awareness Program") as part of the Public Outreach and Engagement Plan for the Section. The purpose of the Public Education and Awareness Program is to communicate to daily commuters and other potential Users how the PMLs function, the benefits of using them, differences between using a Transponder and an Imaged-Based Transaction and the option to use the GPLs or take transit. The marketing campaign shall include specific tactics for communication with Stakeholders including print and

broadcast media advertising, digital and social media as well as other appropriate means. The Public Education and Awareness Program must include:

- the schedule for opening of the PMLs to traffic;
- educational materials to inform travelers about signing and tolling information on the PMLs, so motorists understand on-road sources of information to facilitate choice;
- maps, charts, or diagrams depicting entrances to and exits from the PMLs;
- education materials on MDTA resources including websites and phone applications;
- instructions on how to obtain a Transponder;
- education about how dynamic pricing is used in the PMLs;
- information on requirements to use the PMLs, including
 - the proper use of a Transponder;
 - HOV lane eligibility;
 - switchable Transponder requirements to declare HOV eligibility;
 - non-HOV options including Transponder use and as pre-registered video; and
- coordination with MDOT and MDTA on education program content and strategy.

The Section Developer shall maintain the Public Education and Awareness Program throughout the term of the Section P3 Agreement. Continuing public education and awareness activities shall include at a minimum:

- updates to developed content that was originally implemented;
- changes in managed lane technology use, operational policies;
- continued marketing of the facility including E-ZPass® and other Transponders; and
- additional content developed in coordination with MDOT and MDTA.

4.7 Website

A website shall be fully operational and available to the public starting not later than 180 days prior to the start of construction but not before approval of the Section Agreement by the Board of Public Works. This website shall explain what PMLs are, how they will function on I-495 and I-270 via the use of graphics, videos, maps, etc., and describe any traffic impacts during construction or maintenance work. All public information and communications materials on the website shall be Americans with Disabilities Act compliant. All public information documents shall be provided in English and Spanish at a minimum. Creating the website includes:

- obtaining a domain name (which will be owned by MDOT);
- identifying a website platform and building the website with the acceptance of MDOT;
- ensuring compatibility with, and a link to, MDTA's tolling website, DriveEZMD, and provide information for E-ZPass for Users on how to open accounts, how to obtain Transponders, and to understand payment options;
- the ability for the public to download and use the DriveEZMD phone application (when available);
- hosting the website;
- providing database storage;

- establishing redundancies to reduce downtime with a goal of 3-9's or 99.9% availability; and
- ensuring the website is a responsive mobile-friendly design, as required by MDOT web Design standards.

Any marketing of tolling services shall be coordinated with MDTA and MDOT.

The Phase Developer's website shall be linked to the MDOT website for the P3 Program. The Phase Developer's website shall:

- present the overall Phase in an interactive graphic format, allowing customers to plan trips on the PMLs within the entire Phase;
- provide the public with current and historic Toll Rates for use with planning trips;
- present the current status of the PMLs and any planned closures for maintenance or construction;
- provide construction status including detours and closures during the D&C Period and detours and closures for maintenance activities during the operating Period;
- allow for the expansion of the website beyond Phase 1 to allow for the inclusion of future phases and section of the P3 Program; and
- allow for and manage content provided by multiple Sections of Phase 1.

After a Phase 2 Developer is selected, the Phase Developer shall Plan, coordination with, and execute the transfer of the website maintenance, hosting and operations to the Phase 2 Developer so all Sections within Phase 1 can be seamlessly maintained by the Phase 2 Developer.

4.8 Branding

MDOT already has in place brand standards and guidelines for the use of its name, logo, and brand. These standards shall be followed in developing the Phase branding. Any use of MDOT branding will require prior written approval by MDOT.

All marketing materials shall adhere to MDOT's overall brand standards as well as with the P3 Program branding. A process and protocol shall be established with timelines and expectations for timely reviews and acceptances for any designed materials including, but not limited to the website design, collateral materials, or any marketing materials.

4.9 Deliverables

Table 4-1 - Public Outreach and Communication Submittals

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
Public Relations Coordinator qualifications	With Committed Section Proposal
Public Outreach and Engagement Plan	Within 60 days of the Effective Date
Public Education and Awareness Program	180 days prior to Final Completion
Website operational	180 days prior to the start of construction

ARTICLE 5. Environmental Management

5.1 General Environmental Philosophy

The Phase passes through sensitive environmental and cultural resources, for which the protection is of paramount importance. The philosophy followed by MDOT is to incorporate environmental stewardship measures to the greatest extent to avoid and minimize impacts to human, natural and cultural resources while considering reasonable cost, practicality, and schedule.

The Work shall be executed using this philosophy in a collaborative manner with MDOT such that no action or inaction results in non-compliance with the requirements of the ROD, Applicable Laws and regulations, applicable permits, conditions, and approvals.

5.2 MDOT's Roles and Responsibilities

5.2.1 Environmental Management Team

MDOT's Environmental Management Team ("EMT") will coordinate throughout the duration of the Predevelopment and Section Work with the Phase or Section Developer's Environmental Compliance Manager ("ECM"). The anticipated role for the EMT includes:

- collaborating with ECM during Predevelopment Work and toward ensuring environmental stewardship measures are incorporated to the greatest extent possible to avoid and minimize impacts to human, natural and cultural resources;
- reviewing Deliverables for environmental compliance with NEPA Commitments and permit conditions;
- serving as a point of contact with Governmental Entities for permits and approvals to be acquired by MDOT, including submissions of design Plans and applications/requests related to permits, approvals, and modifications;
- performing Erosion and Sediment Control ("ESC") quality assurance ratings; and
- coordinating and attending meetings involving resource or Governmental Agencies.

5.2.2 Independent Environmental Monitors

MDOT will provide qualified Independent Environmental Monitors ("IEM") who will assess compliance with all environmental permits and permit conditions, authorizations, and environmental regulations for each Section. The IEM's roles will include:

- reviewing design and construction activities for compliance with all conditions of the MDE, the USACE, and other Governmental Entity permits, as well as other applicable authorizations and environmental regulations;
- reporting findings directly and concurrently to the MDE's Nontidal Wetlands Division and the USACE and other resource-specific Stakeholders, notifying Stakeholders and MDOT immediately of any reported or observed violations or non-compliance issues within the terms or conditions of MDE and other permits, the Water Quality Certifications, or approved Plans and specifications;
- independently documenting impacts to regulated resources by developing and maintaining a detailed tracking list of impacted resources; and

- assisting with the identification of ongoing opportunities for further avoidance and minimization of impacts to regulated environmental resources and protection of water quality.

5.3 Permits and Approvals

MDOT is seeking two separate NEPA approvals for the MLS and the I-270 from I-370 to I-70 components of the P3 Program. A ROD for the MLS component is anticipated in the Spring of 2021. Commitments included in the permits and approvals issued after ROD are unknown at this time but will be provided as soon as practical.

For the portion of the Phase along I-270 from I-370 to I-70, the NEPA class of action is expected to be an Environmental Impact Statement. Once initiated, the NEPA process and permitting process for the I-270 from I-370 to I-70 component will follow a similar regulatory process as the MLS. MDOT will complete the NEPA process for both components. It is anticipated the Phase Developer will assist and cooperate with MDOT as needed during the NEPA process for the I-270 from I-370 to I-70 component. MDOT may conduct briefings with the Phase Developer to inform them of the status of the NEPA process.

MDOT will provide, and remain the permit holder, for the following permits and approvals at the conclusion of NEPA:

- the initial NEPA Approval and issuance of a ROD;
- Section 4(f) of the Department of Transportation Act approval;
- Section 106 of the National Historic Preservation Act approval/Programmatic Agreement;
- Section 7 of the Endangered Species Act approval;
- National Park Service – Special use permit for Maryland and Virginia; and
- Archaeological Resource Protection Act permit for Maryland and Virginia Resources.

For the MLS component, MDOT will obtain, and remain the permit holder, for the following permits:

- USACE - Section 404 Clean Water Act permit;
- MDE and Virginia Department of Environmental Quality (“VDEQ”) - Section 401 Clean Water Act - Water Quality Certifications;
- MDE – Maryland Nontidal Wetland and Waterways permit; and
- VDEQ Virginia Wetland Protection permit.

MDOT will serve as the primary point of contact for all MDOT-provided permits and approvals. The responsibility of fulfilling the commitments and conditions contained within MDOT-provided permits and approvals will be transferred to the Phase Developer. The Phase Developer will be responsible for all permit modification and approvals needed to reflect their Final Design.

The Phase Developer is advised that permits may contain time of year restrictions on certain activities and the Section Schedule and Environmental Compliance Plan shall reflect these restrictions. The Phase Developer shall also adhere to all time of year restrictions committed to by MDOT SHA during the permitting process.

5.4 Phase Developer Roles and Responsibilities

In coordination with MDOT, adhere to the ROD including any mitigation measures stipulated, Applicable Laws and regulations, applicable permits, conditions, and approvals required for the P3 Program. Unless otherwise stated as a condition of MDE permits, notify MDE at least five days

before and five days after the start and completion of authorized activities including, but not limited to, construction related activities in, or near, regulated natural resources.

5.4.1 Staffing

5.4.1.1 Environmental Compliance Manager

Provide an ECM to be responsible for all environmental compliance for the Work. The ECM shall report directly to the Phase Developer Project Manager and shall be the primary liaison to MDOT for environmental compliance. The ECM may be requested to support the MDOT EMT at meetings with MDOT or any Governmental Entity. If the IEM has identified any reported or observed violations or non-compliance issues, the ECM shall work with MDOT to develop mitigation and repairs. The ECM shall delegate roles and responsibilities to qualified professionals, as necessary, to successfully oversee and report all environmental compliance for the Work. The ECM shall have the following qualifications:

- a minimum of 15 years' experience addressing environmental compliance on highway projects, of which one project must have been in Maryland;
- have served as ECM on a similarly large and complex highway or transportation project; and
- hold an appropriate professional qualification for the role such as degrees, training, and licenses.

The ECM position must be filled for the term of the Section P3 Agreement; the Person holding such position is expected to be on-site in the Section Office and be committed full time during the Section D&C Work. Qualifications shall be subject to review and acceptance by MDOT. If a replacement is needed to fill the position, the qualifications for the replacement shall be submitted and are subject to review and acceptance by MDOT.

5.4.1.2 Hazardous Materials Manager

Provide a Hazardous Materials Manager with expertise in the safe handling of Hazardous Materials required to perform the Work and those that may be discovered/impacted. The Hazardous Materials Manager shall conduct appropriate activities such as:

- scheduling and conducting Hazardous Materials training for the Phase Developer's and Section Developer's employees;
- verifying all employee and subcontractor certifications required for any handling of Hazardous Materials prior to employee handling such materials;
- maintaining records of all Incidents involving Hazardous Materials and notifying the ECM, MDOT and appropriate authorities in writing of any such Incidents;
- developing investigative work Plans and Remedial Action Plans or equivalent reports necessary and acceptable to MDE and the US Environmental Protection Agency ("US EPA") in material discovery and remediation efforts of Hazardous Materials; and
- be experienced in MDE guidance for the investigation and remediation of Hazardous Materials under the MDE Land Restoration Program and Voluntary Clean-up Program.

The Hazardous Materials Manager shall have the following qualifications:

- a minimum of 10 years' experience with addressing Hazardous Materials;

- be trained and certified at least to the minimum requirements established under the current guidelines of OSHA such as 29 CFR 1910.120, HAZWOPER and management and supervisor training; and
- be experienced in MDE guidance for the investigation and remediation of Hazardous Materials under the MDE Land Restoration Program and Voluntary Clean-up Program.

The Hazardous Materials Manager position must be filled for the duration of the Section D&C Work and the Person holding such position is expected to be on-site whenever Hazardous Materials may be encountered in the Work.

5.4.2 Environmental Compliance Plan

The Phase Developer is responsible for achieving and maintaining commitments, permits and authorizations through a strong ECP and partnering with MDOT. Prepare an ECP and submit to the IQF. The ECP shall detail methodologies to achieve and maintain environmental commitments and permit conditions throughout the term of the Section P3 Agreement. The ECP is an overall guidance document making reference to other Plans needed to carry out the Work. The ECP will be a living document and shall be updated continuously as commitments are made and met, the NEPA process is finalized, and permits/approvals are procured. The ECP must contain all permit authorizations and modifications, environmental commitments, Inspection reports, and checklists. At a minimum, the ECP must include the following information:

- the Phase Developer's Environmental Compliance Team structure including staff positions, qualifications, roles and responsibilities, and an organizational chart reflecting all members of the Environmental Compliance Team;
- a discussion of the Plan for further avoidance and minimization of impacts including how and where the Phase Developer's Environmental Compliance Team can further avoid and minimize both temporary and permanent impacts to sensitive natural and cultural resources;
- a discussion of the Plan for water quality monitoring identifying how and where the Phase Developer expects to monitor water quality during construction as well as how data shall be provided through a web-based system on a real-time basis;
- Inspection protocols, including the methodology and frequency of Inspections, and proposed Inspection forms and checklists to be used;
- response protocols in the event of any violations of permit conditions;
- a Spill Prevention Control and Countermeasures Plan and a Stormwater Pollution Prevention Plan in accordance with Applicable Law;
- a Plan for air quality including off-road diesel emissions reductions;
- a Plan for maintaining access and mobility;
- the Phase Developer's strategies for environmental communication, Emergency response and environmental risk management;
- a discussion of the construction noise and the proposed work hours to be used to meet the construction noise limits;
- a discussion of the Phase Developer's approach to vibration monitoring and mitigation;
- implementation and reporting requirements (e.g., daily/weekly/monthly reports), commitment checklists, and details on how the Phase Developer proposes to maintain the CTD;
- a schedule of communication and compliance status updates with MDOT and Governmental Agencies;

- environmental compliance training materials, including content summary and training frequency and visitor protocol for untrained people entering the worksite;
- permit modification and Environmental Summary/NEPA Re-evaluation process;
- rare, threatened, and endangered species, fisheries, and wildlife management strategy indicating how impacts to animals, fish and amphibians shall be minimized;
- an approach to compliance with forest regulations;
- a listing of time of year restrictions and protocol for compliance;
- a discussion of the compliance action Plan;
- a listing of all environmental commitments to be included in the CTD;
- a discussion of how the Phase Developer will comply with the Clean Water Act permits;
- how the Phase Developer will comply with the provisions of the National Flood Insurance Program; and
- how the Phase Developer will comply with all other Federal, state, and local permits.

The ECP shall contain documentation including all permits and authorizations (including revisions, modifications, amendments, supplements, renewals, or extensions), environmental commitments, and Inspection reports and checklists. The ECP shall be available in real-time to the Phase Developer's staff and MDOT.

5.4.2.1 Well Impacts and Requirements

As part of ECP, address wells (such as municipal, domestic, irrigation, or monitoring and observations wells) that may be impacted by the Work during the term of the Section P3 Agreement. This component of the ECP includes:

- a process for training personnel on recognition of wells;
- procedures for avoiding or protecting wells in place during the Work;
- procedures for closeout of wells removed in the course of the Work;
- procedures for preventing contamination and for addressing contamination (including temporary measures and permanent measures to restore the well to its original state) of a well resulting from the Work; and
- procedures to notify MDOT and the appropriate Governmental Entities in case of contamination of a well.

5.4.2.2 National Flood Insurance Program Compliance

As part of ECP, prepare all documents necessary for MDOT to obtain all necessary approvals for any regulated activity within floodplains. Obtain from the Maryland Floodplain Mapping Program ("MDFMP") in conjunction with the FEMA Digital Flood Insurance Rate Maps (<https://mdfloodmaps.net/>) the effective flood insurance studies for Montgomery County and Frederick County and the effective Digital Flood Insurance Rate Maps covering the Work. Determine the extent to which the proposed activities encroach into a Special Flood Hazard Area, floodway (for streams studied with detailed methods), a Non-Encroachment Area (for streams studied with limited detailed methods), or FEMA buyout properties.

When an activity is proposed within a floodway or Non-Encroachment Area as defined by MDFMP (including Bridges and Small Structures), determine if the proposed activity will result in an increase in the base flood elevation as defined by MDFMP. If a base flood elevation increase will

occur to the extent that a CLOMR is required, prepare and provide all documentation necessary for MDOT to obtain a CLOMR prior to construction of the regulated activities. Prepare all documents including notification letters to property owners necessary for MDOT to obtain approval from MDFMP in accordance with the conditions outlined in the Memorandum of Agreement (“MOA”) between MDFMP and MDOT. MDOT will provide all fees in accordance with the MOA. Within 60 days of Substantial Completion, prepare and submit to MDOT the As-Built Drawings for Work within the regulated areas necessary for MDOT to obtain a letter of map revision (“LOMR”). Provide all fees associated with obtaining CLOMRs and LOMRs; and when an activity is proposed within a Special Flood Hazard Area, but outside of a floodway or Non-Encroachment Area, obtain any necessary local floodplain development permits, as required, from Montgomery County or Frederick County floodplain administrators. For clarity, the Phase Developer is not responsible for impacts due to a rise in water surface elevation resulting from the conversion of the effective FEMA model run to the corrected effective FEMA model run.

Terms in this Exhibit 6 Article 5 (Environmental Management) will have the meaning as defined by FEMA for the National Flood Insurance Program, 44 CFR Parts 60-65.

5.4.3 Hazardous Materials Management Plan

Prepare a HMMP detailing the procedures and measures for the safe handling, storage, treatment and disposal of Hazardous Materials, whether encountered on, released by, or brought onto the ROW by the Phase Developer, or by a third party. The HMMP includes:

- identification of, qualifications of and contact information for designated individuals responsible for the implementation of the HMMP;
- procedures for identifying and documenting potentially contaminated sites which might impact the Work or which the Work might impact;
- procedures for preparing an investigative work Plan and a Site investigative report if Hazardous Materials are discovered during the Work;
- procedures for mitigation of known contaminated sites anticipated to impact the Work;
- procedures for mitigation of unknown or unanticipated contaminated sites encountered during the Work;
- a detailed Hazardous Materials spill response Plan for the term of the Section P3 Agreement;
- training requirements for personnel who may encounter Hazardous Materials;
- provisions for appropriate storage and disposal of all Hazardous Materials encountered or generated within the ROW; and
- procedures for how Material Safety Data Sheets will be maintained and updated for all chemicals to be used in the Work, per OSHA requirements, for the term of the Section P3 Agreement.

The HMMP shall include provisions for limiting the potential for exposure of personnel to Hazardous Materials, making all workers aware of the potential Hazardous Materials to which they may be exposed, and personal protection equipment required to protect anyone on the Site from exposure. The HMMP shall require all personnel handling Hazardous Materials be trained and certified at least to the minimum requirements established under the current guidelines of OSHA 29 CFR 1910.120 (HAZWOPER Training). Further, the HMMP shall include procedures for ensuring all applicable certifications, licenses, authorizations, and Governmental Approvals for personnel handling Hazardous Materials are current and valid through the term of the Section P3 Agreement.

5.4.4 Environmental Compliance and Awareness Training Program

An environmental compliance and awareness training program shall be offered in English and Spanish for all personnel working on the Site, including subcontractors and MDOT. Training shall be conducted before personnel are permitted to enter the ROW or LOD established for the Work, and no personnel shall be allowed to enter the ROW until they have completed the environmental training program. The purpose of this training is to ensure all personnel are educated on environmental compliance requirements and environmental sensitivities. The training program is to cover all necessary topics to remain in compliance including, but not limited to:

- erosion control measures - sequencing, implementation, and maintenance;
- maintaining the LOD;
- tree and shrub protection;
- wetland and waterway protection;
- wildlife habitat protection;
- recognizing the consequences for departure from approved operating procedures;
- pumping and dewatering operations;
- accidental discovery of archaeological material or human remains;
- access and mobility;
- temporary stabilization;
- Incident communication and reporting;
- time of year stream work restrictions;
- Hazardous Materials;
- no work zones; and
- historic properties.

The outline of the training program aspects and procedures shall be included in the ECP as submitted to the IQF. The Phase Developer is required to track the attendance of the program, and documentation of attendance for and content of environmental training shall be provided to MDOT.

5.4.5 Commitment Tracking Database

Create and maintain a CTD capturing all permit conditions and commitments. The intent of the CTD is to track and confirm compliance with each commitment applicable to the Work. This includes tracking impacts on all environmental resources. The CTD shall be used to monitor compliance throughout the term of the Section P3 Agreement. The CTD contains at a minimum:

- the source of the commitment (i.e., permit condition, NEPA commitment, etc.);
- a description of the commitment;
- the location of the commitment (the entire Phase or associated with a specific Section);
- the current status of the commitment; and
- the status of any compliance activities being performed to meet the commitment.

The CTD shall be capable of sorting/filtering commitments by the applicable stage of the Work (design, construction or O&M) and sorting/filtering commitments by topic (i.e., wetlands, trees, air quality, etc.). Using the CTD, generate a report (to be submitted as mutually deemed necessary) demonstrating the status of compliance with commitments accompanied by a memorandum explaining any issues.

5.4.6 Environmental Permit Plan

Prior to commencing Design Work, prepare an environmental permit Plan identifying all necessary environmental permits for the Work. The environmental permit Plan shall include permit type, permitting agency, applicant/owner, key risks, mitigation requirements, schedule, and any fees. The permit Plan shall be submitted for review.

5.4.7 Permits and Approvals

The Phase Developer is responsible for all agency coordination, applications, conditions, and compliance associated with all required permits and approvals for the Work in accordance with the Agreement. The Phase Developer is fully responsible for obtaining all permits not specifically identified as provided by MDOT. All permit conditions and compliance requirements shall be the responsibility of the Phase Developer unless otherwise noted in the Agreement.

5.4.7.1 Forest and Tree Permits and Approvals

Impacts to forests and trees in Maryland will be subject to review and approval by DNR under the Maryland Reforestation Law (Maryland Natural Resources Code § 5-103). The Reforestation Law enables MDOT to establish banks that comply with the Forest Conservation Act statute (Maryland Natural Resources Code § 5-1601-1613). If the establishment of a bank is necessary to meet mitigation requirements, the Phase Developer shall work in close coordination with MDOT.

DNR will provide a letter to MDOT concurrent with the ROD that acknowledges coordination between DNR and MDOT during the NEPA process relating to a compliance approach to the Reforestation Law. MDOT has and will continue to coordinate with DNR throughout the NEPA process to identify reforestation permitting and mitigation approaches. Forest assessments per statute are required to refine forest and tree impacts within Phase and Section limits.

MDOT conducted a desktop analysis using the tree canopy land cover class from the high resolution land cover dataset produced by the Chesapeake Conservancy's Conservation Innovation Center to estimate forests impacts for the MLS project. Estimated forest impacts and compliance requirements from the desktop analysis are included in the Draft Environmental Impact Statement ("DEIS") and will be further refined in the FEIS and ROD. MDOT also initiated a reforestation mitigation site search to identify potential mitigation opportunities on MDOT property and on other public lands. The results of the mitigation site search will be provided to the Phase Developer. The Phase Developer must conduct a forest stand characterization and specimen tree survey; calculate forest impacts; identify, coordinate, and fulfill (plant/warranty) all mitigation requirements on a Section basis in compliance with the Reforestation Law and commitments made during the NEPA process.

It is anticipated that DNR will require submission of Reforestation Law applications separately for each Section and initially based on the Conceptual Design. Reforestation Law mitigation shall occur per Section and proposed mitigation shall be submitted with the Section's Reforestation Law Site Review Form application. Upon receipt of a fully completed application, DNR will provide an initial approval letter (within 60 calendar days) that will outline the required mitigation for that Section. During Final Design, resubmission of the application will be required and must reflect design modifications, and revised impact quantities and mitigation requirements. DNR will then issue a revised approval letter including the revised mitigation requirement for that Section. MDOT SHA will be the applicant and will review, accept and coordinate all submissions to DNR. MDOT will remain the permit holder and coordination through MDOT will continue during design and construction.

Every reasonable effort shall be made by the Phase Developer and Section Developers to avoid and minimize adverse impacts to natural resources, where feasible. For those impacts that cannot be avoided, mitigation shall occur on a per Section basis and adhere to all requirements of the Applicable Law, including following the mitigation hierarchy that requires providing mitigation in the following order: on-site; off-site on publicly owned land in the affected county and watershed; off-site on publicly owned land in the affected county or watershed or through purchase of forest mitigation bank credits in the affected county and watershed; purchase of credits from a forest mitigation bank in the affected watershed; and payment into the Reforestation Fund after all other mitigation options have been exhausted. Purchasing of bank credits through local government approved banks may apply with proof of purchase and must comply with local and state requirements in place at the time of each Section's initial approval. Excess planting for mitigation credit may be applied across multiple Sections in compliance with DNR forest mitigation banking requirements.

Identification of mitigation sites will be required for Reforestation Law compliance and is the full responsibility of the Phase Developer. MDOT is currently conducting a reforestation site search within the affected MLS watersheds (Maryland six-digit hydrologic cataloging units) and counties to identify potential off-site mitigation opportunities on public lands, including MDOT property. The results of this site search will be completed by MDOT and after review by DNR, a report will be available to the Phase Developer. The potential sites identified in the report are based on desktop level analysis or preliminary field visits and coordination with public partner agencies. This site search will be provided to the Phase Developer for use by the Phase and Section Developers. It will be the Phase Developer's responsibility to fully vet sites to determine planting feasibility, including performing any field investigations to identify constraints and suitable areas for reforestation. In conjunction with MDOT and the Phase Developer's public outreach and engagement staff, conduct landowner coordination, obtain letters of agreement to secure the site for use in providing compensatory mitigation and develop the necessary agreements. After obtaining the necessary permit and approvals for the mitigation sites, the Phase Developer shall install plant material; maintain the sites during the specified warranty period (typically two to five years, or otherwise as determined/required by the property owner); and any other requirements as agreed upon with the landowners (e.g. invasive species control and deer protection). After the warranty period acceptance, work with MDOT to transfer the mitigation sites to the public landowner. For MDOT excess lands that have been retained for P3 Program reforestation mitigation, it will be the Phase Developer's responsibility to establish an easement to protect the existing forest on the specified parcels in perpetuity and coordinate with MDOT as necessary in developing the easement.

Mitigation on public lands require a letter of agreement to use the property and must be planted within two years or three growing seasons of Substantial Completion on the pertinent Section. Mitigation on DNR lands require a letter of agreement to use the property and mitigation must be planted within five years of receipt of approval for that contract.

Virginia Department of Forestry regulates Virginia state forests, but there are no state forests identified within the Phase. The Phase Developer is responsible for compliance with all Applicable Laws, regulations, and commitments for tree and forest impacts in the Commonwealth of Virginia. Impacts to trees on National Park Service property must be mitigated based on the Diameter of Breast Height ("DBH") of the impacted trees at mitigation site locations identified by the National Park Service.

5.4.7.2 Section 106 Work Requirements

The National Historic Preservation Act (54 USC § 300101 et seq.) requires federal agencies to take into account a project's effects on historic properties, which are properties listed in or eligible for listing in the National Register of Historic Places, through its Section 106 process and its implementing regulations at 36 CFR § 800.

While FHWA is the lead federal agency for purposes of Section 106 compliance, MDOT SHA, on behalf of FHWA, initiated the Section 106 process in 2018 and continues to consult with the Maryland Historical Trust, Virginia Division of Historic Resources, (collectively the State Historic Preservation Offices or “the SHPOs”) native American tribes, other Governmental entities and Stakeholders. The Section 106 process will be completed through implementation of a Programmatic Agreement. It is anticipated that the Phase Developer will be responsible for compliance with the Section 106 process in coordination with MDOT SHA and FHWA, including review by the SHPOs and consultation with other Stakeholders.

A draft Programmatic Agreement has been provided as part of the DEIS, however, a final version will likely not be available until release of the ROD, following consultation with Stakeholders. A separate Programmatic Agreement will likely be prepared for Phase North. Although the Phase Developer will be required to follow the provisions of the final Programmatic Agreement, they should anticipate the requirements of the Section 106 process as currently stipulated in the draft Programmatic Agreement, and for the Programmatic Agreement for Phase North when developed, to include:

- investigating, analyzing, and providing MDOT SHA with information or studies to support documenting determinations of eligibility and assessments of effects at MDOT SHA's discretion completed to SHPO standards in the appropriate state, specifically Design Work to assess effects on three historic properties whose effects are currently unknown;
- hiring or retaining personnel for the duration of the D&C Period meeting the Secretary of the Interior's Professional Qualifications Standards at 36 CFR § 61 for both historic architecture and archaeology;
- designing and implementing the Work in such a way as to avoid and minimize additional adverse effects to historic properties to an extent feasible, including the implementation of context-sensitive measures;
- developing a Construction Protection Plan to avoid damage to known and unknown historic properties subject to review and acceptance by MDOT;
- developing a landscape restoration plan to document pre-construction existing conditions and create plans to restore landscape features through Section 106 consultation and according to the process at 36 CFR § 800 and any specific requirements in the Programmatic Agreement; and
- adhering to the Inadvertent Discovery Plan included in the Programmatic Agreement for inadvertent archaeological discoveries and inadvertent adverse effects to built historic properties.

During the Predevelopment Work, the Phase Developer shall collaborate with MDOT to confirm the impacts to all potential historic properties and resources have been identified. Should additional historic properties or resources be identified beyond those cited in the Programmatic Agreement, the Phase Developer, as directed by MDOT, shall conduct additional designs, studies, investigations or prepare documentation needed in accordance with the terms of the Programmatic Agreement and 36 CFR 800. The Phase Developer is advised that should additional adverse effects to historic properties be identified, acceptance of mitigation measures by MDOT SHA, FHWA, the SHPOs or other Stakeholders will be required. The Section Schedule shall address the time required for additional approvals needed for the Work. The Phase Developer shall also allow for the cost of additional mitigation in the Section Design-Build Price.

The Phase Developer is advised of two critical locations where cemeteries exist, or are likely to exist, and human remains, unmarked, or inadequately marked exist. These locations are the former location of the Montgomery County Poor Farm along I-270 in the vicinity of Wootton Parkway, and the Morningstar Tabernacle No. 88 and Moses Hall Cemetery in Cabin John. The Phase Developer should expect to prioritize design to a final or near-final level in these areas to

allow required excavations and studies that will be needed to identify and treat interments prior to construction. Minimization of LOD in these areas to the maximum extent practicable to avoid impacts to burials will be expected.

Should sensitive historic resources, properties and sites may be identified for Phase North, the Phase Developer shall take similar precautions as required for Phase South.

Should the Phase Developer change the design and create a new impact on a historic property or resource anywhere in the Phase, the decision to advance that design change will be at MDOT SHA's sole discretion and the Phase developer may be required to perform studies, prepare documentation or consult with Stakeholders to demonstrate mitigation from the proposed change will meet the necessary approvals. If MDOT allows such a change to advance, the Phase Developer shall remain responsible for all mitigation Work needed, including costs and schedule for such mitigation.

Qualifications for staff filling the roles of historic architect, archaeologist or any cultural resources related tasks shall be subject to review and acceptance by MDOT. These personnel, once approved by MDOT SHA, will liaise with MDOT SHA cultural resources staff, assist in resolution of issues, generating required information, review of studies, and other functions related to fulfilling the terms of the Programmatic Agreement. The Phase Developer is encouraged to retain cultural resources staff once approved by MDOT SHA for consistency and efficiency. If replacement staff is needed to fill the position, the qualifications for the replacement shall be submitted and are subject to review and acceptance by MDOT.

5.4.8 Revisions to Permits

It is the responsibility of the Phase Developer to obtain the necessary required revision, modification, amendment, supplement, renewal, or extension from the appropriate Governmental Entities for changes in the design constituting a departure from any federal, state, or local permits, conditions, and approvals. All conditions in the permits and approvals shall be adhered to unless modifications are accepted by MDOT and the Governmental Entities. Delays and additional mitigation required resulting from modifications shall be the sole responsibility of the Phase Developer. It is not the responsibility of, nor guaranteed by MDOT, that approval or authorization will be granted by the Governmental Entities for permit modifications differing from the originally authorized terms and conditions.

Work in close coordination and collaboratively with MDOT for any required changes to permits where MDOT is the applicant. MDOT will serve as the primary point of contact for all MDOT-provided permits and approvals. Notify MDOT of any changes inconsistent with existing approvals. Prepare any additional data or environmental documentation needed to modify or obtain environmental approvals required for the implementation of the Section Developer's changes and provide all necessary modification package materials to MDOT, who will submit to the Governmental Entities. MDOT will transfer all terms and conditions of any newly issued permit/approval modifications to the Section Developer for implementation and compliance.

5.4.9 Avoidance and Minimization

Focus Predevelopment and Section Work efforts on avoiding and minimizing impacts to sensitive environmental resources in all areas of the Work. The design shall continue to emphasize avoidance and minimization of impacts. Reduction in impacts on wetlands, Waters of the US, and other sensitive environmental resources could result in a reduction of mitigation required.

5.4.9.1 Avoidance and Minimization of Impacts Plan

Prepare and submit for MDOT review and acceptance an Avoidance and Minimization of Impacts Plan demonstrating efforts to further reduce impacts to wetlands, wetland buffers, waterways, and the 100-year floodplain less than those shown in permits. The Plan shall contain concise information (including but not limited to narrative descriptions, graphic illustrations, drawings, charts, Plans, and specifications) enabling MDOT, USACE, MDE, and VDEQ to clearly understand and evaluate the efforts to reduce impacts. The Avoidance and Minimization of Impacts Plan shall become the total maximum impacts allowable for the Work, once the Plan is accepted by MDOT and the Governmental Entities.

5.4.9.2 Design Package Avoidance and Minimization Summary

Efforts to avoid and minimize impacts to natural resources were made throughout the planning process, and it is the responsibility of the Phase Developer to continue these efforts during the Work.

A design package avoidance and minimization summary ("DPAMS") shall also be provided with each Design Submittal for areas of impact to sensitive environmental resources. These summaries shall further demonstrate efforts to reduce both temporary and permanent impact quantities to sensitive environmental resources, including but not limited to wetlands, wetland buffers, Waters of the US, 100-year floodplains, cultural resources (Section 106 resources), forest areas, parkland (Section 4(f) and 6(f) resources), and communities.

The DPAMS shall contain concise information (including but not limited to narrative descriptions, graphic illustrations, drawings, charts, Plans, and specifications) enabling MDOT and the appropriate Governmental Entities to clearly understand and evaluate the reduction in impacts. Detailed design Plans for each work Deliverable causing impacts to sensitive environmental resources are subject to review and acceptance by MDOT and approval by the appropriate Governmental Entity prior to any disturbance to sensitive environmental resources.

The DPAMS shall be prepared and submitted concurrently with each Design Submittal, and on a quarterly basis during the Construction Work. Develop a Submittal schedule for the approvals needed from MDE and USACE, indicating anticipated dates for submission of Plans and reports. Update the schedule as required as the Work progresses.

5.4.10 Waters of the US and Wetlands Mitigation

In Maryland, approximately 1.6 acres of wetland mitigation credit and 24,500 linear feet of stream mitigation credit are required to compensate for the proposed impacts caused by the MLS portion of the Phase. In Virginia, a total of approximately 0.01 acres of wetland mitigation credit and 729 linear feet of riverine mitigation credit is required for the proposed impacts in the Middle Potomac-Catoctin watershed. Impacts resulting from Phase North are unknown. The Phase Developer is responsible for verification of these mitigation credit values and for further avoidance and mitigation, as discussed in this [Exhibit 6 Article 5 \(Environmental Management\)](#). On-site and off-site mitigation were investigated for the proposed impacts. MDOT considered off-site mitigation based on the following hierarchy:

- mitigation banking and in-lieu fee programs;
- permittee-responsible mitigation site search on public lands; then
- permittee-responsible mitigation on private lands.

On-site wetland mitigation was not proposed due to concerns with the potential failure of replacing functions and values adjacent to the proposed roadway expansion. In Maryland, proposed on-site stream mitigation credit for open channels to remain or to be relocated following construction is approximately 8,600 linear feet resulting in the need for approximately 15,900 linear feet of offsite stream mitigation credits.

Off-site permittee-responsible wetland and stream mitigation has been identified by MDOT.

Available mitigation bank credits are located in Virginia that could compensate for the proposed Virginia impacts; however, no mitigation bank credits, or in-lieu fee programs were identified in Maryland. A two-tiered approach has been used to identify permittee-responsible mitigation that included mitigation site identification on public and private lands.

5.4.10.1 Mitigation on Publicly-Owned Land

MDOT is preparing designs for a number of mitigation sites to compensate for wetland and stream impacts. These mitigation sites are located on publicly owned land outside of the Phase limits. MDOT is currently developing the design (the final mitigation Plans or "FMP") to obtain USACE Section 404 and MDE Nontidal Wetland permit (approximately 65% complete.) The Phase Developer shall be responsible for completing the design, obtaining final permits and approvals and for performing all construction of these sites. Approval of the FMP is anticipated no later than 90 days after the ROD, after which design information will be made available to the Phase Developer.

It is anticipated that as a condition of the USACE Section 404 and MDE Nontidal Wetland permits will require compensatory mitigation within the same watershed as the impacts. Work in Phase I generally falls in the Middle Potomac-Catoctin basin (Cataloging Unit 02070008 as defined by the US Geologic Service.) Sites on publicly owned land within this watershed are depicted on the map included in the Joint Permit Application Appendix H: Potential Mitigation Site Vicinity Map and List in the Compensatory Mitigation Plan. The Joint Permit Application is an attachment to the DEIS. The permits will detail all specific conditions related to mitigation and construction schedule requirements and adherence to these conditions by the Phase Developer is required.

If impacts are reduced within the Phase such that not all the mitigation sites and credits are needed, some sites may not need to be constructed because the credit is no longer needed. If it is later determined that not all mitigation site credits are needed, USACE and MDE will make the final decision for which site(s) would be eliminated.

To complete the mitigation Work, responsibilities of the Phase Developer include:

- completion of the mitigation designs and obtaining permitting/approvals;
- constructing the mitigation Work;
- all oversight required during construction;
- preparing mitigation site As-built Record Drawings to ensure construction was completed according to Plan;
- performing any warranty Work required; and
- after the warranty period ends, all maintenance and monitoring work required.

MDOT will remain the main point of contact with public mitigation site landowners throughout Final Design and construction and will lead communication and coordination with all public entities. The Phase Developer shall work through MDOT to coordinate with public landowners and Governmental Entities.

Mitigation must be constructed before or concurrent with impacts being created by the Work.

The Phase Developer is advised that use of the mitigation credits to compensate for impacts created from the Work must be strictly in accordance with the permit conditions and requirements. Changes or deviations between the as constructed mitigation quantities and the as-planned mitigation quantities presented in the 65% design are the responsibility of the Phase Developer to resolve including the possibility that a planned site is no longer acceptable for use as a mitigation site and the planned credits are not available. Any mitigation resulting from new or additional impacts not authorized as part of the USACE and MDE's 404/401 and Nontidal Wetlands and Waterways permits (to be issued following ROD) shall be the sole responsibility of the Phase Developer and shall be coordinated through MDOT.

5.4.10.2 Mitigation on Privately-Owned Land

MDOT is also preparing designs for a number of mitigation sites to compensate for wetland and stream impacts that are located on privately owned land outside of the Phase limits. Off-site wetland and stream compensatory mitigation on privately-owned properties will be fulfilled by separate contractors through a full delivery contractual approach. MDOT will oversee and administer all aspects of mitigation on private sites including the mitigation design, construction, construction oversight, maintenance and monitoring. MDOT will provide off-site wetland and stream compensatory mitigation credits on privately-owned properties for the Phase Developer's use.

It is anticipated that a condition of the USACE Section 404 and MDE Nontidal Wetland permits will require compensatory mitigation within the same watershed as the impacts. Work in Phase I generally falls in the Middle Potomac-Catoctin basin (Cataloging Unit 02070008 as defined by the US Geologic Service.) Sites on privately owned land within this watershed are depicted on the map included in the Joint Permit Application Appendix H: Potential Mitigation Site Vicinity Map and List in the Compensatory Mitigation Plan. The Joint Permit Application is an attachment to the DEIS. Credits to be delivered to the Phase Developer are those associated with sites RFP-2 and RFP-3. Note that Site RFP-3 cannot be used to mitigate impacts in Phase South. MDOT will maintain administrative control related to oversight and coordination of the separate private mitigation site contractors.

5.4.10.3 Mitigation in the Commonwealth of Virginia

For the authorized, permitted impacts to Virginia jurisdictional nontidal wetlands and Waters of the US, approved mitigation banks shall be used serving the Phase with available nontidal and Waters of the US credits. The purchase of mitigation credits based on actual impacts shall be the responsibility of the Phase Developer.

5.4.11 Environmental Summary/NEPA Re-evaluation Process

Modifications or design changes proposed by the Phase Developer, which occur inside or outside of the LOD, such as shifts in alignment, staging areas etc., shall be reviewed for impacts by the Phase Developer, including impacts to the natural, social and cultural Environments (including air and noise) to determine if additional environmental documentation is necessary. If an Environmental Summary/NEPA Re-evaluation is required, the Phase Developer would assist by preparing/providing supplemental information for MDOT to include in the Environmental Summary/NEPA Re-evaluation. MDOT will be the sponsoring agency and FHWA will be the lead agency.

Provide all the information needed, such as narratives and figures to MDOT. MDOT, in conjunction with the FHWA, will make a determination of the need for an Environmental Summary/NEPA Re-evaluation for any of the items identified above and prior to initiation of construction for the affected design Element(s). If an Environmental Summary/NEPA Re-evaluation is required, provide all necessary information for submission to MDOT. MDOT will coordinate approvals with the Governmental Entities (for permits and approvals held by MDOT) and FHWA. Allow for sufficient time in the schedule to account for review and approval. The step-by-step process for Environmental Summary/NEPA Re-evaluation for design changes is as follows:

- identify if the design creates an impact not anticipated in the ROD;
- present the scope of work, Plans, and maps to MDOT to determine if a scope and / or design change is warranted relative to the ROD;
- if directed by MDOT, conduct a review to determine if any environmental, social or cultural impacts (including air and noise) will occur due to the change;
- if directed by MDOT, present information to MDOT including a draft Environmental Summary/NEPA Re-evaluation narrative and figures;
- MDOT will review the draft Environmental Summary/NEPA Re-evaluation and either deny the draft Environmental Summary/NEPA Re-evaluation with comments, or conditionally accept the draft Environmental Summary/NEPA Re-evaluation;
- MDOT will determine the specific agency involvement;
- MDOT will present the draft Environmental Summary/NEPA Re-evaluation to the specific agencies for concurrence (the Phase Developer may be requested to participate in the meetings regarding the presentation of this information);
- If directed by MDOT, prepare the final Environmental Summary/NEPA Re-evaluation and MDOT shall send the following documentation letters required to Governmental Entities;
- MDOT will obtain permits and approvals in accordance with the processes documented throughout these Technical Provisions; and
- MDOT will submit the Environmental Summary/NEPA Re-evaluation to FHWA for formal approval.

Reviewing agencies may request more information before they will approve an Environmental Summary/NEPA Re-evaluation. If requested by MDOT, it is the responsibility of the Phase Developer to supply additional information to MDOT.

5.5 Hazardous Materials and Waste Mitigation

The Phase Developer is responsible for the management, treatment, handling, storage, remediation, removal, transportation and disposal of any Hazardous Materials used or encountered either on existing ROW or any additional ROW acquired.

5.5.1 Hazardous Waste Management

The ECM will be responsible for implementing procedures and controls to prevent waste from entering the environment by containing, collecting, storing, testing, and disposing of all waste in accordance with federal, state, and local regulations.

Obtain approval from MDOT and MDE for temporary storage sites and haul the waste material away from the worksite to the storage sites at the end of each day. Ensure the storage site prevents the migration of the contaminated material into the environment, and it is protected from vandalism and unauthorized access by the general public.

COMAR 26.13.03.05 stipulates the "pre-transport" requirements and the amount of time permitted for the accumulation of Hazardous Materials. Representative samples of each waste stream shall be collected and analyzed by an MDE approved laboratory. Notify MDOT of the results within five Business Days of receipt of the analytical results. All Hazardous Materials shall be removed from the temporary storage site within 75 days from the initial date of accumulation or before the completion of work, whichever comes first. The method of disposal shall be based on the analytical results of the waste characterization samples.

When a portion of the Work involves Hazardous Materials or regulated waste, an environmental professional or an employee with US Department of Transportation Hazardous Materials training working under the direct supervision of the ECM shall take representative samples of the accumulated residues of each waste stream in accordance with Applicable Law to properly characterize and profile the material prior to disposal. Provide written Plans for the transportation and disposal of the waste, including the name and address of the licensed transporter and treatment storage and disposal facility.

All Hazardous Materials or regulated waste must be transported by a certified waste hauler to a treatment storage and disposal facility permitted to accept this material. Waste material shall be disposed of in accordance with all local, state, and federal regulations and standards.

5.5.2 Environmental and Hazardous Materials Response

An Emergency Action Plan ("EAP") shall be developed in accordance with OSHA Parts 1910 and 1926. The EAP includes:

- identification of potential environmental accidents and Emergencies associated with the Site-specific activities;
- response procedures to construction Site environmental accidents and Emergencies and for the preventions and mitigation of the environmental impacts that may be associated with them; and
- annual reviews and revisions of the EAP, in particular after the occurrence of an environmental accident and Emergency.

Develop a Spill Prevention, Control, and Countermeasure Plan as required by regulation and for submission of the Plan as part of the ECP.

Any personnel who either causes, discovers, witnesses, or otherwise has knowledge of a spill or release of a Hazardous Material or petroleum is responsible for proper spill notification and response procedures as outlined in the MDOT SHA Standard Operating Procedure No. ECD-P-008a, Rev. 1 for Spill Response, Notification, and Emergency Management for Maintenance Shop and Mobile Road Crew Personnel. The Standard Operating Procedure provides procedures for response procedures and reporting to MDOT SHA's Environmental Compliance Division and District Environmental Coordinator within 15 minutes after any spill or discharge event. The Phase Developer is also responsible for submitting an MDE Spill Incident Report Form.

Additional reporting requirements shall follow at a minimum:

- COMAR Title 26, Section 10.01.03; and
- 40 CFR Part 302 Designation, Reportable Quantities and Notification.

In Maryland any petroleum release (regardless of volume) shall be reported. A release of a Hazardous Material that is equal to or exceeds the US EPA's reportable quantity (varies based on the compound) shall also be reported. If impacts are encountered in the ground, the volume would be unknown so reporting should occur.

Once a release has been identified and remediation is required, the following regulations apply:

- MDE Cleanup Standards for Soil and Groundwater
- US EPA Regional Screening Levels and associated risk assessments

If the release has resulted in impacts above the cleanup standards then remediation shall be performed to MDE or US EPA cleanup levels as applicable.

5.5.3 Industrial Hygiene

Conduct surveys on any impacted Element to determine if any Hazardous Materials are present on any Element or each property acquired for the Work, prior to any intrusive, construction or demolition activities initiated on the properties. The Hazardous Material surveys shall include any potential Hazardous Materials that may still be present on the properties including, but not limited to, Bridges, buildings subject to demolition and utilities. All surveys, removal, and disposal activities shall be conducted in accordance with all federal, state, and local regulations.

5.5.3.1 Asbestos

Perform asbestos Inspections on all structures (including Bridges) and, as applicable, perform asbestos abatement, abatement monitoring, notifications, and demolition in accordance with MDOT procedures and specifications. Prior to demolition, asbestos abatement shall be performed for all structures found to contain regulated asbestos materials ("RACM") and non-RACM expected to become friable during the course of demolition, make all appropriate abatement and demolition notifications as required by federal, state, and local regulations.

Asbestos Inspection, abatement, and monitoring shall be performed by individuals and firms licensed by the State of Maryland. Both the asbestos abatement Contractor and asbestos monitor must be two separate entities. Copies of all asbestos Inspection, monitoring, and disposal records shall be provided to the appropriate Governmental Entities.

Soils with naturally occurring asbestos have the potential to be encountered within the Phase, and the Phase Developer shall abide by all federal, state, and local requirements pertaining to them.

5.5.3.2 Lead-Based Paint

Test, identify, inspect, notify, amend notifications as necessary, pay notification fees, and abate for lead-based paint on any structure, including but not limited to Bridges and buildings. Prior to demolition or renovation, abatement shall be performed for all structures found to contain regulated concentrations of lead in paint greater than 0.5% or more by weight or 0.7 mg/cm², during the course of the Work, make all appropriate abatement and demolition notifications as required by federal, state, and local regulations.

Maryland law provides that when composite samples of waste streams analyzed using toxicity characteristic leaching procedures exceed the threshold value (5 mg/l for lead), they shall be considered Hazardous Materials and be removed under manifest by a licensed Hazardous Materials transporter to a permitted disposal facility.

Lead Inspection, abatement and monitoring shall be performed by individuals and firms licensed by the State of Maryland. Copies of all lead Inspection, monitoring, and disposal records shall be provided to the appropriate Governmental Entities.

5.5.4 Areas with Known Impacts and Potential Sites of Concern

A Hazardous Materials Technical Report will be provided in the FEIS and will provide information relative to potential Hazardous Materials sites identified within the Phase or the adjacent to the Phase potentially impacting Work.

5.5.5 Documentation

Retain copies of all regulated hazardous waste manifests; analytical laboratory results; property studies; documents prepared for containment, management, mitigation or remediation; asbestos records; and any other Hazardous Materials records. A final copy of all such records shall be submitted to MDOT within thirty days after Final Completion.

5.6 Deliverables

Table 5-1 – Environmental Management Submittals

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
ECM qualifications	With the Committed Section Proposal
ECP	Prior to beginning field activities
HMMP	Prior to beginning field activities
CLOMR	Prior to beginning construction on Elements for the Work affected by the CLOMR
LOMR	After completion of Elements of the Work affecting the LOMR
Environmental compliance and awareness training program	Prior to beginning field activities
Environmental compliance and awareness training program attendance	Quarterly
CTD	With the Committed Section Proposal
Environmental Permit Plan	Prior to beginning Section Design Work
Reforestation mitigation applications and Plans	As needed
Construction Protection Plan	Prior to beginning Section Construction Work
Qualifications for staff filling the roles of historic architect, archaeologist or any cultural resources related tasks	Prior to beginning any work for which these positions are required

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
Avoidance and Minimization of Impacts Plan	With the Committed Section Proposal
DPAMS	With the Committed Section Proposal and with each Design Deliverable
NEPA Documentation if Environmental Summary/Re-Evaluation is required	As needed
EAP	With the ECP
Spill Prevention, Control, and Countermeasure Plan	With the ECP
MDE Spill Incident Report form	After any spill or discharge event
Hazardous Materials documentation	30 days after Final Completion

ARTICLE 6. Noise Analysis and Mitigation

6.1 Scope

Noise analysis and noise mitigation both for temporary and permanent conditions are required for the Work. Final sound barrier locations and dimensions shall be determined during the Final Design noise analysis in collaboration with MDOT. A final Technical Noise Analysis Report ("TNAR"), and noise model and supporting files, shall be prepared by the Phase Developer.

6.2 Applicable Standards

All work performed shall be in accordance with 23 CFR 772, "Procedures for Abatement of Highway Traffic Noise and Construction Noise." The highway noise prediction requirements, noise analyses, noise abatement criteria, and requirements for informing local officials in 23 CFR 772.3 "Noise Standards" constitute the noise standards mandated by 23 U.S.C. 109(1). All highway projects which are developed in conformance with this regulation shall be deemed to be in accordance with the FHWA noise standards.

The Phase Developer shall also comply with Maryland regulations or Virginia regulations as applicable for the location of the sound barrier.

6.3 Noise Analyses

Collaborate with MDOT to determine required noise analyses, complete the TNAR in draft format and submit for review. The production of the final TNAR may consist of individual technical barrier memoranda provided as appendices or chapters to the TNAR. After completion of the TNAR, any changes in the design may require a revision to the TNAR.

6.3.1 Noise-Sensitive Land Uses

Verify all land uses for the Phase as identified in the FEIS TNAR and revise any land uses for consistency with the NEPA categorization. Classify the land uses, on mapping, based on the classification and descriptions used in "Table 1 to Part 772 – Noise Abatement Criteria" contained in 23 CFR Part 772. This classification of land uses shall be in accordance with the classification and descriptions used in "Table 1 to Part 772 – Noise Abatement Criteria" and mapping shall be included in both the draft and final TNAR.

6.3.2 Noise Analysis Work Plan

In collaboration with MDOT, produce and submit a Noise Analysis Work Plan ("NAWP") prior to the initiation of field activities or noise modeling exercises. The NAWP shall address the collection of all information pertinent to the development of the TNAR. All proposed noise-sensitive area ("NSA") boundaries, noise measurement, and noise analysis locations shall be included on mapping with each proposed modeling receptor's associated land-use classification clearly identified. In addition, all noise modeling methodology for the TNAR should be presented in the NAWP. The NAWP shall also identify any associated risks, as part of the noise analysis, potentially leading to a delay in the analysis and potentially compromise the schedule.

6.3.3 Noise Monitoring Locations/Receptors

Perform measurements of existing noise levels for the purposes of validating the noise models provided in the Reference Information Documents using FHWA Traffic Noise Model (“TNM”) Version 2.5 for the analysis as identified in the NAWP. For the development of noise modeling, use the current version of TNM required by FHWA. Prior to the initiation of the field data collection activities, collaborate with and gain acceptance of the NAWP from MDOT and assist MDOT with ROE letters for each location where access is required. Prior to accessing each property or parcel, ensure ROE letters have been provided to each property owner and ROE has been obtained. As part of the noise monitoring Plan, include, at a minimum, one “first-row” and one “second-row” noise measurement is obtained for each NSA, where second-row land uses are present. Noise measurements shall be conducted in times of free-flow traffic conditions to ensure validation of the traffic noise model can be effectively completed with greater accuracy.

Use sound level meters for logging per ANSI S1.4-1983, Type I or Type II certification for noise measurement activities. Meters shall have been calibrated within two years of use. Noise meter calibration certificates shall be included in the technical appendices of the TNAR. Noise measurement sites shall be located in discernible areas of frequent human use, not nominal distances from the roadway. Perform measurements, at each identified location, for a duration of no less than 20 continuous minutes. During the measurement period, all factors that could adversely affect the measured sound level shall be clearly noted on field sheets. In addition, atmospheric data, for all monitoring sessions shall be recorded, as well as photos at each monitoring location. These field sheets shall be included in the technical appendices in the TNAR.

Count and classify traffic during each noise monitoring session into one of the five TNM vehicle classes. Traffic speeds shall also be determined by the use of a radar gun or other appropriate device. Traffic data collected during the noise monitoring effort shall also be included in a clear and concise format in the technical appendices of the TNAR.

6.3.4 Noise Model

6.3.4.1 Model Validation

Complete TNM validation for the existing roadway network in the Phase meeting or exceeding the acceptable FHWA +/- 3 decibels of outside sound pressure (“dBA”) tolerance for noise measurement locations when comparing the modeled existing sound level with the noise level obtained during field measurement activities. Refined noise modeling and measurement practices and procedures should be performed to the greatest extent practical to produce tolerances that are greatly improved over the FHWA acceptable tolerance. Acceptance of the validation noise models is required prior to progressing with the prediction of design year sound levels and noise abatement recommendations.

6.3.4.2 Modeling of Receptor Sites

A “receptor” is a discrete or representative location of an NSA, for any of the land uses listed in “Table 1 to Part 772 – Noise Abatement Criteria” contained in 23 CFR Part 772. Receivers are discrete points within a noise model representing noise-sensitive land uses. An individual receiver may represent multiple receptors.

As part of the TNM modeling process, receptors shall be placed in areas of discernible frequent human use, or at the nearest corner of the dwelling structure, when a discernible area of human use is not able to be identified. Balconies and decks shall be modeled as an area of frequent human

use. Model every single-family dwelling with an individual TNM modeling location and model multi-family dwellings with representative modeling locations.

The final noise mitigation design will use the specific environmental traffic data developed for the Phase with the appropriate future design year unless changes are proposed in the design influencing traffic volumes. Develop and update the traffic data for the final TNAR based on the Final Design Deliverables.

6.3.4.3 Evaluation of Land Uses

Use "Table 1 to Part 772 – Noise Abatement Criteria ("NAC")" contained in 23 CFR Part 772 for NAC determination by land use. The NAC shall be clearly explained and contained in supporting TNAR documentation. The appropriate VDOT or MDOT noise policy shall be referenced, when considering increase over existing noise impacts or calculating impacts for special land-use areas (i.e., Category C or E). All land uses approaching or exceeding the NAC under design year build conditions shall warrant noise abatement considerations to reduce or eliminate noise impacts.

6.4 Noise Mitigation

Prior to submitting a sound barrier Plan to MDOT, certify the proposed design meets the noise abatement requirements. This certification shall be included in the TNAR when it is submitted to the IOF and MDOT. All sound barriers in the TNAR shall be clearly named and classified individually in the text, figures, and tables. As a starting point in the sound barrier design process, the barrier termini shall extend beyond the last benefitted receptor by four times its perpendicular distance from the roadway.

The design shall attempt to achieve feasible (5 dBA) insertion losses at all areas approaching or exceeding the NAC for each NSA where sound barriers are recommended. However, it should be noted noise policies vary between Maryland and Virginia, and each state's noise policy should be strictly adhered to during the barrier design. Cost averaging over multiple sound barriers or site constraint assessments shall not be used to determine reasonableness or feasibility.

The use of alternative mitigation methods and alternative materials may be considered. However, the use of quiet pavement shall not be considered as an alternative mitigation method.

The sound barrier shall break the line-of-sight to the receiver at the majority of the impacted receptors. While breaking the line-of-sight at the majority is the goal, it shall not be a limiting factor. It is desirable to break the line-of-sight at all the impacted and benefitted receptors, while still conforming to procedural, acoustical, and other engineering considerations. The design shall attempt to maximize noise reduction benefits while minimizing costs when developing Final Design Deliverables for sound barriers. Design and construct sound barriers to replace all existing barriers impacted by the Work or any existing sound barrier, or any segment of existing sound barrier removed for any reason. The replacement barrier shall be designed to meet the same requirements as new barriers and shall provide the same or greater noise reduction as the existing barrier and same or greater line-of-sight mitigation.

6.5 Public Comment on Proposed Sound Barriers

If a portion of benefitted residents have opposing viewpoints (as identified in the public hearing commenting period of environmental clearance) under Maryland policy a vote is taken on the need for a sound wall. However, MDOT may determine that a vote is required, regardless of the number of benefitted residents with opposing viewpoints. If a voting process for all proposed

barriers (but not for existing barriers to be replaced) is required, it shall be conducted in collaboration with MDOT.

The public comment process for sound barriers in Virginia shall follow VDOT policy.

6.6 Sound Barrier Construction

Construct the proposed sound barrier prior to demolishing an existing sound barrier wherever possible. If a proposed sound barrier cannot be constructed prior to demolishing an existing sound barrier, begin construction of new sound barriers within sixty days of the start of demolition of an existing sound barrier or clearing work associated with sound wall construction, whichever occurs first. Complete construction of any new sound barrier intended to replace an existing sound barrier or trees which were acting as a screen for adjacent properties within 240 days from the start of demolition of the existing sound barrier or cutting of trees, whichever occurs first. Once work commences on an individual sound barrier, continue construction operations until the sound barrier is complete.

In areas where an existing sound barrier (in whole or in part) will need to be removed for construction of the proposed roadway and construction Elements, the materials may be salvaged by the Phase Developer. The sound barrier components may be reused for construction of replacement barrier provided the materials meet the Handback Requirements.

Architectural finish of proposed barriers shall meet the requirements of Exhibit 6 Article 15 (Landscaping and Aesthetics). Where sound barriers are proposed adjacent to or as an extension of existing sound barriers, the architectural finish shall match the existing barrier.

Coordinate with all area first responders to provide and maintain access for proposed barriers. Traffic barrier shall be installed at all locations where sound barriers are constructed within the clear zone. Sound barriers shall be constructed such that the Asset can be maintained and inspected, including access for first responders entering the roadway and to conduct Inspections and maintenance activities. Sound barriers shall be constructed so not to trap or pond water.

6.7 Construction Noise

Operations shall be performed so exterior noise levels measured during a noise-sensitive activity shall not be more than 80 decibels ("dB"). 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.

Monitor construction noise if requested by Governmental Entities, MDOT, or neighboring property owners. If construction noise levels exceed 80 dB during noise-sensitive activities, take corrective action before proceeding with operations. If required, certain activities producing objectionable noise shall be restricted or prohibited between 10:00 PM and 6:00 AM.

Equipment shall in no way be altered so as to result in noise levels greater than those produced by the original equipment. When feasible, establish haul routes directing vehicles away from developed areas and ensuring noise from hauling operations is kept to a minimum.

6.8 Deliverables

Table 6-1 – Noise Submittals

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
NAWP	Prior to beginning field work relating to noise analysis and mitigation
TNM validation	Prior to developing noise mitigation recommendations
Technical Noise Analysis Report	Prior to submitting Sound Barrier Design Deliverables
Sound barrier Plans	Following review of the TNAR for the pertinent Sound Barrier segment
Public comment and sound barrier voting	Prior to submitting Sound Barrier Design Deliverables

ARTICLE 7. Utility Coordination

7.1 Scope

The Phase Developer is alerted to the presence of overhead and subsurface Utilities within the Phase. It is the responsibility of the Phase Developer to identify, designate and locate, and track, eliminate, mitigate, coordinate, perform, or cause to be performed, Utility Adjustments for the Utilities as necessary to maintain service and safety with minimal disruption to the traveling public or utility customers. In the execution of the Work, coordinate with Utility Owners in order to perform the Utility Adjustment Work, manage the Utility Adjustment process, and collaborate with MDOT and Utility Owners to minimize utility conflicts through design and alternative construction techniques to the greatest extent practical.

7.1.1 Utility Work Plan

Prepare and submit a Utility Work Plan to establish the procedures and processes for identifying and adjusting Utilities, coordinating with Utility Owners and administering all Utility Work. If not completed as part of the Predevelopment Work, the Utility Work Plan shall be prepared as a Preliminary Section Design Activity and submitted to MDOT for review. Undertake all Utility Adjustment Work in accordance with the Utility Work Plan. The Utility Work Plan shall include at a minimum:

- the assignment of an experienced Utility Coordinator dedicated to the Work who will serve as the main point of contact with Utility Owners and MDOT, and be responsible charge for all aspects of utility coordination;
- procedures and process for communicating between Utility Owners, MDOT, and any entities impacted by Utility Adjustments;
- a Plan to identify, designate, and locate all existing Utilities in areas affected by the Work;
- a Plan to address utility betterments requested by the Utility Owners;
- a Plan to coordinate activities with each Utility Owner and activities between Utility Owners;
- the approach to coordinating activities with the Utility Owners for previously undiscovered Utilities;
- procedures and process for tracking utility facilities, determining Utility impacts and conflicts (including the format and content of a Utility Adjustment Matrix indicating all utilities in the Phase) and extent of impacts and adjustments;
- the approach to collaborating with MDOT and Utility Owners to minimize Utility conflicts to greatest extent practical, and when Utility conflicts are unavoidable the approach to Utility Adjustments;
- the process to assess costs and assignment of costs for Utility Adjustments;
- procedures to be used for amending accepted Utility Adjustment Packages;
- procedures to be used for ensuring Utility relocations are performed per accepted Utility Adjustment Packages;
- procedures to be used for billing and payment for Utility Adjustments where the Utility Owner is entitled to compensation for performing Utility Adjustments;
- procedures to be used for ensuring Utility Owners or any party impacted by Utility Work

- are provided Plans and are given the opportunity to review all Plans that could have an impact on their utilities before Work on those Plans is performed;
- procedures and processes for reporting any Incidents or damage to Utilities;
- procedures and process for Utility completion and Utility clearance reports;
- format and content of a monthly Utility status reports;
- procedures and processes for submitting Plans to Utility Owners and impacted parties, in conformance with Utility Owner requirements; and
- any specific requirements of an individual Utility Owner.

7.1.2 Utility Coordinator

Provide a Utility Coordinator with experience in coordinating Utility Adjustments on major roadway projects and a thorough knowledge of MDOT utility procedures. Responsibilities for this position include coordination with all Utility Owners, scheduling Utility Adjustments, working collaboratively to minimize impacts, addressing issues and conflicts, organizing and facilitating meetings, and periodic reporting and recordkeeping. The Utility Coordinator shall have the following qualifications:

- a minimum of 10 years of experience performing utility coordination;
- experience in coordinating Utility Adjustments on large and complex highway and transportation projects including at least one project valued at over \$50 million; and
- thorough knowledge of MDOT utility policies and procedures

The Utility Coordinator position must be filled during the Section D&C Work, the Person holding such position is expected to be on-site in the Section Office as needed to perform the required duties and committed as needed to perform the required duties.

7.1.3 Utility Contacts

Maintain and keep current a list of principal contacts at each Utility Owner. The individuals listed in the following tables have been identified as principal contacts for the respective known Utility Owners. Unless otherwise noted, the same contact shall be used for Maryland and Virginia.

Table 7-1 – Maryland Utility Contacts

Mr. Marc Bianco AT&T Local Phone: 703-489-2370 email: mb458f@att.com	Mr. Samson Thomas Potomac Electric Power Company (PEPCO) 3400 Benning Road, NE Washington, DC 20019 Phone: 202-388-2736 email: sdthomas@pepco.com
Mr. Ben Fabina AT&T Core Phone: 301-228-2502 email: Benjamin.Fabina@kci.com	Mr. Scott R Moore Colonial Pipeline Phone: 443-821-1797 email: smoore@colpipe.com

Table 7-1 – Maryland Utility Contacts

<p>Rob Mezzadra (USA Engineering) CenturyLink 215 Schilling Cir Suite 108 Hunt Valley, MD 21031 Phone: 410-688-8943 email: Robert.mezzadra@usa-engineering.com</p>	<p>Johnathan C. Frazier TC Energy (Transcanada-Columbia) 1700 MacCorkle Avenue, SE Charleston, WV 25314 Phone: 304-357-2209 email: Johnathan_Frazier@tcenergy.com</p>
<p>Mr. John Hollida City of Rockville DPW 111 Maryland Avenue Rockville, MD Phone: 240-314-8500 email: jhollida@rockvillemd.gov</p>	<p>Mr. Jon Bobel Verizon 13101 Columbia Pike FDC 1 Silver Spring, MD 20904 Phone: 301-282-2942 email: jon.e.bobel@verizon.com</p>
<p>Tom Chase Comcast 900 Michigan Ave, NE NE Washington, DC 20017 Phone: 301-456-8951 (Keltus Duncan) email: tom_chase@comcast.com</p>	<p>Mr. Peter Milewski (Nat. Telecom Design) Verizon Business Phone: 540-710-5416 work email: pmilewski@ntdfiber.com</p>
<p>Mr. Jeremy Little Crown Castle Fiber 196 Van Buren Street, Suite 250 Herndon, VA 20170 Phone: 571-485-4524 Email: jeremy.little@crowncastle.com</p>	<p>Nathan Cole, P.E. Chief, Planning & Engineering Branch Washington Aqueduct US Army Corps of Engineers 5900 MacArthur Blvd., NW Washington, DC 20016 Phone: 202-764-2776 or 202-587-9368 email: nathan.h.cole@usace.army.mil</p>
<p>Mr. Eyasu Yilma Manager, Potomac Interceptor DC Water 301 Bryant Street, NW Phone: 202-612-3250 email: k.yilma@dcwater.com</p>	<p>Mr. Stephen Lincoln and Galen Jones Washington Gas 6801 Industrial Road Springfield, VA 22151 Phone: 703.750.4739 email: slincoln@washgas.com galen.jones@washgas.com</p>
<p>Mr. Amalfi Arias Fiberlight, LLC 7500 Greenway Center Dr, Suite 1110 Greenbelt, MD 20770 Phone: 571-830-5351 email: Amalfi.arias@fiberlight.com</p>	<p>Mr. Jeff Lohrmann Washington Suburban Sanitary Commission 14501 Sweitzer Lane Laurel, MD 20707 Phone: 301-206-8744 email: Jeff.Lohrmann@wsscwater.com</p>
<p>Mr. Denis McElligott MD Department of Information Technology 100 Community Place Crownsville, MD 21032 Phone: 410-697-9394 email: Denis.mcelligott@maryland.gov</p>	<p>Ignacio Russo Williams Companies, Inc. (Transco Pipeline) 11910 Carroll Mill Road Ellicott City, MD 21042 Phone: 443-367-2501 email: ignacio.russo@williams.com</p>

Table 7-1 – Maryland Utility Contacts

<p>Mr. Kenneth Bishop MDOT Fiber Phone: (410) 971-8789 Email: Kbishop1@mdot.maryland.gov</p>	<p>Mr. Brad Leatherman Zayo Group 21635 Red Rum Dr Suite 165 Ashburn, VA 20147 Phone: 703-928-0649 email: bradley.leatherman@zayo.com</p>
<p>Mr. Kamal Hamud Montgomery County DOT Fiber Phone: 240-832-3422 email: Kamal.hamud@montgomerycountymd.gov</p>	<p>Mr. Eddison Fraser RCN Corporation Phone: 301-531-2770 email: eddison.fraser@rcn.net</p>

Table 7-2 – Virginia Utility Contacts

<p>Boyd Williams CenturyLink Phone: (571) 455-2355 Email: boyd.williams@centurylink.com</p>	<p>Patricio (Jeff) Acierto Cox Communications 7741 Southern Drive Springfield, VA 22150 Phone: (703) 480-7812 email: Patricio.Acierto@cox.com</p>
<p>Michael Moncrieffe Dominion Energy - Distribution 3072 Centreville Road Herndon, VA 20171 Phone: (571) 203-5251 email: michael.moncrieffe@dominionenergy.com</p>	<p>Daniel J. Cabonor Dominion Energy – Transmission 10900 Nuckols Rd. Glen Allen, VA 23060 Phone: (804) 298-5391 email: daniel.j.cabonor@dominionenergy.com</p>
<p>William (Bill) Barrack Fairfax County Department of Public Works and Environmental Services Planning and Design Division 12000 Government Center Parkway Suite 463 Fairfax, VA 22035 Phone: (703) 324-5033 email: William.Barrack@fairfaxcounty.gov</p>	<p>Robert Cotten Fairfax Water 8560 Arlington Blvd. Fairfax, VA 22031 Phone: (703) 698-5600 email: rcotten@fairfaxwater.org</p>
<p>Adam DuBois III Verizon 4242 Duke Street Alexandria, VA 22304 Phone: (571) 429-0984 email: adam.x.dubois.iii@verizon.com</p>	<p>Gene Muller Verizon Business Phone: (703) 801-9532 email: gene.muller@verizon.com</p>

7.2 Utility Standards and Requirements

Utility Adjustments shall be performed in accordance with the terms of the Utility agreements between MDOT and the Utility Owners. If there is a conflict with provisions of the Phase P3 Agreement and the Utility Owner's requirements, collaboratively resolve the conflict with the Utility Owner and MDOT. Adhere to requirements and policies established by FHWA, MDOT, and Utility Owners for Section D&C Work and ensure Utilities are protected.

Utility coordination and Utility Adjustments for impacted utilities located in Virginia must follow the VDOT Utility Manual of Instructions: Utility Relocation Policies and Procedures. Utility Adjustment to be relocated to a position within the highway right-of-way shall be accommodated in accordance with the provisions of 23 CFR 645B.

The minimum cover over any utility under a controlled access highway shall be 5 feet. The minimum depth of non-controlled access highways shall be 3 feet. Any new or relocated utilities shall comply to these requirements unless a greater depth is required by:

- federal, state, or local regulations;
- MDOT SHA; or
- industry or Utility Owner requirements.

The cover over existing utilities should not be reduced to less than these minimums without MDOT's and the Utility Owner's concurrence. Additional cover over existing utilities that do not meet these minimums may be required to be relocated.

No manhole, junction box, handhole or other surface feature shall be located in any travel lane of any roadway.

Utilities carried on an existing structure to be replaced shall be accommodated on the replacement structure.

Utility shutdowns shall be coordinated with the Utility Owner and any Work and associated schedules shall allow for restrictions to shutdowns. Subject to verification by Utility Owner for completeness and accuracy, the following restrictions, including but not limited to:

- the 66" water main at River Road and the 96" diameter water main near Tuckerman Lane owned by WSSC can never be out of service at the same time;
- Washington Gas will not allow Work affecting transmission or large distribution lines between October 1st and April 1st; and
- no outages to PEPCO transmission facilities are allowed between June 1st and September 15th.

7.3 Utility Depictions on Plans

Identify all Utilities within the Phase. Plans shall indicate the material type, size, and ownership. All subsurface Utility data shown on the Plans shall be designated at the highest practical subsurface utility engineering Quality Level in accordance with the current CI/ASCE Standard 38. Where Utility test holes are performed, the Utility type, size, and horizontal and vertical location data shall be included on the design documents.

Verify the location of Utilities and all associated appurtenances, including valves, manholes, vaults, handboxes, pedestals, cathodic protection test stations, meters, utility poles, guy

anchors, and any other component of Utility infrastructure. Any easement associated with a Utility shall be clearly shown on the Design Deliverables with dimensions and recorded plat or deed references.

7.4 Utility Agreements

7.4.1 Agreements with Utility Owners

MDOT will strive to enter into Utility Framework Agreements with some or all of the Utility Owners in relation to the P3 Program or the Phase as applicable, prior to the Effective Date of the Phase P3 Agreement. The Phase Developer shall assist MDOT in completing the negotiations to allow MDOT to execute a Utility Agreement with a majority of the affected Utility Owners. The Phase Developer shall execute the Work in conformance with the terms of these agreements and any subsequent revisions. Should the Phase Developer seek to amend a Utility Framework Agreement, the amendments shall be subject to review and acceptance by MDOT.

It is expected that MDOT will enter into further Utility Agreements with Utility Owners governing the conduct of Utility Work during the respective D&C Periods of each Section. The Phase Developer shall work with MDOT to negotiate and agree the terms for any further Utility Agreements directly with Utility Owners. The Phase Developer shall be responsible for complying with all obligations agreed with Utility Owners under the Utility Agreements or (as they relate to the Phase) the Utility Framework Agreement (with the exception of any obligations that are expressly retained by MDOT to be set out in the Section P3 Agreement).

The Phase Developer is not precluded from negotiating and entering into any direct agreements with Utility Owners in relation to the conduct of the Work at its own cost and risk with MDOT's prior written consent.

7.4.2 Payment to Utility Owners

Make any payments due to the Utility Owners for Utility Adjustment Work in accordance with the terms of the Utility Framework Agreements and Utility Agreements.

7.5 Required Items in Utility Submittals

Submit a Utility Adjustment Package where Utility Adjustment Work is required. Include Design Deliverables clearly depicting Utility Adjustments with each Submittal together with a composite utility Plan with all Utility Adjustments showing all other disciplines for coordination, including roadways, structures, drainage, and any other proposed conditions. Cost estimates for all Utility Adjustments shall be provided and shall include a breakdown of Utility costs.

7.6 Utility Adjustments Performed by Phase Developer

Where Utility Adjustments are performed on behalf of the Utility Owner, obtain permits, furnish, install, inspect, test, and coordinate the completion of the Utility and be responsible for obtaining all Governmental Approvals required for the Work. If additional ROW or easements are needed, the Phase Developer shall identify and perform all Work to obtain ROW or

easements following the requirements in Exhibit 6 Article 8 (Right-of-Way) and any Utility Framework Agreement or Utility Agreement.

The Phase Developer is alerted that some Utility Owners have experience or pre-qualification requirements, which must be met before designing and constructing their facilities. Should the Phase Developer not meet the experience or pre-qualification requirements or should the Utility Owner choose to self-perform the Work, Utility Adjustments may be performed by the Utility Owner or their choice of designated designer and contractor. The Phase Developer remains responsible for the cost and schedule impacts and is required to cooperate fully with any Utility Owner or their designers, contractors, and representatives in executing the requisite Utility Adjustments.

7.7 Utility Adjustments Performed by Utility Owner

For all Utility Adjustments performed by the Utility Owner, coordinate with the Utility Owner to ensure Utility Adjustments are consistent with the proposed Work. The requirements for the Work shall be in accordance with agreements in place with the Utility Owner. The Phase Developer remains responsible for the cost and schedule impacts and is required to cooperate fully with any Utility Owner or their designers, contractors, and representatives in executing the requisite Utility Adjustments.

7.8 Utility Easements

Identify the required utility easement in cooperation with Utility Owners and be responsible for obtaining easements or any property rights needed for the Work. The Phase Developer is responsible for ensuring all new Utility Easements are obtained and properly recorded in accordance with the Phase P3 Agreement and Section P3 Agreement.

7.9 Washington Aqueduct

The Washington Aqueduct is a National Historic Landmark, and it is anticipated the ROD will contain a listing of commitments and restrictions for working near the Aqueduct and relative to this facility.

The Washington Aqueduct is owned and maintained by the USACE and is designated as a critical infrastructure facility, therefore due to security concerns, facility drawings are not publicly available. The USACE will coordinate with the Phase Developer as needed, and the point of contact is Nathan Cole, who can be reached at Nathan.H.Cole@usace.army.mil.

In addition to the stipulations anticipated in the ROD, the following limitations apply to activities on the US Army Corps of Engineer property:

- permission is required for any Construction Work, site work, soil investigations (borings, test pits, etc.), and heavy vehicle travel along MacArthur Blvd from 10801 MacArthur Blvd, Potomac, MD 20854 property (Ol' Angler's Inn) to the DC line;
- vehicles with a GVW under 6 tons do not require a permit;
- vehicles above 6 tons require authorization by the USACE; and
- permission will not be granted for any vehicle with a GVW in excess of 15 tons.

Request for permit and Plan review shall be directed to USACE point of contact as identified above.

7.10 Construction Requirements

7.10.1 Care During Construction

All Construction Work shall be performed with care and shall be done in a manner to avoid damage to Utilities or any property or structure. Ensure continuity of all existing Utility services to all users. If a Utility is damaged by Work activities, MDOT, the Utility Owner, and any impacted parties shall be notified immediately in accordance with the Utility Work Plan.

The Phase Developer is alerted to the potential for encountering Hazardous Materials in the execution of Utility Adjustments.

7.10.2 Miss Utility

7.10.2.1 Maryland

Fully comply with all provisions of the COMAR, Public Utilities, Title 12, Underground Facilities (a.k.a. the "Miss Utility Law"). Notify public service companies of work intentions 48 hours prior to commencing Work by calling Miss Utility at 1-800-257-7777; calling 811, or by applying for Utility locates online at: <http://www.missutility.net/>. All notifications to the above Utility Owners and Miss Utility shall be given 48 hours (two full days) in advance of working in the area of each specifically affected Utility.

7.10.2.2 Virginia

Fully comply with the Code of Virginia Underground Utility Damage Prevention Act and the Rules for Enforcement. Notify public service companies of work intentions prior to commencing Work and allow sufficient time for utilities to be marked. Further information can be obtained by calling 811, or by applying for Utility locates online at: <https://va811.com/>.

7.10.3 Access to Utilities

Allow access to Utilities by Utility Owners to install, inspect, repair, maintain, or adjust their Utilities. Accommodate and cooperate with Utility Owner's efforts to avoid delays with access by Utility Owners or hindering the performance of Utility Owner's activities.

7.10.4 Inspection

Provide all necessary construction Inspections and material clearances for Utility Adjustment Work. These requirements shall be agreed upon by all parties and included in the design documents for each Utility Adjustment Package.

MDOT SHA Office of Construction ("MDOT SHA OOC") uses Survey123 (as developed by the ESRI Corporation) for utility inspections. The Phase Developer shall provide inspection data in a format compatible with Survey123.

All Work and materials shall be inspected for conformity with the RFC documents. To ensure safety and access during these Inspections, provide any equipment needed, such as walkways, railings, ladders, and platforms. Inspections shall not relieve the Phase Developer from performing the Work in accordance with the design documents. Ensure corrective measures are taken for any substandard Work or materials. Unsuitable Work or materials shall be rejected.

Inform MDOT, Utility Owner, and inspecting agency of any part of the Work, which is to be backfilled and covered, and allow a full and adequate opportunity to inspect and test such part of the Work before it is covered. If requested, remove or uncover any area of the completed Work and, after Inspection, restore the area.

7.10.5 Recordkeeping

Provide recordkeeping for all utility coordination and utility adjustments.

7.10.6 Survey Control

The Phase Developer is responsible for survey control of all Utility Adjustment Work and for ensuring all Utility Adjustment Work is performed in accordance with the Utility Adjustment Packages. The Phase Developer is responsible for providing sufficient survey control for Utility Owner performed Utility Adjustments if needed.

7.10.7 Permits

Obtain all necessary permits or ensure all permits are obtained by anyone performing Utility Work, including Utility Owners. Verify the Utility Work performed complies with the requirements of permits, approvals, or agreements.

7.11 Utility Service Connections

Establish new Utility services and any needed relocations of existing Utility services if needed to complete the Work. The Phase Developer is responsible for paying all installation fees and monthly usage throughout the term of the Section P3 Agreement.

7.12 Utility Clearance Reports

As Utility adjustments are completed, submit a Utility Clearance Report for each Utility Adjustment certifying all Utilities have been determined to be no longer in conflict with the Work and all payments for Utility Adjustments have been made. Obtain approval from the pertinent Utility Owner for the Utility Clearance Reports.

7.13 As-Built Drawings

The Phase Developer must obtain acceptable As-Built Drawings from Utilities or have them produced for all Utilities. As-Built Drawings shall conform to these Technical Provisions and to Utility Owner requirements. As-Built Drawings shall show, at a minimum, all new utility facility

locations, any old facilities which have been removed, and clear labeling to indicate any abandoned facilities no longer in use but physically remain in place.

7.14 Deliverables

Table 7-3 – Utility Submittals

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
Utility Work Plan	Prior to beginning Utility Work
Utility Adjustment Package	Prior to beginning construction on the specific utility
Utility status reports	Monthly
Utility Clearance Report	Within 30 days of construction completion of each Utility Adjustment
As-Built Drawings	Within 30 days of construction completion of each Utility Adjustment

ARTICLE 8. Right-of-Way

8.1 Scope

The acquisition of all privately and publicly owned real estate interests necessary for the delivery of the Phase (excluding the MDOT-Provided Parcels) and the expense of such acquisition, is the responsibility of the Phase Developer, subject to the obligations of MDOT set out herein. The acquisition of all MDOT-Provided Parcels is the responsibility of MDOT, subject to the obligations of the Phase Developer set out herein (including the obligation to pay any acquisition costs). In collaboration with MDOT, provide all services necessary to acquire title to the ROW or any other real estate interests, in form and substance acceptable to MDOT, in the name of the State of Maryland, MDOT State Highway Administration; and provide relocation assistance, in accordance with Applicable Law, for any Persons, businesses, farms or non-profit organizations displaced from real property and improvements acquired for the Work, if necessary. Management of any acquired property is required until such time construction activities are deemed complete. This management responsibility includes maintaining, securing, controlling, clearing, and demolishing any acquired property/improvements from the ROW.

8.2 MDOT-Provided Parcels

A listing of MDOT-Provided Parcels in Phase South MDOT is acquiring together with other pertinent information on these parcels is provided in the Reference Information Documents.

During the Predevelopment Work as part of developing the Section Schedule, the Phase Developer shall prepare a schedule of when the Phase Developer will require access to the MDOT-Provided Parcels for the D&C Work. The schedule of timing for access to MDOT-Provided Parcels is subject to review and acceptance by MDOT.

MDOT may enter into Third Party MOUs with government agencies with respect to the acquisition of certain MDOT-Provided Parcels, and any amounts due by MDOT under these Third Party MOUs shall be payable by the Phase Developer. The Phase Developer shall be responsible for delivering any mitigation, site improvements, modifications, or other ongoing obligations and complying with any requirements agreed under any Third Party MOUs.

The Phase Developer shall cooperate with MDOT, the Office of the Attorney General of Maryland ("OAG"), the federal government, to include the FHWA, and any other Governmental Entity relative to the acquisition and provision of the MDOT-Provided Parcels.

The Phase Developer's responsibility for costs and expenses that MDOT incurs in acquiring and providing the MDOT-Provided Parcels shall include responsibility for the costs of any mitigation, site improvements, modifications, property acquisitions, and any other ongoing obligations required to facilitate the conveyance of the parcel or property interest to MDOT or to grant MDOT the rights required for such property.

The obligations of the Parties set out in the following Sections of this Article 8 do not apply to the MDOT-Provided Parcels unless expressly stated otherwise.

8.3 Additional Properties

The Phase Developer, at its sole cost and expense, will be responsible for the acquisition of, or for causing the acquisition of, any property or property rights not provided for as MDOT-

Provided Parcels, including those necessary to accommodate necessary permanent and temporary rights, as well as for laydown, staging, temporary drainage, and other construction methods the Phase Developer may require in connection with the construction, repair, renewal, operation or maintenance of the Section ("Additional Properties"). The Phase Developer shall work with MDOT to identify and agree on any Additional Properties that will be needed in order to advance the ROW acquisition process as part of the Predevelopment Work.

The Phase Developer will be required to use its best efforts to minimize the need for the acquisition of Additional Properties. Additional Properties that need to be acquired from private landowners ("Privately Owned Additional Properties") will be treated differently from Additional Properties that need to be acquired from landowners that are Governmental Entities ("Publicly Owned Additional Properties"), as further described herein.

If any Privately Owned Additional Properties are needed, the Phase Developer shall use its best efforts to acquire Privately Owned Additional Properties. If, in relation to Privately Owned Additional Properties that are permanently needed to construct or maintain the Section, the Phase Developer is unable to reach a settlement with any private landowner, then subject to the Phase Developer's satisfaction of the requirements in Exhibit 6 Article 8 (Right-of-Way) Section 8.6.2.4 (Condemnation Support), MDOT shall proceed with any necessary condemnation proceedings, with the assistance of the Phase Developer, in accordance with these Technical Provisions, and to the extent permitted by Applicable Law and in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act (the "Uniform Act"). MDOT's obligation to pursue condemnation proceedings for any Privately Owned Additional Properties will only arise upon the Phase Developer's satisfaction of the requirements of Exhibit 6 Article 8 (Right-of-Way) Section 8.6.2.4 (Condemnation Support).

For the acquisition of any Privately Owned Additional Properties, the Phase Developer shall be responsible for all Phase Developer costs related to the acquisition process as well as the amounts payable to the property owner relating to the acquisition of the property interest or parcel. Should MDOT be required to undertake condemnation proceedings for the acquisition of any Privately Owned Additional Properties, MDOT's costs and expenses incurred in relation to condemnation proceedings will be reimbursed from the Additional Properties Costs Escrow Account. MDOT's costs and expense to be reimbursed include, without limitation, MDOT's internal and external costs of staff and advisors relating to the proceedings, MDOT's legal counsel costs, court fees payable by MDOT, Board of Property Review fees payable by MDOT, MDOT's other legal, administrative, and incidental expenses, expert witness fees, rates and costs (including appraisers, engineers, land planners, real estate consultants, cost estimators, outdoor advertising sign experts, and environmental consultants payable by MDOT), other litigation services (including transcripts and exhibits) costs, in each case, to the extent payable by MDOT, and MDOT's internal costs of managing publicity associated with the condemnation. Following any withdrawal by MDOT from the Additional Properties Costs Escrow Account, MDOT will provide notice to the Section Developer of (i) the details and amounts of such costs and expenses withdrawn and (ii) the balance of the Additional Properties Costs Escrow Account to the Section Developer. If the balance of the Additional Properties Costs Escrow Account is insufficient to reimburse MDOT for costs and expenses incurred by MDOT in connection with the condemnation of Additional Properties, MDOT shall issue an invoice to the Section Developer and the Section Developer shall reimburse MDOT directly and within 30 days of receipt of an invoice.

If any Publicly Owned Additional Properties are needed permanently or temporarily, the Phase Developer shall provide support to MDOT who will lead negotiations with the public property owner. MDOT shall use reasonable efforts to negotiate with any Governmental Entities to acquire such Publicly Owned Additional Properties to the extent permitted by Applicable Law, and in accordance with the Uniform Act. MDOT shall have no obligation to exercise eminent

domain with respect to Publicly Owned Additional Properties and any decision by MDOT to exercise eminent domain with respect to a Publicly Owned Additional Property will be at MDOT's sole discretion. The Phase Developer shall be responsible for all Phase Developer costs related to the acquisition process for any Publicly Owned Additional Properties as well as the cost of the property interest or parcel and the cost of any mitigation, site improvements, modifications, or other ongoing obligations required to facilitate the parcel or property interest to be conveyed to MDOT or to grant MDOT the rights required for such property. In the event that MDOT elects to exercise eminent domain with respect to a Publicly Owned Additional Property, prior to the commencement of condemnation proceedings the Phase Developer and MDOT shall agree to an approximate amount for MDOT's costs associated with such proceedings (which may be reimbursed from the Additional Properties Costs Escrow Account or directly by the Section Developer or as otherwise agreed).

Any funds remaining in the Additional Properties Costs Escrow Account after all property acquisition relating to that Section has been completed and MDOT has been reimbursed for all costs incurred conducting eminent domain proceedings for the relevant Section shall be shared between MDOT and the relevant Section Developer (with the respective share of MDOT and the Section Developer to be agreed during the Predevelopment Work).

The Phase Developer shall comply with the Uniform Act with respect to Privately Owned Additional Properties and, if applicable, Publicly Owned Additional Properties. MDOT shall be responsible to FHWA for providing oversight to the Phase Developer and ensuring that compliance with the Uniform Act is properly documented, provided that this does not create an obligation for the benefit of the Section Developer. Except with respect to MDOT's obligation to comply with the Condemnation Process Schedule as set out in Exhibit 6 Article 8 (Right-of-Way) Section 8.6.2.4 (Condemnation Support), the Phase Developer will solely bear the risk of any time and cost impacts to the Work related to the acquisition of Additional Properties including risk associated with delays or impediments to MDOT acquiring such Additional Properties.

8.4 Applicable Law

8.4.1 Maryland

All real estate interests required for the Phase shall be acquired in accordance with Applicable Law. The Phase Developer shall work cooperatively with MDOT to obtain property needed for the Work, subject to MDOT's rights of review, acceptance, and audit enumerated in Exhibit 6 Article 8 (Right-of-Way), the Agreement, the Section P3 Agreement or as required by Applicable Law.

8.4.2 Virginia

[To be determined following conclusion of the Bi-State Agreement between VDOT and MDOT]

8.5 Administrative Requirements

8.5.1 Office of Real Estate Management System

The Phase Developer must supply and maintain parcel-by-parcel status information incorporating the fields and information required by MDOT SHA's Office of Real Estate

Management System ("MDOT SHA OREMS"). Parcel status is required for both Privately Owned Additional Properties and Publicly Owned Additional Properties. The MDOT SHA OREMS database shall be accessible to and updated by such agents and representatives of the Phase Developer with certain access, read, review, and approval rights, as authorized by MDOT.

8.5.2 ROW Acquisition Plan

Prepare a ROW Acquisition Plan for the acquisition of Additional Properties as part of the Predevelopment Work, which shall set forth Phase Developer's organization, including names, titles and qualifications of personnel, schedule, interface between design and ROW acquisition activities, recordkeeping, and reporting.

The ROW Acquisition Plan shall include:

- the name of title company(ies) providing title-related services including the issuance of title reports, title updates, title insurance, title policies and conducting settlements that may be required by MDOT SHA Office of Real Estate ("MDOT SHA ORE");
- the name(s) and qualifications of the proposed ROW Acquisition Manager and other ROW acquisition personnel;
- the resumes and qualifications for pertinent staff performing ROW acquisition;
- how the Phase Developer plans to accommodate Persons with disabilities, in accordance with Applicable Law, and to provide necessary translation services for individuals whose primary language is not English;
- the approach to documenting and reporting on the ROW acquisition activities;
- the steps needed to produce and distribute acquisition and relocation documents;
- a procedure for engaging in, and concluding, negotiated settlements;
- the procedures to prevent fraud, waste, and mismanagement; and
- a schedule for ROW acquisition as described below.

The Phase Developer shall update the ROW Acquisition Plan as needed but at a minimum every 3 months and provide a copy to MDOT.

8.5.3 Schedule and Review Procedures

The ROW Acquisition Schedule shall indicate the date to begin the acquisition of each real estate interest and the anticipated completion date of acquisition activities for each property interest or parcel. The ROW Acquisition Schedule shall address all other activities needed to complete the ROW acquisition, such as the NEPA documentation and reviews by MDOT and others. The Phase Developer shall include adequate time for all ROW acquisition activities in the ROW Acquisition Schedule which is to be reflected in the Predevelopment Work Schedule and the Section Schedule. The Predevelopment Work Schedule and the Section Schedule must also include adequate time for all D&C and O&M activities related to ROW acquisition activities. Condemnation proceedings, if needed for an acquisition, shall be addressed in the Condemnation Process Schedule as noted in Exhibit 6 Article 8 (Right-of-Way) Section 8.6.2.4 (Condemnation Support), which is part of the ROW Acquisition Schedule. The time period that MDOT has agreed with respect to condemnation proceedings, if needed for an acquisition, are set out in the Condemnation Process Schedule as noted in Exhibit 6 Article 8 (Right-of-Way) Section 8.6.2.4 (Condemnation Support). Phase Developer shall update the ROW Acquisition

Schedule monthly at a minimum and to reflect any changes to the ROW acquisition activities, including any condemnation proceedings, and provide a copy of the updated schedule to MDOT. The time periods allowed for condemnation in the ROW Acquisition Schedule shall take into account the time periods in the Condemnation Process Schedules and any additional condemnation proceedings to be undertaken..

In developing the ROW Acquisition Schedule, coordinate with MDOT to incorporate adequate time periods for all activities, including MDOT's review of Deliverables (such as Acquisition Packages and Condemnation Packages). The Phase Developer acknowledges that MDOT will not be required to commence condemnation proceedings for more than 10 parcels or property interests per month.

If MDOT notifies the Phase Developer that any Deliverable has a deficiency, correct such deficiency and resubmit the complete Deliverable to MDOT marked as revised with the new date. Resubmissions shall be treated as a new Deliverable. A Deliverable will be deficient, as determined by MDOT, if any portion of the Deliverable is not in compliance with the requirements of the Phase P3 Agreement.

MDOT reserves the right to undertake an additional review of Deliverables which contain or identify facts or issues of an unusual nature or which do not clearly fit within MDOT standards.

The Phase Developer may consult with MDOT SHA Appraisal Review to review issued ROW plats, to ensure that appraisals are properly scoped to address the appraisal required for any acquisition.

8.5.4 Phase Developer's Right-Of-Way Scope of Services

Complete all administrative activities and prepare and file all documentation sufficient for the Phase Developer to acquire all relevant real estate interests for the Phase.

Except as otherwise authorized by Applicable Law for early acquisition and acceptance by MDOT, do not proceed with the acquisition of the property interest or parcel until all necessary NEPA approvals (including public involvement, if needed) are issued related to the acquisition of said property interest or parcel. Furthermore, do not commence any negotiations with private landowners until the specific Deliverable for that particular property interest or parcel has been accepted by MDOT.

If, in relation to Privately Owned Additional Properties that are permanently needed to construct or maintain the Section, the Phase Developer is unable to reach a settlement with any private landowner, then, if explicitly agreed to by MDOT, condemnation proceedings may be advanced as discussed in Exhibit 6 Article 8 (Right-of-Way) Section 8.6.2.4 (Condemnation Support).

If any Publicly Owned Additional Properties are permanently or temporarily needed to construct or maintain the Section, MDOT shall use reasonable efforts to acquire or work with FHWA to negotiate with any Governmental Entities to acquire such Publicly Owned Additional Properties. The Phase Developer will solely bear the risk of, and MDOT will not bear any liability for, the timetable, or ultimate success of such proceedings. The Phase Developer shall endeavor to identify all Publicly Owned Additional Properties during the Predevelopment Work.

The Phase Developer and the Section Developer shall cooperate with any outside counsel that MDOT retains relative to the acquisition of the MDOT-Provided Parcels and Additional Properties that are permanently needed for the ROW.

The Phase Developer shall not enter to begin construction on any property interest or parcel unless the property interest or parcel has been acquired, a valid right-of-entry agreement executed in MDOT's favor exists and is in MDOT's possession as to the subject property interest or parcel, or MDOT otherwise has obtained a right to possess the subject property interest or parcel. Further, any entry pursuant to a right-of-entry agreement must be limited to the terms of such agreement.

8.5.5 Acquisition Process Summary

The Phase Developer's major activities with respect to the acquisition of the Additional Properties include:

- ROW property interest or parcel identification, budget estimates and updates to the estimates;
- preparation of ROW plats meeting MDOT standards and submission of same subject to review, acceptance, and issuance by MDOT;
- title services;
- appraisal services;
- appraisal review;
- negotiations specific to Privately Owned Additional Properties;
- closing services;
- all aspects of relocation assistance;
- condemnation support services;
- environmental due diligence;
- documentation and document control;
- progress reports;
- ROW administration and management;
- quality management approach to ROW acquisition;
- certifying by the Phase Developer's design engineer the required ROW acquisition is necessary;
- obtaining right-of-entry, as necessary; and
- property management, which includes securing, managing, controlling, clearance, and demolition of structures located within the ROW, as needed.

8.5.6 Personnel Qualifications

The Phase Developer shall be responsible for hiring and providing personnel for the acquisition of ROW as further set forth below.

8.5.6.1 ROW Acquisition Manager

Provide a ROW Acquisition Manager to oversee the ROW acquisition process and coordinate the ROW acquisition work with MDOT as needed to meet the requirements of the Agreement. The ROW Acquisition Manager shall have the following qualifications:

- at least 5 years of recent experience managing the acquisition of ROW for transportation projects for an authority with condemnation rights; and
- familiarity with the appraisal process, appraisal reports, and appraisal report review pursuant to the Uniform Standards of Professional Appraisal Practice (“USPAP”) and knowledge and experience with the application of the Uniform Act and Applicable Law.

The ROW Acquisition Manager position must be filled until the ROW acquisition process is completed for the Phase; the Person holding such position is expected to be on-site in the Section Office and committed to the Work as needed to perform the required duties. Qualifications shall be subject to review and acceptance by MDOT. If a replacement is needed to fill the position, the qualifications for the replacement shall be submitted and are subject to review and acceptance by MDOT.

8.5.6.2 Quality Control and Quality Assurance

As part of the ROW acquisition work, identify staff responsible for internal quality control and quality assurance.

8.5.6.3 Appraiser and Appraisal Reviewer

Appraisal reviewers shall meet the same qualifications as appraisers. Each appraiser and appraisal reviewer shall be licensed and certified in the State of Maryland and shall have a minimum of 5 years of experience in appraising real property for eminent domain purposes, including partial taking appraisal, partial taking appraisal review, and expert witness testimony. He or she must also have been actively and continuously engaged for at least the previous 3 years in appraisal work in the State of Maryland. Appraisers and the appraisal reviewers shall have separate and distinct duties, and appraisers must be employed by different firms from the appraisal reviewers. Each appraiser shall be required to submit 3 samples of previous appraisal work prepared for eminent domain purposes. All appraisers preparing and signing appraisals must be accepted and pre-certified by MDOT before performing any appraisals for the Work. If required by MDOT, the appraiser shall be required to demonstrate his/her experience in providing expert witness testimony in eminent domain proceedings.

8.5.6.4 Relocation Agent

Each relocation agent shall have a minimum of 3 years of experience in relocation assistance performed in connection with the acquisition of ROW for transportation projects, pursuant to the Uniform Act. A relocation agent’s responsibilities shall include the following: determining identity and eligibility of all displacees; interviewing displacees and developing a relocation cost estimate; contacting all displacees and informing them of their eligibility for benefits and actual benefits; maintaining a file of all documentation concerning the relocation of the displacees; advising MDOT of rights and benefits of displacees; collecting, reconciling and recommending relocation submittals to MDOT for review and acceptance; and extending all relocation assistance advisory services to displacees.

8.5.6.5 Negotiators

Negotiators shall have a minimum of 3 years of experience in ROW negotiations for the acquisition of real estate interests and shall be familiar with appraisal reports and appraisal report review pursuant to the USPAP. The ROW negotiator's responsibilities shall include the following: communicating with property owners to discuss the acquisition of property needed; maintaining complete and accurate files of all transactions and contacts with the property owners or their representatives; actively working toward a negotiated acquisition of needed property with the property owner or representative; submitting Condemnation Packages to MDOT; and providing condemnation litigation support.

8.5.6.6 Real Estate Attorney

Each real estate attorney shall be barred in the State of Maryland and shall have at least 5 years of experience in real estate transactions, title review, and title curative matters. The real estate attorney's responsibilities shall include, but not be limited to, coordinating and clearing all title issues, preparation of option contracts, preparation of deeds or other conveyance instruments, preparation of releases, partial releases, subordinations, and partial subordinations, and compliance assistance with state and federal acquisition requirements for the Additional Properties. Any attorneys retained by the Phase Developer or Section Developer shall not through negotiations or otherwise hold themselves out as representing the State, OAG, MDOT or any MDOT-related entity. All ROW matters referred to MDOT for acquisition through condemnation or otherwise, shall be handled by the OAG or outside counsel selected by MDOT or the OAG.

8.5.7 Conflict of Interest

The Phase Developer shall not acquire, directly or through an agent, or permit the acquisition of any ROW for the purpose of avoiding compliance with Applicable Law.

8.5.8 Meetings

The Phase Developer shall attend meetings as requested by MDOT. At such meetings, the Phase Developer shall provide meeting materials as needed, take minutes, and distribute the minutes to all attendees.

8.5.9 Documentation and Reporting

The Phase Developer shall provide MDOT with all records, reports, appraisals, written communications, and supporting documentation prepared or received by the Phase Developer during the ROW acquisition process. All written correspondence with MDOT and property owners relating to the acquisition of real property shall include a heading with the following information:

- county;
- project number (or "Work number");
- item number;
- Federal Project Number (if applicable);
- route and termini;

- Work limits;
- property interest or parcel number or property address;
- name of record owner(s); and
- use of MDOT's naming convention for all electronic files and reporting fields.

In administering and managing its ROW acquisition activities the Phase Developer shall:

- maintain property interest and parcel records on file for all aspects of the acquisition process in accordance with MDOT's requirements and Applicable Law;
- include all documents for each property interest or parcel file;
- provide monthly summaries for the cost of ROW acquisition and related relocation assistance, including amounts authorized and amounts paid for each property interest or parcel and budget forecasting for all acquisitions as requested by MDOT;
- maintain and electronically transmit to MDOT, in a format acceptable to MDOT, monthly status reports including appraisal information, acquisition and relocation status, if applicable, of all property interests or parcels and activities related to ROW acquisition;
- prepare and submit electronically to MDOT, monthly, a spreadsheet containing ROW acquisition specific data required to complete the fields in MDOT SHA's OREMS database or as directed by MDOT;
- provide updates to data contained in the monthly reports at interim periods between reports if requested by MDOT; and
- input and update property interest or parcel status in MDOT SHA's OREMS database as directed by MDOT.

8.5.10 Responsibilities of Phase Developer

The Phase Developer is responsible for the costs of all services and preparation of all documentation for all ROW acquisition, maintenance, permitting, and related relocation assistance for all Additional Properties (including Additional TCAs) needed for the Work. The Work related to ROW acquisition includes mapping, surveying, preparation of ROW plats meeting MDOT standards, environmental assessment, testing and remediation, appraisal, appraisal review, negotiation, acquisition, relocation advisory assistance and determination of relocation benefits to be provided, procurement of title insurance, clearing of title, the closing of acquisitions, demolition of acquired improvements, administrative settlement packages, coordination with all relevant government entities, coordination with the OAG, coordination with any outside counsel hired by MDOT or the OAG, preparation and submission of all information necessary for the initiation of condemnation proceedings, procurement of expert witness services relative to condemnation proceedings, and provision of support and assistance relative to the litigation of condemnation proceedings.

Additional detail of the ROW acquisition process is discussed in Exhibit 6 Article 8 (Right-of-Way) Section 8.6 (ROW Acquisition Process).

The Phase Developer is responsible for and shall process payment submittals for requests of payments and disburse all payments of agreed purchase prices, court awards and judgments, including any interest due under such rulings (including any pre- or post-judgment interest amounts due); tax rebates associated with any parcel being acquired; any fees or amounts payable to the holder of any lease, easement, conveyance, lien, mortgage or other interest;

any costs associated with recording legal instruments; any costs associated with demolition of improvements acquired for the Work; and Board of Property Review awards and fees within 30 days of receipt of the invoice

The Phase Developer is responsible for possessing all improvements acquired, unless eminent domain is exercised, including initiating an ejectment action and working with local law enforcement, if required, should an occupant delay in vacating a property. If the occupant of the property is eligible for relocation assistance, all the rights and benefits the displacee is entitled to receive must have been made available, including advisory services at the Phase Developer's cost and expense.

The Phase Developer is also responsible for the costs of acquisition and documentation for the acquisition of any temporary right or interest in real property not required for the permanent Work but that the Phase Developer deems desirable to acquire for workspace, Contractor lay-down areas, material storage areas, borrow sites, or any other convenience of Phase Developer. MDOT shall have no obligations or responsibilities with respect to the acquisition, maintenance or disposition of Additional TCAs or such temporary rights or interests.

The Phase Developer shall store the completed hard copies of files until all ROW acquisition is completed, or a date specified by MDOT, submitting the completed files in accordance with the closeout procedures as defined by MDOT within 90 days of the completed ROW activity. The Phase Developer shall provide to MDOT its ROW file for each property interest or parcel, which file shall include, but not be limited to, the following documentation:

- an appraisal report(s) (initial appraisal and all other issued appraisal reports, accepted or not accepted, with most recent appraisal report on top);
- appraisal review results for each report;
- Offer of Just Compensation letter(s);
- option contract(s), ROE agreement(s), deed(s), easement(s), release(s) or partial release(s), subordination(s) or partial subordination(s), judgment(s) (including Inquisitions and Agreed Inquisitions), Board of Property Review Awards;
- title insurance policy or attorney's certificate, if required by MDOT;
- negotiator reports, Record of Negotiations or other correspondence regarding the property interest or parcel;
- negotiator's certificate;
- relocation files (in chronological order);
- relocation agent reports or contact sheets;
- any other applicable or general correspondence; and
- all other documentation regarding the property interest or parcel.

8.5.11 Responsibilities of MDOT

MDOT will have the following limited responsibilities, subject to the delivery by the Phase Developer of the relevant Deliverables in a form acceptable to MDOT, in connection with acquisition of ROW for the Phase:

- final acceptance of:
- all Acquisition Packages;

- Condemnation Packages;
- relocation eligibility and the Phase Developer's payment of relocation benefits;
- administrative settlements; and
- the amount of just compensation agreed to with property owner(s), including whether to accept a determination of just compensation determined by a Board of Property Review or court (subject to consultation with OAG);
- issue a determination of just compensation on all property interests or parcels after appraisal review;
- coordinate services between the Phase Developer and the OAG or outside counsel for all Board of Property Review proceedings, court proceedings, trials, and related tasks;
- provide a contact to serve as the point of contact for all ROW acquisition;
- review for acceptance the completed, final closeout files in accordance with the closeout procedures;
- MDOT is responsible to hear and render decisions on appeals relating to relocation assistance. A decision on an appeal shall be binding on the Phase Developer unless overturned upon judicial review; and
- Any other obligations expressly set out as obligations of MDOT in this Article 8.

8.5.12 MDOT Audits

In addition to its review and acceptance authority, MDOT may, at its sole discretion, audit or monitor the ROW acquisition activities and services performed by the Phase Developer. MDOT may contract with independent consultants to assist it in fulfilling the audit or monitoring function. In addition to any of the matters specifically required to be provided by the Phase Developer to MDOT pursuant to Exhibit 6 Article 8 (Right-of-Way) Section 8.5.10 (Responsibilities of Phase Developer), provide information to MDOT as requested to assist in its review and assessment of the progress, timeliness, adequacy, or sufficiency of the Phase Developer's ROW acquisition activities.

8.6 ROW Acquisition Process

8.6.1 Pre-Acquisition Activities

8.6.1.1 Title Services

The Phase Developer may select and contract with one or more title companies acceptable to MDOT. For each Additional Property to be acquired, the Phase Developer shall deliver to MDOT a 60-year title search, a preliminary title commitment or preliminary title report, and, if necessary or appropriate, copies of all underlying documents together with a plat of all easements, including existing Utility property interests. Each title report shall be dated not more than 60 days prior to the date of submittal to MDOT of the Acquisition Package for each such property interest or parcel. Review the preliminary title commitment or report to ensure all current owners of record title are contacted, and negotiations or condemnation actions are conducted with all appropriate parties. All title reports must be in the following required format: clearly indicate which exclusions and exceptions shall be deleted upon acquisition of the subject property interest or parcel, and clearly indicate any required Deliverables to the title company

to clear identified exclusions and exceptions. Notify the title company, by letter, which exceptions should be removed, including easements that:

- are appurtenant to and of benefit to the property interest or parcel but not included in the property interest or parcel to be acquired; and
- are a burden on the property interest or parcel and not acceptable.

Work with the current owners of record title to each property interest or parcel or interest in a property interest or parcel or their designee and all other appropriate parties to clear any title exceptions or exclusions not acceptable to MDOT.

If required by MDOT, secure an owner's policy of title insurance, from a title company acceptable to MDOT, in the amount of the total acquisition cost, to include cost of the property, improvements and damages to the remainder of the property, for each property interest or parcel acquired, whether by purchase or condemnation, ensuring title in the name of MDOT SHA. All property and real estate interests, including temporary interests, shall be acquired in the name of the "State of Maryland, Maryland Department of Transportation State Highway Administration," in fee simple absolute or easement interest as appropriate and approved by MDOT, free and clear of all liens and encumbrances. Title policies must be in a form and substance acceptable to MDOT.

8.6.1.2 Introduction of Property Owners

To begin the acquisition of any Additional Property, the Phase Developer shall prepare for MDOT review initial contact letters of introduction for property owners and displacees, and any other related correspondence MDOT requires. Following signature, the Phase Developer is responsible for delivery or mailing. The letters shall clearly describe the Work, MDOT's need for the owner's property, and shall include the name and telephone number of Phase Developer's representative. The form for these letters will be subject to review and acceptance by MDOT prior to use. Property owners or displacees unable to read or understand the letters must be provided appropriate translation services or other reasonable assistance, as necessary.

Such letters shall include any standard brochures of informational materials designated by MDOT, including MDOT's current pamphlet, "Your Land and Your Highway" and "Relocation Assistance – Your Rights and Benefits," if applicable.

8.6.1.3 Right-of-Entry

The Phase Developer shall pursue and obtain ROE Agreements ("ROE") with MDOT's assistance prior to or concurrent with the property interest or parcel negotiations, if applicable. The form of the ROE will be provided by MDOT and will contain provisions allowing for entry and construction, if appropriate, to commence while negotiations are occurring or otherwise prior to the acquisition of title. Such ROE agreements shall be sought and negotiated strictly in accordance with Applicable Law and only with the prior written consent of MDOT. If a ROE is obtained, an option contract must be obtained, or a condemnation proceeding initiated within 90 days from the date of the ROE unless such time is expressly extended by MDOT.

8.6.1.4 Other Parties with an Interest in a Property

The Phase Developer shall identify lessees, licensees, occupants, or other parties with potential compensable interests, including outdoor advertising sign owners, and, if appropriate, after

consultation with MDOT, negotiate with such parties for the acquisition of such interests, as applicable, within the administrative settlement process.

8.6.1.5 Appraisals

8.6.1.5.1 Appraisal Services

The Phase Developer shall provide MDOT with fair market value appraisals for all Additional Properties. Qualified appraisers shall be used to assist MDOT in establishing just compensation for property interests or parcels. Ensure all appraisals are prepared in conformance with Applicable Law (including the Uniform Act), USPAP, and in accordance with professional appraisal methods and applicable MDOT standards. Appraisal services to be provided by the Phase Developer shall include:

- selecting appraisers from MDOT's list of pre-certified fee appraisers;
- establishing personal pre-appraisal contact with each owner of record title and document all such contacts within the appraisal report;
- contacting the record title owners or their designated representatives, in writing, to offer them the opportunity to accompany the appraiser on the appraiser's Inspection of the property interest or parcel and maintain a record of all such contacts and attempts to contact in the property interest or parcel file;
- requiring the appraiser to prepare a complete appraisal on the whole property affected by the acquisition, including improvements, and any damage to same;
- preparing a report for each property interest or parcel to be acquired to include the whole property, the portion to be acquired, and any special analyses, studies or reports, as necessary;
- performing an evaluation of all outdoor advertising signs impacted by the Work, as required, utilizing the appropriate forms as instructed by MDOT;
- causing the appraiser(s) to testify as an expert witness(es) or providing expert witness(es) acceptable to MDOT in Board of Property Review hearings and condemnation proceedings through jury trial and be available for depositions, other discovery, and pre-hearing or pre-trial meetings, as directed by MDOT;
- coordinating in writing with the review appraiser regarding corrections and additional information that may be required for an appraisal;
- preparing updated appraisals, as well as updated appraisal reviews, when required by MDOT or as needed during condemnation proceedings to include:
 - a letter of transmittal with a specific reference to the original appraisal report, any changes in market conditions since the original appraisal, any changes in the subject property since the original appraisal, a statement of the current value or extension of the original value opinion and the listing of the current date of value;
 - any qualifying and limiting conditions or general assumptions by the appraiser;
 - a copy of the survey and legal description of the property being acquired, current photographs of the subject property, clearly showing the area being acquired, even though the original appraisal report contained photographs of the subject and the area of the acquisition; and

- documentation of significant changes to the subject property including the area being acquired, access to the remainder property, damages to the remainder(s), market conditions, the subject property's highest and best use from the previous appraisal or significant changes in the approaches to value, and reappraisal of the property, in MDOT's discretion;
- preparing and delivering to MDOT upon request, a copy of all file documents;
- engaging an environmental professional who meets the qualifications set forth in American Society for Testing and Materials ("ASTM") Standard E 1521, Standard Practice for Environmental Site Assessments to perform an assessment of any property interest or parcel where there is suspected contamination, which may affect the value of the property; and
- engaging a land planner, or other appropriate and qualified person, to evaluate the land-use potential for a property interest or parcel to assist with the development of an appropriate appraisal.

8.6.1.5.2 Appraisal Review

When reviewing an appraisal or an updated appraisal, reviewers shall:

- determine, in consultation with MDOT, if additional appraisal reports or technical expert reports are required, and initiate, review, and reconcile each such report;
- review all appraisal reports for each property interest or parcel to determine the consistency of methodology, supporting documentation related to the opinions and conclusions reached, and compliance with applicable standards;
- inspect the subject properties and all properties used in direct comparison for each appraisal being reviewed; and
- submit an appraisal review report subject to review and acceptance by MDOT and the establishment of Just Compensation.

Upon completion of the review, the appraisal reviewer shall certify in writing to MDOT that all required standards have been met.

8.6.1.6 ROW Acquisition Package Acceptance

Acquisition Packages for each Additional Property submitted for MDOT's acceptance shall include the following items, prepared for each property interest or parcel:

- a cover sheet that identifies the contents of each submission;
- the appraisal, the appraisal review, and supporting reports or documents;
- ROW plat of the property interest or parcel signed and sealed by a Professional Land Surveyor and issued by MDOT;
- a title report, current within 90 days, including copies of all documents identified in the exceptions listed, the Title Examiner's analysis or title commitment to determine potential problems and proposed methods to cure title deficiencies and title curative documents;
- an accurate and complete MDOT SHA Form 80, and a copy of all leases on the property;

- a real/personal property report detailing the items making up each property interest or parcel, classified as real estate, tenant-owned improvements or personal property;
- all documents relating to relocation assistance (if applicable);
- the proposed initial Offer of Just Compensation, option contract, deed, easement, release(s), subordination(s), or waiver(s), and any other documents necessary to provide MDOT good and marketable fee simple title free of all liens and encumbrances; and
- any other required MDOT forms, such as a record of all contacts with the property owner or any party with a compensable interest.

8.6.1.7 Acceptance of the Offer of Just Compensation

Upon MDOT's determination of just compensation, presentation of the Offer of Just Compensation to the property owner may proceed. Offer letters shall include a copy of the ROW plat, appraisal report, and any other materials required by MDOT.

8.6.2 Acquisition Activities

8.6.2.1 ROW Negotiations

The Phase Developer shall conduct all negotiations in accordance with the requirements of Applicable Law.

The Phase Developer shall, upon MDOT's acceptance of the Acquisition Package, contact each property owner or owner's designated representative, in-person where practical, to present the Offer of Just Compensation with supporting documents including the appraisal report, right-of-way plat(s), and appropriate brochures (provided that in the case of Publicly Owned Additional Property, the Phase Developer shall only contact the owner with MDOT's prior consent and MDOT may elect to lead all negotiations with the relevant owner). A copy of the appraisal report for the subject property shall be provided to the property owner or authorized representative at the time of the initial offer. All appraisal reports produced or acquired relating specifically to the property owner's property must be delivered to the property owner. Maintain a file record of receipt of offer, appraisal report, and other documents signed by the property owner and a complete and detailed Record of Negotiations on forms acceptable to or provided by MDOT detailing all follow-up contacts, attempted contacts, and written and verbal communication. Secure the necessary documentation and title curative work upon acceptance of the purchase offer.

The Phase Developer shall provide timely (i.e., not more than 5 Business Days after inquiry) response to the verbal or written inquiries of any property owner, lessee, licensee, occupant or other holders of a compensable interest, as applicable. Prepare a separate negotiator contact report for each meeting or conversation with any Person (or their appointed representative(s) supported by a written confirmation of appointment) who has a compensable interest in each property interest or parcel on MDOT SHA ORE Form 17 — "Record of Negotiations." Contact records shall also be prepared for unsuccessful attempts to contact such Persons.

The Phase Developer shall confer with and transmit to MDOT's Real Property Manager any settlement request from property owners, lessees, licensees, occupants, or other holders of any compensable interest, as applicable, including a detailed recommendation from the Phase Developer in accordance with standards, manuals, and procedures. MDOT shall determine

whether to accept such a settlement request. Delivery of the administrative settlement request and the Phase Developer's recommendation to MDOT must occur within 5 Business Days following the Phase Developer's receipt of the administrative settlement request.

The Phase Developer shall consider all reasonable settlement requests (complying with the regulations as outlined in Exhibit 6 Article 8 (Right-of-Way)) which help expedite the ROW acquisition process. MDOT encourages all positive and creative solutions which satisfy the property owner and promote the success of the P3 Program.

The Phase Developer shall prepare and deliver supplemental settlement or counter-offer letters to the property owners, lessees, licensees, occupants, or other holders of any compensable interest, as applicable. Submit to MDOT a copy of such letters within 2 Business Days after delivery to the property owner. Supplemental settlement or counter-offers above the initial offer letter acceptable to MDOT must be accepted in advance by MDOT or expressly state it is contingent on MDOT acceptance.

The Phase Developer shall provide a letter with MDOT's response to the property owner, lessee, licensee, occupant, or other holders of a compensable interest, as applicable, and deliver all settlement responses (if within reasonable proximity of the Work) by hand within 3 Business Days after receipt. If this delivery method is not feasible, mail (with return receipt requested) response letters not more than 3 Business Days following any decision by MDOT. If the mailing option is selected, make a telephone call to the property owner to discuss the settlement offer prior to mailing the response letter. The MDOT Real Property Manager, on an as-needed basis, will be the point of contact on all administrative settlement matters.

Notwithstanding an unsuccessful completion of the formal administrative settlement process, the Phase Developer shall continue to engage in negotiations with the owners of compensable interests.

The Phase Developer shall maintain and store a complete property interest or parcel file for each property interest or parcel. All original documentation related to the purchase of the real property interests or parcels shall be maintained (housed separately from the relocation files) in conformance with MDOT standards, manuals, and procedures. All original ROW documents shall be retained and properly secured. Signed original documents shall be forwarded to MDOT periodically or as requested by MDOT with a transmittal form during the acquisition process; provided, however, all remaining original documents shall be forwarded upon completion of the acquisition of ROW. Prepare and deliver documents of conveyance to the property owner, lessee, licensee, occupant, or other holders of any compensable interest for execution. Such documents shall be notarized and recorded in accordance with Applicable Law.

At the conclusion of successful negotiations on a property interest or parcel where an offer is accepted, prepare an Option Assembly Package for the property. The Option Assembly package shall include the contract of sale, tax information, applicable federal tax form W-9, title report, plat, contact notes and all other information relative to the property interest or parcel. Provide the Option Assembly package to MDOT with the draft closing Submittal.

8.6.2.2 Relocation Assistance

The Phase Developer shall coordinate and perform the administrative requirements necessary to relocate any occupants and personal property from Additional Properties, as required for the Work and authorized by MDOT. All Work prepared with respect to relocation assistance shall be performed in accordance with Applicable Law, including the Uniform Act, and in accordance with

all provisions of this Phase P3 Agreement. All Work shall be recorded in the MDOT SHA OREMS database, unless otherwise agreed to in writing by MDOT.

The Phase Developer's major activities with respect to the provision of relocation assistance, in accordance with the MDOT SHA ORE Manual, include:

- preparing a relocation assistance package for each relocation;
- monitoring relocation assistance activities;
- preventing fraud, waste, and mismanagement; and
- assisting with all requests and being responsible for implementing decisions made by MDOT, including MDOT's review and appeal process for relocation assistance and judicial reviews associated with relocation assistance.

The Phase Developer shall provide relocation assistance strictly in accordance with Applicable Law, and, in particular, the Uniform Act. With respect to relocation assistance, the Phase Developer's responsibilities and obligations include:

- providing written notice to all displaced property owners, lessees, licensees, occupants, other holders of compensable interests, and other potential displacees regarding relocation assistance and providing such Persons with a relocation assistance brochure acceptable to MDOT;
- performing relocation interviews, completing and maintaining interview forms, and discussing eligibility requirements, programs, and services with potential displacees;
- maintaining a written record of all verbal and non-verbal contacts;
- contacting and providing relocation assistance to those Persons affected by the ROW acquisition and completing forms for all displacees, as required;
- locating, evaluating and maintaining files on comparable available housing, and commercial, retail, and industrial sites, as applicable;
- calculating replacement supplement eligibility and benefits;
- computing and submitting requests for relocation rental/housing studies or supplements to MDOT SHA ORE prior to submission to displacees. All relocation eligibility studies and supplements shall be subject to MDOT's written acceptance within 5 Business Days;
- performing a decent, safe, and sanitary Inspection for each replacement residential housing comparable, photographing the comparable and completing the Inspection form. All pertinent relocation assistance forms shall be obtained from MDOT SHA Real Property Manager;
- obtaining at least 2 moving estimates from moving companies to affect relocation of personal property in compliance with the Uniform Act;
- preparing a moving Plan with appropriate photos, sketches, and inventory of personal property to be moved;
- coordinating moves with displacees and moving companies in accordance with MDOT standards and the Uniform Act;
- maintaining relocation contact records on an MDOT SHA Form 17 or in MDOT SHA OREMS database as directed by MDOT;
- attending all closings on replacement properties, if requested by any Person involved, and assuring supplemental payments, if any, are properly distributed;

- processing and computing increased interest payments on the mortgage of owner-occupied dwellings, as required;
- providing a 90-day notice of eligibility letter to displacees simultaneous with the delivery of the relocation benefits package. Deliver a 90-day letter to displacees with the location of the comparable property used to compute the replacement housing eligibility;
- informing the displacees of their right to appeal their replacement eligibility in accordance with the Uniform Act and Applicable Law, including the first stage of appeal of relocation assistance submitted to MDOT SHA Director of ORE or his/her designee, the second stage of appeal of relocation assistance submitted to the MDOT Deputy Administrator or his/her designated representative, and, thereafter, judicial review;
- delivering a 30-day notice to displacees and property owners upon MDOT's possession or right of possession of real property or improvement being acquired, if applicable;
- notifying MDOT SHA Real Property Manager immediately if a displacee has not moved after the 30-day notice expires;
- ensuring ROW Relocation Agents are available for any appeals or hearings;
- preparing relocation payment claim submissions for all displacees and all relocation assistance benefits;
- verifying decent, safe and sanitary dwelling criteria on all replacement housing as selected by the displacees, unless otherwise instructed by MDOT;
- securing dwellings and structures no later than 10 days, or such shorter time specified by MDOT, after vacancy by the displacees and protecting acquired improvements following acquisition and relocation;
- maintaining a complete file, separate from an acquisition file, relative to the relocation of each displacee and making such file available for Inspection;
- preparing all correspondence to the displacees or their representative(s) and have Phase Developer's correspondence signed by the ROW Relocation Agent;
- delivering to each displacee the relocation assistance payments and obtaining a written receipt signed by the displacee;
- assisting MDOT, the OAG, or any outside counsel with ejection or eviction proceedings by serving notice of the potential for, or of actual, such proceedings on occupant(s) of property who have not complied with move-out dates, coordinating the ejection or eviction process with local authorities, and accompanying the Sheriff's Department, as necessary, during the ejection or eviction process; and
- preparing any lease or license agreements relative to any displacees that MDOT permits to stay on real property to which MDOT has acquired title and collecting any rents from displacees and submitting same for deposit to MDOT.

The Phase Developer shall extend special effort and consideration to displacees in the move-out process. If the displacees have not moved from the State-owned improvement and ejection or eviction becomes necessary, the Phase Developer must provide written request to MDOT to begin ejection or eviction proceedings, the costs and expenses of which, and the risks of delay in the Work associated therewith, the Phase Developer shall bear. The request must include written evidence of the due diligence efforts made by the Phase Developer to move the displacees from the acquired parcel, property interest, or improvement and also written recommendations on how MDOT can facilitate the displacee's move.

In conjunction with negotiations, the Phase Developer shall maintain a relocation office (meeting Americans with Disabilities Act requirements) within reasonable proximity of the Work available to all displacees for relocation services at the convenience of the displacees and provide displacees with a 24-hour toll-free phone number with a monitored voicemail.

8.6.2.3 Closing Services

For purposes of closing services, the Phase Developer shall:

- submit a final, previously accepted Closing Submittal to MDOT a minimum of 24 hours prior to closing, with such submission including:
 - a reference to the disposition of any environmental matters;
 - an updated title commitment (if title insurance is required by MDOT) no more than 15 days prior, with notations indicating the disposition of all encumbrances, liens or other clouds on title;
 - a copy of the special warranty deed or other conveyance instrument to be delivered;
 - a proposed closing statement indicating disposition of all proceeds;
 - a copy of any and all releases or subordinations of liens;
 - a copy of any miscellaneous documents and other curative matters required to be delivered at closing; and
 - a copy of the closing memorandum.
- prepare the escrow agreement and closing documents, if applicable, including a closing memorandum identifying all parties involved in the closing, and listing all documents to be executed or delivered in connection with the closing;
- schedule and attend closing with the Phase Developer's title company; provide curative title documents and exhibits as required and in conjunction with the applicable title company;
- confirm all conditions to closing are satisfied and notify MDOT of all closing appointments;
- at closing or at such other appropriate time, pay to the property owner(s) or other appropriate party(ies) any balance due on the total just compensation agreed upon by the parties, or as finally determined by a binding decision of a Board of Property Review, or as determined by a court;
- if title insurance is required, obtain an issued title policy based on the accepted updated title commitment within 30 days following closing and transmit the same to MDOT;
- record the fully executed deed and any other instruments delivered at closing, including but not limited to releases and partial releases, and subordinations and partial subordinations, Inquisitions and Agreed Inquisitions, in the appropriate land records office immediately following closing;
- obtain and deliver to MDOT one certified copy of each instrument of conveyance immediately after closing, and where title insurance is required provide the original title policy to MDOT within 5 Business Days after receipt; and
- cause to be delivered to MDOT the original recorded conveyance instrument within 10 days after the title company receives same.

8.6.2.4 Condemnation Support

Where the Phase Developer has followed the acquisition process for Privately Owned Additional Properties permanently needed to construct and maintain the Section set forth in this Article 8 (Right-of-Way) and engaged in Good Faith negotiations and is unable to acquire the permanent Privately Owned Additional Property, the Phase Developer may request that MDOT SHA acquire the property by condemnation. MDOT will only commence condemnation proceedings if the Phase Developer has demonstrated to MDOT's satisfaction, acting reasonably, that (i) the Phase Developer has used all reasonable efforts to negotiate in good faith with the property owner and exhausted all options reasonably available to it to acquire the relevant Privately Owned Additional Property without the use of condemnation, and (ii) the Privately Owned Additional Property is required for the delivery of the relevant Section and, (iii) the parcel or property interest is to be used for permanent improvements and not for temporary or construction laydown purposes. If MDOT is not satisfied, acting reasonably, that these conditions have been fulfilled by the Phase Developer, MDOT shall not be required to commence condemnation and may direct the Phase Developer to continue negotiations in order to reach a settlement for the acquisition of the relevant Privately Owned Additional Property. Should MDOT proceed with condemnation of the relevant Privately Owned Additional Property, the Phase Developer shall provide all assistance and resources necessary to support such proceedings. MDOT will bear the risk of time and cost impacts to the Work for failing to provide the specified access rights for the relevant Privately Owned Additional Property to the Phase Developer or relevant Section Developer within the timeframe agreed as part of the Condemnation Process Schedule, except that, if, without fault on the part of MDOT, any failure to provide access is due to the issuance of any preliminary or permanent injunction or temporary restraining order or other similar order by a court of competent jurisdiction, or due to a legal challenge or restraint or prohibition by a Governmental Entity that delays or prevents the condemnation proceedings, MDOT will provide schedule relief only to the Section Developer, unless otherwise agreed between the Phase Developer and MDOT during the Predevelopment Work.

The Phase Developer acknowledges that MDOT will not be required to commence condemnation proceedings for more than 10 parcels or property interests per month.

MDOT and the Phase Developer shall agree to a schedule for the condemnation process relating to each Privately Owned Additional Property for which condemnation proceedings may be pursued ("Condemnation Process Schedule"). The Condemnation Process Schedule shall be agreed to by the parties during the Predevelopment Period prior to the acceptance of the Committed Section Proposal. Once agreed, MDOT shall comply with the time periods set out in the Condemnation Process Schedule subject to the Phase Developer or relevant Section Developer complying with all its related obligations. The Condemnation Process Schedule shall include, for each Privately Owned Additional Property that may need to be acquired using condemnation:

- timing of the condemnation proceedings for the parcel, with any agreed timeframes to commence once the Phase Developer has used all reasonable efforts to negotiate in good faith an acquisition of the relevant Privately Owned Additional Property in accordance with the requirements of this Exhibit 6 Article 8 (Right-of-Way) Section 8.6.2.4 (Condemnation Support);
- a time period following the commencement of condemnation proceedings by which MDOT will be able to provide the required access rights with respect to the Privately Owned Additional Property;
- timeframes reflecting the relocation of any displacee on the Privately Owned Additional Property which are affected by the acquisition and make note of any such displacee;

- note whether a "quick take" acquisition will be used for the property; and
- include timeframes reflecting the maximum number of condemnation proceedings that MDOT will commence during any month in accordance with this Exhibit 6 Article 8 (Right-of-Way) Section 8.6.2.4 (Condemnation Support).

It is expected that different Privately Owned Additional Properties shall have different time periods in the Condemnation Process Schedule due to different factual circumstances of such parcel. While MDOT may use "quick take" condemnation proceedings to provide access to a parcel or property interest before the condemnation proceedings are concluded, MDOT cannot guarantee access will be granted using the "quick take" approach.

Where the Phase Developer believes, and can demonstrate to MDOT, that a Publicly Owned Additional Property is required for the relevant Section, the Phase Developer shall work with MDOT to negotiate a Third Party MOU with the relevant Governmental Entity to acquire the Publicly Owned Additional Property. The Phase Developer acknowledges that MDOT is unable to exercise its condemnation authority in relation to federally owned property and, possibly, in relation to certain other publicly owned property. If MDOT does have legal authority to use eminent domain with respect to any publicly owned additional property, MDOT may, at its sole discretion, but shall be under no obligation to, commence condemnation proceedings in relation to such publicly owned property (and any determination by MDOT to use condemnation shall be subject to such timeframes, terms and conditions as MDOT may determine, including with respect to its costs).

In the event that condemnation proceedings are requested for a Privately Owned Additional Property, following the Phase Developer's exercise of all reasonable efforts to acquire the Privately Owned Additional Property through negotiation, the Phase Developer shall assist MDOT by preparing and submitting Condemnation Packages, exhibits, transcripts and providing any required condemnation support, including providing expert witnesses and exhibits required by MDOT, the OAG, or outside counsel selected by the OAG for administrative or judicial actions. Phase Developer acknowledges that condemnation proceedings, and therefore, its acquisition obligations may extend past Final Completion and these obligations shall survive termination of the Phase P3 Agreement and shall be included as Section Developer obligations in the Section P3 Agreement.

Should the Phase Developer believe that condemnation proceedings are needed for a Privately Owned Additional Property, the Phase Developer is responsible for performing the following tasks and services and such other related tasks as directed by MDOT:

- notify MDOT of any potential condemnation case filings and document the reason(s) for filing condemnation cases including recommendations for requesting that the State Roads Commission ("SRC") initiate quick-take condemnation proceedings;
- in the event a parcel owner cannot be identified or found, promptly document the reasons the owner(s) cannot be identified or found supported by affidavits of appropriate title experts or other personnel, and request MDOT to seek SRC approval to acquire such needed property interest by condemnation; and
- submit a Condemnation Package to MDOT requesting that the SRC acquire the permanent Additional Properties by quick-take condemnation, so long as the SRC has authority to acquire such property through condemnation.

The Condemnation Package shall include 2 copies of the documents listed in Section 8.6.2.4.1 (Condemnation Package Documents); Section 8.6.2.4.2 (Condemnation Package Documents Needed for Any Property with Tenants); and Section 8.6.2.4.3 (Condemnation Package Documents Needed for Any Property with One or More Interested Parties) as applicable.

8.6.2.4.1 Condemnation Package Documents

For all acquisitions of Privately Owned Additional Properties that shall be subject to condemnation proceedings, provide the following information in the Condemnation Package:

- a complete copy (not the original) of the entire item file;
- full-size copies of all issued ROW plats;
- appraisal report(s);
- appraisal review determination of amount to be offered and deposited into court;
- complete Record of Negotiations;
- signed offer letter and copies of all other, pertinent communications;
- draft resolution for SRC to authorize condemnation;
- current title report or bring to date of older title report (within 30 days of submission of Condemnation Package);
- current Maryland State Department of Assessment and Taxation real property data search printout confirming the name of the current owner according to assessment records (within 30 days of submission of Condemnation Package); and
- accurate and complete MDOT SHA Form 80, generated from MDOT SHA OREMS, including:
 - a description of the fee or other interest(s) in property to be acquired matching the description on the plat(s);
 - the last four digits of the owner's social security number or employer identification number or verification that owner refused to provide; and
 - the correct full legal names and addresses of all interested parties and their interest/representative capacity (i.e. fee simple owner, personal representative, trustee, secured party, tenant, etc.).

8.6.2.4.2 Condemnation Package Documents Needed for Property with Tenants

If a property interest or parcel acquisition involves tenants, the Phase Developer shall provide the following information in the Condemnation Package:

- a list of tenants provided by the owner/landlord including:
- the correct full legal name and address for each tenant; or
- verification that owner/landlord refused to provide a list of tenants along with a list of tenants prepared based on best available information, including physical inspection of the property;
- copy of all leases or verification that owner/landlord refused to provide;
- tenant waivers for each tenant waiving all rights of possession in the property to be acquired, all rights to compensation, and all rights to possession in the property to be acquired or owner/landlord indemnity agreement providing for same; and
- if tenant waivers or owner/landlord indemnity agreements are not provided, recommendation whether to include tenants as defendants in condemnation proceedings and the basis for that recommendation.

8.6.2.4.3 Condemnation Package Documents Needed for Property with One or More Interested Parties

If a property interest or parcel acquisition involves one or more business entities or representatives of other interests in the property, the Phase Developer shall provide the following (unless the information is already provided in recent title report or commitment for title insurance):

- documents from available resources confirming the correct full legal name of each business entity or representative that may have an interest in the property;
- documents that establish the legal existence of each entity that may have an interest in the property;
- documents from available resources confirming each business entity or representative that may have an interest in the property is in good standing and active status with the Maryland Department of Assessments and Taxation;
- the identification of the successor(s) in a property interest with supporting details and documentation where there has been a change in ownership, assignment, or the business entity/representative is defunct or not in good standing with the Maryland Department of Assessments and Taxation; and
- documents from available resources confirming name and address of resident agent, officer, or other authorized representative of each business entity or representative that may have an interest in the property for use with service of process.

8.6.2.4.4 Additional Procedures for Condemnation Packages

Submit a separate check for the Offer of Just Compensation from the Phase Developer's account to be deposited with the Clerk of the Court for the use and benefit of all parties that may have an interest in the property to be acquired. Unless directed otherwise, such checks shall be made payable to the Clerk of the Circuit Court (for the County in which the case is to be filed).

Submit a request for the acquisition to be placed on the agenda of the next scheduled SRC meeting, provided the completed Condemnation Package is submitted by Phase Developer at least 10 Business Days before MDOT's deadline for eminent domain authorization requests.

Submit a draft Land Acquisition Petition or Complaint for Condemnation prepared by the Phase Developer in paper and electronic (MS Word) format. MDOT will provide Phase Developer with the current forms/templates. MDOT, in cooperation with the OAG or outside counsel, will file a Land Acquisition Petition or Complaint for Condemnation within 30 days of the submission of a complete Condemnation Package, the Phase Developer's check for the Offer of Just Compensation to be deposited with the Clerk, and SRC's authorization to initiate condemnation proceedings, whichever is last to occur.

Submit a copy of the Land Acquisition Petition or Complaint for Condemnation to the Phase Developer's title company and confirm with the title company the appropriate parties were joined in the case and that no changes in title have occurred since the original title examination was completed. Order a title bring to date to the date of filing and provide the same to MDOT, the OAG, or outside counsel.

Coordinate and provide technical support to MDOT, as required to facilitate filing the Land Acquisition Petition or Complaint for Condemnation. Certify all cases, as appropriate, to the Clerk of the Circuit Court for a Board of Property Review hearing. Send by certified mail MDOT SHA Form 83 to the Clerk of the Circuit Court, Chairperson of the Board of Property Review,

property owner, property owner's attorney or designated representative, and other interested parties listed on the Land Acquisition Petition. A copy also must be mailed to the Board of Property Review's secretary to schedule a hearing. The secretary will schedule a hearing date with the Board of Property Review and the property owner and mail a hearing notice. Schedule an internal meeting in advance of a Board of Property Review hearing, with attendees to include MDOT, OAG, outside counsel, engineer, appraiser, and Right-of-Way agent to prepare for the hearing.

Provide individuals having sufficient knowledge of the acquisition, design of the Work, and value of the property interest(s) to be acquired and any damage to remaining property to appear as witnesses at the Board of Property Review hearing or other proceedings, including depositions and trial. These individuals are responsible for preparing exhibits as requested by MDOT, the OAG, or outside counsel in support of their appearance as witnesses.

Make available to MDOT and the OAG's office or outside counsel an agent who will be expected to assist in making arrangements for conferences with witnesses prior to meetings, hearings, depositions, conferences, mediations, and/or trial and perform any other duties which will assist in the successful prosecution of the suit, including his or her attendance in court and filing necessary documents to complete all condemnation proceedings.

Update the existing appraisal to the date of value or obtain a new appraisal based on the date of value as directed by MDOT. The decision to update the existing appraisal or order a new appraisal will be based on a variety of factors, including market conditions, proximity of date of value in appraisal to date of value in condemnation proceeding, the nature and extent of the acquisition, and knowledge of additional facts or allegations not known at the time of the initial appraisal. If it is determined an updated or new appraisal is necessary or desirable, obtain such appraisal using the same procedures as described in Exhibit 6 Article 8 (Right-of-Way) Section 8.6.1.5 (Appraisals). The Phase Developer must also undertake an appraisal review as described in Exhibit 6 Article 8 (Right-of-Way) Section 8.6.1.5 (Appraisals). Submit the updated or new appraisal to MDOT. If MDOT determines a revised offer is appropriate, prepare a revised offer letter, submit to MDOT SHA for acceptance, and provide a check for the additional funds to be deposited with the Clerk of the Circuit Court for the use and benefit of the parties having an interest in the property to be acquired.

Coordinate with MDOT and the OAG or outside counsel as to land planners and/or other expert witnesses (in addition to appraisers) as required by the OAG or outside counsel.

Appear or provide for the appearance of expert witness(es) or fact witness(es) when requested by MDOT or the OAG or outside counsel. Necessary appearances may include Board of Property Review hearing preparations, Board of Property Review hearings, and other proceedings, including depositions, conferences, mediations, hearings, jury trials and related proceedings.

Communicate with MDOT as to the parcel status on a monthly basis in the Monthly Progress Report or as requested by MDOT.

Upon completion of a Board of Property Review hearing, prepare the appropriate MDOT Board of Property Review hearing notes and/or reports and certify for payment the Board of Property Review members' invoices for conducting all tasks related to the hearing.

Coordinate with MDOT and the OAG or outside counsel regarding fact and/or expert witnesses needed to testify at the Board of Property Review hearings and other proceedings, including depositions, conferences, mediations, hearings, and jury trials. At the request of the OAG, outside counsel, or MDOT, provide for all necessary witnesses including: engineers, land planners, real estate consultants, cost estimators, outdoor advertising sign experts, and

environmental consultants, the costs of which are to be borne by MDOT but to be reimbursed by the Phase Developer, consistent with Exhibit 6 Article 8 (Right-of-Way) Section 8.3 (Additional Properties). All identified, designated, or necessary witnesses shall be and remain available to testify until legal title to the ROW is acquired, even if all D&C Work is completed.

Coordinate pre-hearing preparation and other meetings with MDOT, the OAG, or outside counsel and all others required for testimony or exhibit preparation. Require witnesses with all exhibits and documents to be present at such meetings.

Timely file and provide proper service of objections if requested by MDOT, the OAG, or outside counsel after completion of the Board of Property Review hearing and promptly provide evidence of filing and copies of all filed documents to MDOT.

Provide an individual or individuals having sufficient knowledge of the design of the Work to appear as a witness for testimony at the Board of Property Review hearing or other proceedings. This individual(s) is also responsible for preparing exhibits as requested by MDOT, the OAG, or outside counsel in support of said testimony. Exhibits shall be left in the custody of MDOT at the close of the hearing.

8.6.3 Early ROW Acquisition

Phase Developer shall notify MDOT if certain property interests or parcels are needed to be acquired prior to the ROD and contingent on MDOT’s approval. All early ROW acquisitions shall be in compliance with the FHWA guidelines under 23 CFR Subchapter H Right-of-Way Environment Part 710 Right-of-Way and Real Estate Subpart A General, and Subpart E: Property Acquisition Alternatives Section 710.501 Early Acquisition. If needed, complete the acquisition process and coordinate the scheduling of any remaining early ROW acquisitions.

8.7 Deliverables

Table 8-1 – ROW Submittals

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
Schedule of when the Phase Developer will require access to the MDOT-Provided Parcels	With the Committed Section Proposal
ROW Acquisition Plan	Prior to beginning ROW acquisition work
Updates to the ROW Acquisition Plan	Minimum of every three months
ROW Acquisition Schedule	With the ROW Acquisition Plan
ROW reporting	Monthly or as needed to document changes in the status of ROW acquisition process
ROW Acquisition Manager qualifications	Prior to beginning ROW acquisition work
Appraiser qualifications	Before performing any appraisals for the Work

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
ROW Documentation	Monthly or more frequently if required due to changes in status
Title services documentation	Not more than 60 days prior to the date of submittal of the Acquisition Package
Owner's policy of title insurance	With the title services documentation
Contact letters of introduction	Prior to beginning the acquisition of a property interest or parcel
ROE	As needed for each property interest or parcel
Fair market value appraisal	Prior to establishing just compensation for each property interest or parcel
Appraisal review certification	Prior to submitting a fair market appraisal
Acquisition Package	Prior to commencing negotiation activities
Option Assembly Package	At the conclusion of each successful negotiation for a property interest or parcel
Relocation assistance package	As needed for each relocation
Closing Submittal	24 hours prior to closing
Condemnation Process Schedule	Prior to acceptance of the Committed Section Proposal
Condemnation Package	As needed

9.1 Scope

Geotechnical investigations, testing, research, and analysis shall be performed as necessary to effectively determine and understand the existing surface and subsurface conditions to perform the Work. Geotechnical investigations and analyses shall be adequate to provide accurate information for the design of roadways, pavements, foundations, structures, and other facilities resulting in Work meeting the operational standard and Handback Requirements.

9.2 Subsurface Information

9.2.1 Existing Information

Available historic subsurface geotechnical exploration information, including reports, boring logs, and boring sticks on Plans from existing structures, are provided as Reference Information Documents. Data from the available historical subsurface information is also provided in the form of a Geotechnical Data Report as a Reference Information Documents located in the Plan Room. The Phase Developer is to form its own interpretation of the existing and additional geotechnical data and satisfy itself as to the nature of the ground and subsoil and the nature of the Work affecting its design, construction method, and equipment. When using the data provided with the Reference Information Documents, verify it is applicable for the intended use and perform additional data acquisition as needed for the Work. Inform MDOT if errors or discrepancies are discovered in the MDOT-provided information.

9.2.2 Additional Investigations

In collaboration with MDOT, the Phase Developer shall determine the specific locations, frequency, and scope of all subsurface geotechnical investigations and testing necessary for the Work; however, the frequency of borings shall meet or exceed the recommended frequencies provided in American Association of State Highway and Transportation Officials ("AASHTO") Load and Resistance Factor Design ("LRFD") Bridge Design Specifications and the AASHTO Manual on Subsurface Investigations. Subsurface investigations for Stormwater Management Facilities ("SWMFAC") shall be as required by the Maryland Department of Environment.

Visual soil identification as reported on the boring logs shall be in accordance with ASTM D 2488, "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)." For the description for soil samples with laboratory test results, the description shall also include the AASHTO and Unified Soil Classification System soil classification. At a minimum, rock descriptions shall include the rock core run length, recovery, rock quality designation, rock type, hardness, strength, and weathering classification of each core. Prepare final boring and rock core logs using gINT software as supplied by Bentley.

All drilling equipment shall be calibrated within the three months prior to performing the work. The calibrated efficiency of the hammers shall be submitted prior to performing the drilling.

Corrosion testing using the general AASHTO LRFD Bridge Design Specifications criteria shall be performed.

Laboratory testing shall be performed by an AASHTO Materials Reference Laboratory (“AMRL”) accredited for each test method to be conducted. The AMRL certification shall be current and valid for the duration of the exploration and testing of the Work. The test methods shall be performed in accordance with the appropriate AASHTO or ASTM standards.

9.3 Geotechnical Investigation and Reports

9.3.1 Subsurface Exploration Plan

Prepare a Subsurface Exploration Plan including, at a minimum, the following components:

- exploration methods and reporting procedures;
- exploration location Plan including test type, location, and depth;
- procedures for avoiding damage to existing utilities and adjacent structures;
- methods and procedures to obtain ROE;
- anticipated equipment needs;
- work zone safety and maintenance of traffic (“MOT”) procedures;
- site restoration and disposal of spoils including disposal of any encountered Hazardous Materials, spoils and groundwater;
- procedures for sample storage and transportation;
- procedures for evaluating the condition or durability and bearing capacity of foundations being considered for reuse; and
- calibrated Efficiency of Hammers.

Submit the Subsurface Exploration Plan prior to commencing geotechnical investigations.

9.3.2 Geotechnical Engineering Reports

Deliverable content will be developed in coordination between the Phase Developer and MDOT. The following outlines general expectations of MDOT.

Geotechnical engineering reports for individual Elements or groups of Elements within a Phase or Section as applicable shall be prepared. Geotechnical engineering reports shall document the assumptions, conditions, and results of the geotechnical investigation and analysis considered necessary to provide a safe and reliable roadway, pavement, foundation, structure, and other facilities.

Geotechnical Engineering Reports documenting the assumptions, conditions, and results of the geotechnical investigation and analysis, shall be prepared and amended as needed. Discussion shall include the following:

- the geology of the Phase, including soil and rock types.;
- field investigations and laboratory test results used to characterize conditions, including index test results, corrosion potential, etc.;
- a discussion of conditions and results with reference to specific locations in the Phase;

- design and construction parameters resulting from the geotechnical investigation and analysis, including parameters for the design of pavements, pipes, foundations (new or reused), structures, slopes, and embankments;
- geotechnical/foundation analysis and design including axial, lateral stability, downdrag, lateral squeeze, scour analysis in accordance with AASHTO LRFD Bridge Design Specifications;
- detailed description of proposed foundation testing and monitoring program including applicable resistance factors;
- detailed description of any proposed ground improvement methods for cuts or fills as required to meet slope stability or settlement requirements;
- detailed description of any proposed geotechnical instrumentation programs including threshold and limiting values and criteria for controlling construction in the vicinity of instrumentation; and
- Plan view locations of field sampling, boring logs, and other field data, laboratory test results, calculations, and analysis supporting design decisions.

Soil parameters used for analysis shall be based on laboratory test results, correlations provided in AASHTO LRFD Bridge Design Specifications, or correlations provided in FHWA references.

Provide a geotechnical engineering report for embankments presenting a determination of slope stability for all slopes steeper than 3:1.

The geotechnical engineering report, upon completion, shall be submitted for review. The report shall be signed and sealed by a licensed professional engineer for the State of Maryland or the Commonwealth of Virginia, depending on the structure location.

9.4 Geotechnical Design Requirements

9.4.1 Roadway Subgrade, Embankment, and Cut Slopes

Mainline and shoulder subgrades shall be designed and constructed such that the post-construction settlement is less than two inches from the profile grade line at any point along the alignment and the Mainline and shoulder surface shall not settle differentially more than one inch over any 100-foot length along the alignment or one inch over the transverse direction.

All slopes over ten feet in height, slopes over soft soils, and slopes adjacent to water shall be designed. Designs shall be included in the geotechnical engineering reports. The minimum factor of safety for highway fill slopes shall be 1.3, and the minimum factor of safety for highway cut slopes is 1.5.

Embankment and cut slopes containing or adjacent to a structure shall have a minimum factor of safety of 1.5.

9.4.2 Structure Foundations

The foundation systems shall accommodate the site constraints and shall accommodate both temporary and permanent configurations. Confirm both the strength and serviceability requirements of the foundation are satisfied through engineering analyses per AASHTO LRFD Bridge Design Specifications. Foundation performance, including lateral movement and short

and long-term settlement, shall be acceptable to the superstructure and shall not adversely impact the structure.

Foundation shall be designed for strength, service and extreme limit states and designs shall be analyzed and scour depths checked in accordance with AASHTO LRFD Bridge Design Specifications.

Bridge foundations shall be designed to settle less than one inch after construction and shall exhibit less than ½ inch of differential settlement throughout the structure. Resistance and safety factors shall adhere to the applicable AASHTO LRFD Bridge Design Specifications.

Resistance factors for design of foundations shall be consistent with the analysis methods or condition/resistance determination methods in accordance with AASHTO LRFD Bridge Design Specifications.

The type and frequency of load testing of deep foundations shall be consistent with the resistance factors used for design in accordance with AASHTO LRFD Bridge Design Specifications. Wave equation analyses shall be performed prior to pile driving to verify the pile can be driven to the required nominal resistance and penetration depth at a driving resistance within 3 and 10 blows per inch without excessive driving stresses, and to develop preliminary driving criteria. The use of dynamic pile driving formulae shall not be an acceptable method for developing driving criteria, performing drivability studies, or determining hammer energy requirements.

Timber piles are prohibited for use for any permanent structure foundation.

Foundation reuse is defined as the use of an existing foundation in whole or in part when the existing foundation has been evaluated for durability and capacity to support the new loads. Existing foundations anticipated for reuse shall be evaluated in accordance with AASHTO LRFD Bridge Design Specifications. Reuse of foundations susceptible to instability from scour shall not be permitted.

9.5 Impacts to Adjacent Properties

Damage resulting from construction activities shall be repaired at the Phase Developer's sole cost and expense. Vibration control, ground settlement control, and monitoring of all existing buildings, structures, utilities, and other features that may be subject to damage from construction induced vibration or settlement shall be performed.

9.5.1 Protection of Existing Structures Plan

Identify and repair all adjacent structures, roadways, utilities, and properties which are damaged as a result of the Phase Developer's activities. Establish a Protection of Existing Structures Plan, including:

- identification of above and below grade structures that might be impacted by construction;
- required preconstruction surveys, including, at a minimum, locations where an excavation shall extend below a line sloping down and away at an angle of 45 degrees below the horizontal below an existing building, structure, roadway, or underground or above grade utility;
- establishment of methods used to minimize effects on existing structures and properties;

- procedures and instrumentation required for monitoring existing structures;
- limiting and threshold values determined based on engineering analysis and published literature;
- response actions when limiting and threshold values are measured;
- instrument locations and elevations;
- Plan for interpreting instrumentation data to compare actual movements with anticipated movements, and for assessing potential causes of observed discrepancies; and
- procedures for controlling groundwater when necessary.

The Protection of Existing Structures Plan shall be submitted at least 60 days before commencing Construction Work.

Pre-construction surveys shall be submitted at least 30 days before commencing Construction Work.

9.5.2 Blasting and Vibration Monitoring Plan

Vibrations due to blasting or other work shall be controlled to avoid damage to structures or other property. A Blasting and Vibration Monitoring Plan shall be prepared for all blasting within 500 feet of a structure and for all ground-borne vibrations within 100 feet of a structure. These values shall be considered minimum distances, and necessary distance shall be established based on detailed study and experience.

The Blasting and Vibration Monitoring Plan shall be prepared, signed, and sealed by an engineer licensed in the State of Maryland or Virginia depending on the location. The Blasting and Vibration Monitoring Plan shall be submitted before commencing blasting or vibration producing activities. The Blasting and Vibration Monitoring Plan is subject to review and acceptance by MDOT.

Perform preconstruction surveys and produce a report of the survey, to include:

- a location Plan of each structure;
- a written description of each structure with a sketch of each anomaly or crack;
- photographs and video of the overall structure and detailed photographs of each anomaly or crack noted;
- a discussion of the construction activities which may affect the structure; and
- recommendations for monitoring the structure during construction.

Preconstruction survey reports shall be submitted a minimum of 30 days before commencing blasting or vibration producing activities.

9.6 Deliverables

Table 9-1 – Geotechnical Submittals

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
Subsurface Exploration Plan	Prior to commencing geotechnical investigations
Geotechnical engineering reports	With pertinent Design Deliverable
Protection of Existing Structures Plan	60 days prior to construction
Blasting and Vibration Monitoring Plan	60 days prior to commencing blasting or vibration inducing operations
Preconstruction Surveys	30 days prior to construction
Blasting Preconstruction Surveys	30 days prior to construction

ARTICLE 10. Surveying

10.1 Scope

Perform surveying to support Section D&C Work in accordance with the applicable regulations described herein and the Phase P3 Agreement. Maintain records of the survey data, including copies of electronic files and MDOT survey book sketches.

10.2 Staffing

A Lead Surveyor shall be assigned to serve as the Phase Developer's surveyor and to oversee all land survey Work and ensure compliance with the requirements of the Phase P3 Agreement. The Lead Surveyor shall have the following qualifications:

- a minimum of 15 years' experience in survey Work including for large and complex highway and transportation projects, with preferably at least one project in Maryland; and
- a licensed Professional Land Surveyor or Property Line Surveyor in the State of Maryland or Commonwealth of Virginia as applicable for the location of the Work

The Lead Surveyor position must be filled for the duration of the Section D&C Work and the Person holding such position is expected to be on-site and committed as needed to perform the required duties.

10.3 Existing Survey Data

Survey control, mapping, and ROW surveys prepared for the P3 Program are provided as Reference Information Documents. Using this information, determine the suitability of the Reference Information Documents for use on the Work and provide any revisions, updates, corrections, or additional land survey or mapping required to perform the Work. Inform MDOT if errors or discrepancies are discovered in the Reference Information Documents.

10.4 Topography

The base topography was developed using fixed-wing aerial Light Detection and Ranging ("LiDAR") acquisition. Supplemental surveys provided are conventional data collection surveys or terrestrial LiDAR surveys developed to a scale of 1-inch equals 50 feet. The contour interval is one foot.

There may have been changes to the topography since surveys included in the Reference Information Documents were performed. When using the data provided with the Reference Information Documents, verify it is applicable for the intended use and perform additional data acquisition as needed for the Work. Inform MDOT if errors or discrepancies are discovered in the MDOT-provided information.

10.5 Right-of-Way

The ROW survey information provided in the Reference Information Documents must be reviewed and verified by the Phase Developer. When areas are identified as being necessary

for ROW or easement acquisition, the existing ROW shall be verified, boundary surveys shall be done, ROW plats prepared for the acquisition.

10.6 Scope of Work

The existing survey data provided by MDOT shall be verified prior to any Design Work. Perform any additional survey work necessary based on the requirements within this document and be compatible with the existing MDOT survey data files provided. Boundary surveys and MDOT ROW plat development is necessary for any ROW acquisition required.

The existing ROW Workmap provided in the Reference Information Documents was developed by MDOT. Field surveys were performed, and field evidence recovered and located to reestablish baselines and certain boundaries as necessary to define the existing baselines of ROW, ROW lines, and existing easement areas. Confirm the ownership of any parcels when an acquisition may be made when the plat is prepared. When using the data provided with the Reference Information Documents, verify it is applicable for the intended use and perform additional data acquisition as needed for the Work. Inform MDOT if errors or discrepancies are discovered in the MDOT-provided information.

10.7 Maryland Survey Work Requirements

All land survey work performed in Maryland shall be done under the supervision of a Professional Land Surveyor or Property Line Surveyor licensed to practice in the State of Maryland. All surveying work shall also adhere to MDOT standards as well as the "Minimum Standards of Practice" set forth in COMAR §15-208(b)(4), Title 09 Department of Labor, Licensing, And Regulation Subtitle 13 Board for Professional Land Surveyors Chapter 06 Minimum Standards of Practice.

MDOT SHA OHD PSD shall be contacted for coordination of any boundary or ROW survey work to be submitted to MDOT.

For ROW acquisitions in Maryland, the ROW plats required for the Work shall be developed to MDOT standards and must be signed and sealed by a Maryland Licensed Professional Land Surveyor or Property Line Surveyor. All MDOT SHA/SRC plats required for the Work shall be coordinated and issued through MDOT SHA OHD PSD.

It is also required any survey work subject to review by MDOT follows these MDOT Standards:

- MDOT SHA Integrated Design System CAD Standards Committee, "MicroStation V8 CAD Standards Manual";
- MDOT SHA OHD PSD, "Field Procedures Manual - Consultant version", (the "PSD Field Procedures Manual"); and
- MDOT SHA OHD PSD, "Plat Development Manual - Consultant version", (the "PSD Plat Manual").

10.8 Virginia Survey Work Requirements

All land survey work performed in Virginia shall be done under the supervision of a Professional Land Surveyor licensed to practice in the Commonwealth of Virginia. The work in Virginia must also adhere to the Minimum Standards of Practice set forth in the Virginia Administrative Code 18 VAC 10-20-370.

Any surveys performed for ROW or perpetual easement acquisition must be coordinated through VDOT for any acquisitions needed in Virginia. The survey and plat development, no matter the standard determined, shall be overseen by a Virginia registered Professional Land Surveyor.

All field surveying in Virginia necessary for the reestablishment of the existing ROW, boundary determination, or preparation of ROW plats shall conform to the VDOT Governance Documents, "Survey Manual" issued 2009 Rev. March 2019 and "Right-of-Way Manual of Instructions"

10.9 Survey Control Requirements

All surveys shall be referenced to the Maryland State Plane Coordinate System on the North American Datum of 1983, 2011 adjustment ("NAD 1983/2011"). All elevations shall be orthometric heights on the North American Vertical Datum of 1988 ("NAVD 88"). The unit of measurement for distances, coordinates, and elevations for any survey data shall be the US Survey Foot. Measurements, elevations, and coordinates shall be displayed in decimal feet.

It is the Phase Developer's responsibility to verify in the field they are using the correct datum or data.

Any new survey control points set for the purpose of boundary surveys and ROW or easement acquisition plats, shall be established following the guidelines set forth in the "PSD Field Procedures Manual."

10.9.1 Horizontal Accuracy Requirements

The horizontal accuracy, unless otherwise stated, shall meet or exceed the accuracy standards and allowable positional tolerance established in COMAR 09.13.06. The accuracy standards address the minimum angle, distance, and closure requirements for surveys and allowable positional uncertainty. The surveyor shall ascertain the positional uncertainties resulting from their survey measurements do not exceed the allowable positional tolerance of controlling points (0.07 feet) + 50 parts per million.

10.9.2 Vertical Accuracy Requirements

Trigonometric levels will not be accepted as a means of establishing elevations for control, however, the Phase Developer is ultimately responsible for their accuracy.

10.10 ROW Surveys and Plats

Any surveys necessary to develop ROW plats for ROW or easement acquisition shall be coordinated with MDOT and done according to the aforesaid MDOT standards and COMAR. Any boundary, ROW surveys, or plats to be issued for ROW acquisition shall adhere to the "MDOT SHA Office of Highway Development Plats and Surveys Division Plat Manual" and shall be coordinated with MDOT SHA OHD PSD as soon as it is determined they are necessary. MDOT SHA OHD PSD shall provide guidance and review the Boundary Workmaps and plats.

Any parcel or property interest purchased by the Phase Developer shall be accompanied with a boundary survey and ROW plat drawn to MDOT standards showing the ROW, easements, and access controls needed for the Work. These surveys and plats shall be submitted to MDOT SHA

OHD PSD for review and issuance. All Deliverables for Metes and Bounds Surveys/Baseline Reestablishment listed in the "PSD Field Procedures Manual" shall be submitted to MDOT SHA OHD PSD for review. Deliverables include survey field books, Boundary Workmaps, all survey control, traverses, and measurements to boundary evidence shall be sketched in a survey book. The survey book shall match the current specifications for new survey field books in the MDOT SHA OHD PSD regarding size, type, number of pages, etc. The book procurement shall be subject to review and acceptance by MDOT SHA OHD PSD before procurement and use. The receipt of the survey field books shall be reported to MDOT SHA OHD PSD, and a series of book numbers shall be assigned by MDOT SHA OHD PSD to prevent duplication. The numbers shall be permanently marked by the Phase Developer on the survey field books on the front, back, and the first and last five pages to allow for easy identification. The survey field books shall also have printed "Property of MDOT State Highway Administration, Plats and Surveys Division, 707 North Calvert Street, Baltimore, Maryland 21202" on the inside of the cover, front and back. The sketches shall follow the procedures outlined in the "PSD field manual."

Each plat submitted to MDOT SHA OHD PSD for review shall be accompanied with a "MDOT-SHA-OHD-PSD PLAT DRAFTING CHECKLIST" as well as a survey report. The report shall be in a hardcopy format and in electronic file format when possible. The report shall include survey records, information related to the source data used, the calculations performed, MDOT survey book sketches, and the data produced as part of the survey process. Upon request, MDOT will provide the format for reports acceptable to MDOT for each report type. Each plat drafter's checklist or survey report shall be reviewed and signed by the Surveyor.

Any plats necessary to be developed for any third parties and not to be issued by MDOT must conform to the requirements of that third party as well as the requirements of the jurisdiction in which they are located. Any plats necessary to be developed for the Commonwealth of Virginia must conform to Virginia requirements including Applicable Law.

Upon completion of the ROW acquisition, ROW definition plats shall be prepared showing the existing ROW and changes in ROW. Plats shall show the ROW and easements existing prior to beginning the Work. The ROW and perpetual easements acquired for the Work shall also be shown with MDOT ROW acquisition Item file number and recording information of the ROW and easements shown for each parcel from which they are acquired. The ROW definition plats shall also show the mathematical ties between the existing baselines of ROW and the baselines of ROW developed for the Work. The ROW definition plats shall be submitted to MDOT SHA OHD PSD to be issued.

10.11 Alignment Descriptions

All Baselines displayed and annotated on ROW acquisition plats must conform to the requirements listed in the "MDOT-SHA-OHD-PSD PLAT DRAFTING CHECKLIST" dated 08-10-2018, or any revisions. Mathematical ties based on field surveys must be shown between any new baselines developed, and the original baselines of ROW on any ROW Workmaps or ROW plats developed.

10.12 Stakeout

No stakeout work will be provided by MDOT. All stakeout necessary for the Work must be performed by the Phase Developer. All stakeout work, as with all surveying, must be done under the supervision of a licensed Professional Land Surveyor or Property Line Surveyor. The stakeout work may include, but is not limited to, soil borings, ROW, baseline of construction and or baseline of ROW.

10.13 Baseline Stakeout

Baseline stakeout, construction stakeout, or ROW stakeout (if separate) for the Work will not be provided by MDOT. Coordinate with MDOT SHA OHD PSD for specific instructions regarding any stakeout of references to preserve the baselines even if the stationing of the baseline is not staked due to machine control technology. The baseline references shall be staked using permanent markers, such as rebar and cap, x-cut, or spike depending on the ground surface, outside of the LOD for the Work in a stable and safe location to allow for future recovery. The references set are to be used to reestablish existing ROW in the future. All MDOT survey field books used to sketch the baseline references must be listed on any ROW plats. All permanent monuments set after construction shall also be shown on the ROW definition plats with ties to the baseline of ROW.

10.14 ROW and Perpetual Easement Monumentation

It may be necessary to temporarily stake the proposed ROW and easements of certain parcels to assist with the negotiations, condemnation proceedings, or to delineate the LOD of the construction activities. These temporary markers shall be wooden stakes. MDOT SHA OHD PSD field manual procedures shall be followed for the labeling and color-coding of the stakes.

At the completion of construction, ROW markers delineating the final ROW line at the breaks for all parcels of fee simple ROW shall be installed. The markers shall be 18-inch rebar with cap. The corporation number or license number shall be stamped on the cap as well as a designator stating "RIGHT-OF-WAY," "ROW," or "RW." If it is determined by MDOT SHA OHD PSD sufficient baseline references have been installed, the installation of each ROW markers may be waived. A written waiver from MDOT SHA OHD PSD must be obtained prior to doing so. Any references or ROW markers shall be 18-inch rebar and cap unless conditions prevent the installation of rebar. In such cases, another appropriate permanent marker shall be used, such as spike, mag nail, X-cut in concrete, etc. The baselines and references shall be sketched in an MDOT survey book and submitted to MDOT SHA OHD PSD upon completion of the stakeout.

Upon completion of the construction, the markers shall be installed to delineate all perpetual easements where they adjoin private property. The markers shall be 18-inch rebar with cap. The corporation number or license number shall be stamped on the cap as well as a designator stating PERPETUAL EASEMENT, PERP EASE, or EASE. This may be waived if written acceptance from MDOT SHA OHD PSD is received due to sufficient baseline references being installed.

Upon completion of construction and fine grading, replace all ROW and perpetual easement markers damaged or removed during the construction. Furnish the rebars and caps. The surveyor responsible for establishing and preparing the ROW plats should supervise the staking of rebar and caps using their corporate number and a cap stamp differentiating between ROW and easement as stated above.

10.15 Deliverables

Table 10-1 – Survey Submittals

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
ROW and Boundary Workmap	Prior to final plat development

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
Metes and bounds surveys/baseline reestablishment	Prior to final plat development
Survey field book procurement	Before use and beginning survey Work
ROW acquisition plats	Six months prior to the scheduled completion of ROW acquisition for the parcel or property interest
Survey field books	Submitted with Boundary Workmap

ARTICLE 11. Roadway

11.1 Scope

The Work requires the design of new, reconstructed, rehabilitated and temporary roadways and appurtenant features as described herein and meeting the requirements of the Phase P3 Agreement.

11.2 Design Requirements

11.2.1 General

All roadway design Elements shall be designed in accordance with the AASHTO, A Policy on Geometric Design of Highways and Streets and all other applicable AASHTO and FHWA design guidelines, policies and procedures, standards and details. Additional standards may be applicable from either VDOT or MDOT, depending on the location of the Element being designed.

Design all roadways to meet the following requirements:

- meet or exceed all AASHTO and other roadway design and safety guidelines and in accordance with Good Industry Practice;
- design within the boundaries of the ROW obtained for the Work;
- within the LOD approved in the environmental permits; and
- meet or exceed the required geometric improvements and traffic operations as identified in these Technical Provisions, as well as the approved IAPA reports.

11.2.2 Roadway Geometry

The Work shall be designed to provide at a minimum the same number of existing GPLs from interchange to interchange. Existing connections and ramps shall not be eliminated or reduced in width, or otherwise have the existing access permanently restricted.

The design shall include all existing GPL traffic movement connections. The traffic capacity, level of access, number of lanes, design speed, and traffic measures of effectiveness as defined in the Reference Design traffic operational analysis, for any existing roadway and roadway connection included in the Work, shall not be reduced.

The design shall provide for PMLs using the design of the preferred alternative.

The accommodation of HOVs will be dependent on the alternative selected through the NEPA process. For Alternatives that propose High Occupancy Toll lanes, the requirement to provide at a minimum the same number of existing GPLs does not include separate replacement of the HOV lanes. For Alternatives that propose Express Toll Lanes and a separate HOV lane, the requirement to provide at a minimum the same number of existing GPLs includes replacement of the HOV lanes.

A geometric design criteria table listing the minimum requirements for geometric design for the GPLs, PMLs, ramps, and each intersecting roadway is included in Exhibit 6 Article 11 (Roadway) Section 11.8 (Geometric Design Criteria). Any deviations from these minimum requirements

will require a Design Exception or Design Variance to be submitted to MDOT in accordance with the requirements of Exhibit 6 Article 11 (Roadway) Section 11.5 (Design Exceptions and Design Variances).

The existing posted speeds are to remain the same on all existing facilities unless otherwise authorized by MDOT. For non-interstate roadways, shoulders shall provide the required width as needed for bicycle compatibility; as noted in an agreement or MOU with a Governmental Entity; or match the existing conditions whichever is larger, unless directed otherwise by MDOT.

Provide transitions from the GPLs to the PMLs at each end of a Section and prior to all intermediate Tolling Points. Coordinate the PML entrance and exit points with signing and traffic analysis to allow drivers time to react to posted Toll Rates and decide if they wish to enter or exit the PMLs. The length of transition areas shall be based on AASHTO geometric requirements and traffic and weaving analysis to provide a safe and functioning roadway.

The use of taper type acceleration and deceleration lanes is prohibited on the interstate (I-495, I-270 and I-70). Taper type acceleration and deceleration lanes may be used in special situations such as on-ramp connections to non-interstate roadways or when justified and shown to perform acceptably. Regardless of location, the use of taper type acceleration and deceleration lanes in special situations must be submitted subject to review and acceptance by MDOT or to VDOT, if such lanes are located in Virginia.

11.2.3 Design Vehicle

The design vehicle shall be in accordance with the following:

- interstate – WB-67 (large semi-trailer, 53 ft. trailer). The design vehicle shall be used for through movements as well as turning movements at all interchanges;
- freeways/arterials – WB-62 (large semi-trailer, 48 ft. trailer). The design vehicle shall be used on all state routes, excluding interstates. If there is a state to state (Maryland, Virginia or US routes) intersection, turning movements shall be designed to allow for a WB-62 to make all movements through the intersection; and
- parkways – Bus-40 (inter-city bus). The design vehicle shall be used on all National Park Service parkways and shall be used for through movements as well as turning movements at all interchanges.

Unless otherwise specified, adjacent public roadways connecting to a state route via an at-grade intersection shall use a maximum design vehicle of a WB-50 for a state route to county roadway movement or a county roadway to state route movement.

Commercial and residential access shall be designed according to the vehicle(s) using the access.

11.2.4 Pedestrian and Bicycle Facilities

All bicycle and pedestrian features shall be replaced in-kind or as identified in a third party agreement or permit. Except for parkways, new sidewalks shall be provided on both sides of all full width crossroad reconstruction improvements and extended to tie into existing sidewalks where practical. Sidewalk must be a minimum of 5 feet in width, unless there is an existing sidewalk greater than 5 feet in width (not including any adjacent curb) or as identified in the local jurisdiction requirements. If existing sidewalks are greater than 5 feet wide, replace existing sidewalk in-kind.

Existing shoulder widths on all Maryland and US routes and local roadways shall not be reduced beyond the minimum required width for bicycle compatibility. For detailed guidance, refer to the requirements outlined in the MDOT Bicycle Policy and Design Guidelines. Refer to agreements and MOUs with counties, municipalities, the National Park Service, Maryland-National Capital Parks and Planning Commission, or other Governmental Entities for local agency bicycle and pedestrian improvement commitments, policies and requirements as applicable.

All pedestrian facilities, whether state or local, shall meet the applicable federal and state American with Disabilities Act and accessibility requirements.

11.2.5 Barriers, Walls, and Medians

The clear zone limits must be free from hazards and fixed objects. In locations where removal or relocation of hazards and fixed objects from the clear zone is not feasible, design barrier systems, including barrier connections and end treatments in accordance with the AASHTO Manual for Assessing Safety Hardware ("MASH") requirements.

Within the limits of the Phase, evaluate all existing barriers not planned for replacement as part of the Work. Barrier in poor condition, and barrier that does not meet either National Cooperative Highway Research Program Report 350 (NCHRP 350) or MASH requirements, shall be improved or replaced to meet MASH requirements. If a short segment of barrier requires replacement because of poor condition, it may be replaced to NCHRP 350 standards. All attenuators, end treatments, and attachments requiring replacement shall be replaced to MASH standards. Traffic barriers which do not meet current height criteria shall be replaced or adjusted to meet criteria. Traffic Barrier W-Beam steel block outs shall be replaced with either wood or composite block outs.

The Proposer may submit a request to MDOT SHA for a substitution of a specific National Cooperative Highway Research Program Report 350 compliant product for use in a specific situation when an equivalent MASH compliant product does not exist, and an alternate MASH compliant barrier configuration cannot reasonably provide the required protection.

In order to preclude toll violations and wrong way access, a continuous barrier system such as delineator posts or pylons, shall be provided between the PMLs and GPLs throughout the Phase.

Glare screens or extended height barriers shall be installed on all concrete median barriers separating opposing travel lanes where the potential for glare conditions will occur.

11.2.6 Cut and Fill Slopes

Unless noted otherwise in Exhibit 6 Article 9 (Geotechnical Engineering), new or modified cut and fill slopes designed and constructed shall be no steeper than 2:1, and new or modified slopes inside interchange improvements designed and constructed shall be no steeper than 3:1.

11.2.7 Building Demolition

The roadway alignment shown in the Reference Design requires the removal and demolition of a number of existing structures and buildings.

11.2.8 Fencing

Fencing shall be installed at the ROW line or along the ROW of through highway line except where sound barrier walls are acting as barriers or other physical barriers define the ROW. Fencing shall be 6-foot-high chain-link fence.

11.2.9 Maintenance Access and Enforcement Areas

The roadway design shall provide a safe area for toll maintenance activities to be conducted. The roadway Design shall also provide a safe area for use by law enforcement to monitor HOV compliance on I-495 and I-270.

11.2.10 Resurfacing

Design of pavement resurfacing shall be provided for all new and reconstructed roadways. This requirement shall include the existing pavement areas used for PMLs, GPLs, all connecting roadways and ramps, and all crossroads.

All existing lanes and shoulders shall be resurfaced to the outermost pavement limits of all proposed widening and construction, including any gaps or areas within the limits of widening or construction.

11.3 Parkways, Local Roads, Streets and Intersections

If the proposed design requires Work on roadways under the jurisdiction of Governmental Entities, such work shall be executed according to the design and construction requirements of the affected jurisdiction.

11.4 Interstate Access Point Approvals

Obtain approvals for any modifications to interstate access contained in the FHWA approved IAPA report. Schedule the IAPA process to fit within the overall Work schedule. All documentation shall be prepared in accordance with MDOT guidelines. Requirements for documentation include preparation of a report to include existing conditions analysis, future traffic analysis, safety analysis, alternatives analysis including no-build and build alternatives, Design Exceptions, supporting information that safety and operations are not adversely impacted, and recommendation for FHWA approval. Preliminary plans showing the proposed interchange configuration and all geometric design data including curves, grades, weave lengths, acceleration, deceleration lane and taper lengths, stopping sight distance and signing plans must also be prepared and submitted with the documentation. The documentation shall be submitted to MDOT for concurrence before forwarding to FHWA for review and approval.

11.5 Design Exceptions and Design Variances

Prepare all Design Exception and Design Variance requests for both the PMLs and GPLs based on the Phase Developer's design. For each request for a Design Exception or request for a Design Variance, prepare all documentation in accordance with MDOT guidelines.

MDOT is seeking to obtain a number of Design Exceptions for the Reference Design. Copies of these Design Exceptions will be provided to the Phase Developer as they are available². If needed, obtain any other Design Exceptions or Design Variances deemed necessary for the Work. Wherever practical, Design Work shall eliminate any existing Design Exceptions or Design Variances such that the number of Design Exceptions or Design Variances remaining in the Work are minimized.

11.6 Roadway Plan Requirements

Deliverable content will be developed in coordination between the Phase Developer and MDOT. The following outlines general expectations of MDOT.

Roadway Plans shall be prepared in accordance with MDOT SHA CAD Standards or the VDOT CADD Manual, depending on whether the work is located in Maryland or Virginia and the CADD files will be archived with the appropriate agency (VDOT or MDOT) at the conclusion of the Work. At a minimum, the roadway Plans shall include title sheet, index of sheets, general notes, and abbreviations, Plan sheet layout, typical sections, pavement details, geometry sheets, superelevation data, roadway details roadway Plans, roadway profiles, and cross-sections. The Plans shall be prepared at a minimum scale of 1" = 50' or larger if required to clearly show the design intent. Plan scale shall be acceptable to MDOT or VDOT prior to the start of design. Intersection sight distance diagrams and turning movement exhibits using AutoTurn software (by Transoft Solutions Inc.) shall also be prepared and submitted for all at-grade intersections with the initial design submission.

The Released for Construction Submittal shall include PDF and MicroStation design files, all model files, all reference files and geometric files, including alignment data files.

11.7 Deliverables

Table 11-1 - Roadway Submittals

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
Access Justification Report and IAPA Letter	At the same time as initial Design Deliverable for associated work
Requests for Design Exception	At the same time as initial Design Deliverable for associated work
Requests for Design Variance	At the same time as initial Design Deliverable for associated work
Design Exception and Design Variance Report	At the same time as Final Design Deliverable
Glare screen or extended barrier height report	At the same time as initial Design Deliverable for associated work

² NTD: The process to review and approve Design Exceptions requires a preferred alternate to be selected before it can be started.

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
Calculations and exhibits to support the Design Deliverable (such as intersection sight distance and turning movement exhibits)	At the same time as initial Design Deliverable for associated work

11.8 Geometric Design Criteria

Design all roadway Elements to meet the minimum geometric design criteria contained in the following Tables. Minimum design speeds are provided in miles per hour ("MPH").

Table 11-2 - I-495 Geometric Design Criteria

ROADWAY	FROM	TO	FUNCTIONAL CLASSIFICATION	ACCESS CONTROL	TERRAIN	MIN. DESIGN SPEED (MPH)	DESIGN VEHICLE	MIN. CROSS SLOPE	MAX. GRADE	MAX SUPER	LANE WIDTH	SHOULDER WIDTH (SEE NOTES 1 & 2)	
												LEFT	RIGHT
I-495	George Washington Memorial Parkway	I-270 West Spur	Urban Interstate	Yes	Rolling	60	WB-67	2%	4%	6%	12 feet	10 feet	10 feet
PMLs	George Washington Memorial Parkway	I-270 West Spur	Urban Interstate	Yes	Rolling	60	WB-67	2%	4%	6%	12 feet	10 feet	4 feet
Clara Barton Parkway	North Access Ramps	South Access Ramps	Principal Arterial/ Parkway	Yes	Rolling	55	Bus-40	2%	6%	6%	12 feet	1 foot with Curb	1 foot with Curb
Cabin John Parkway	North Access Ramps	South Access Ramps	Principal Arterial/ Parkway	Yes	Rolling	60	Bus-40	2%	4%	6%	12 feet	4 feet	12 feet
MD 190 River Road	North Access Ramps	South Access Ramps	Urban Other Principal Arterial	Yes	Rolling	40	WB-62	2%	8%	6%	12 feet	1 foot with Curb	Varies 1.5 – 8 feet with Curb

ROAD-WAY	FROM	TO	FUNCTIONAL CLASSIFICATION	ACCESS CONTROL	TERRAIN	MIN. DESIGN SPEED (MPH)	DESIGN VEHICLE	MIN. CROSS SLOPE	MAX. GRADE	MAX SUPER	LANE WIDTH	SHOULDER WIDTH (SEE NOTES 1 & 2)	
												LEFT	RIGHT
MacArthur Boulevard	Eggert Drive	Persimmon Tree Road	Minor Arterial	No	Rolling	35	WB-62	2%	8%	6%	12 feet	1 foot	1 foot
Persimmon Tree Road	Overpass	Overpass	Arterial	No	Rolling	40	WB-62	2%	8%	6%	12 feet	2 Lane Undivided	8 feet
Seven Locks Road	Underpass	Underpass	Principal Secondary	No	Rolling	35	WB-62	2%	8%	4%	12 feet	2 Lane Undivided	Curb & Gutter
MD 191 Bradley Boulevard	Overpass	Overpass	Urban Minor Arterial	No	Rolling	40	WB-62	2%	8%	6%	12 feet	Curb & Gutter	4 feet

Table 11-3 - I-270 Geometric Design Criteria

ROAD-WAY	FROM	TO	FUNCTIONAL CLASSIFICATION	ACCESS CONTROL	TERRAIN	MIN. DESIGN SPEED (MPH)	DESIGN VEHICLE	MIN. CROSS SLOPE	MAX. GRADE	MAX SUPER	LANE WIDTH	SHOULDER WIDTH (SEE NOTES 1 & 2)	
												LEFT	RIGHT
I-270	I-270 West Spur	I-370	Urban Interstate	Yes	Rolling	60	WB-67	2%	4%	6%	12 feet	10 feet	10 feet
PMLs	I-495	I-370	Urban Interstate	Yes	Rolling	60	WB-67	2%	4%	6%	12 feet	10 feet	4 feet

ROADWAY	FROM	TO	FUNCTIONAL CLASSIFICATION	ACCESS CONTROL	TERRAIN	MIN. DESIGN SPEED (MPH)	DESIGN VEHICLE	MIN. CROSS SLOPE	MAX. GRADE	MAX SUPER	LANE WIDTH	SHOULDER WIDTH (SEE NOTES 1 & 2)	
												LEFT	RIGHT
I-270 West Spur	I-495	I-270	Urban Interstate	Yes	Rolling	60	WB-67	2%	4%	6%	12 feet	10 feet	10 feet
I-270 East Spur	I-270	I-495	Urban Interstate	Yes	Rolling	60	WB-67	2%	4%	6%	12 feet	10 feet	10 feet
Democracy Boulevard	West Access Ramps	I-270	Minor Arterial	Yes	Rolling	40	WB-62	2%	8%	4%	12 feet	Curb & Gutter	Curb & Gutter
Democracy Boulevard	East Access Ramps	I-270	Principal Arterial (Other)	Yes	Rolling	40	WB-62	2%	8%	4%	12 feet	Curb & Gutter	Curb & Gutter
Montrose Road	West Access Ramps	I-270	Minor Arterial	Yes	Rolling	50	WB-62	2%	7%	4%	12 feet	Curb & Gutter	Curb & Gutter
Montrose Road	East Access Ramps	I-270	Principal Arterial (Other)	Yes	Rolling	45	WB-62	2%	7%	4%	12 feet	Curb & Gutter	Curb & Gutter
MD 189 Falls Road	West Access Ramps	I-270	Minor Arterial	Yes	Rolling	40	WB-62	2%	8%	4%	12 feet	Curb & Gutter	4 feet with Curb & Gutter
MD 189 Falls Road	East Access Ramps	I-270	Minor Arterial	Yes	Rolling	40	WB-62	2%	8%	4%	12 feet	Curb & Gutter	Curb & Gutter

ROAD-WAY	FROM	TO	FUNC-TIONAL CLASSIF-ICATION	ACCESS CONTROL	TERRAIN	MIN. DESIGN SPEED (MPH)	DESIGN VEHICLE	MIN. CROSS SLOPE	MAX. GRADE	MAX SUPER	LANE WIDTH	SHOULDER WIDTH (SEE NOTES 1 & 2)	
												LEFT	RIGHT
MD 28 Montgomery Avenue	West Access Ramps	East Access Ramps	Urban Principal Arterial (Other)	Yes	Rolling	35	WB-62	2%	8%	4%	12 feet	Curb & Gutter	Curb & Gutter
Shady Grove Road	West Access Ramps	I-270	Urban Principal Arterial (Other)	Yes	Rolling	45	WB-62	2%	7%	4%	12 feet	Curb & Gutter	5 feet (Bike Trail)
Shady Grove Road	East Access Ramps	I-270	Principal Arterial (Other)	Yes	Rolling	45	WB-62	2%	7%	4%	12 feet	Curb & Gutter	Curb & Gutter
I-370	West Access Ramps	I-270	Urban Interstate	Yes	Rolling	55	WB-67	2%	5%	4%	12 feet	Curb & Gutter	Curb & Gutter
I-370	East Access Ramps	I-270	Urban Interstate	Yes	Rolling	60	WB-67	2%	4%	6%	12 feet	6 feet	10 feet
West-lake Terrace	Overpass	Over-pass	Business B-3	No	Rolling	35	WB-62	2%	8%	4%	12 feet	4 foot with Curb & Gutter	Curb & Gutter
Tucker-man Lane	Underpass	Under-pass	Arterial A-71	No	Rolling	40	WB-62	2%	8%	6%	12 feet	2 Lane Undivided	8 feet
Wooton Parkway	Overpass	Over-pass	Arterial	No	Rolling	45	WB-62	2%	7%	4%	12 feet	Curb & Gutter	Curb & Gutter

ROADWAY	FROM	TO	FUNCTIONAL CLASSIFICATION	ACCESS CONTROL	TERRAIN	MIN. DESIGN SPEED (MPH)	DESIGN VEHICLE	MIN. CROSS SLOPE	MAX. GRADE	MAX SUPER	LANE WIDTH	SHOULDER WIDTH (SEE NOTES 1 & 2)	
												LEFT	RIGHT
West Gude Drive	Overpass	Overpass	Major Arterial	No	Rolling	40	WB-62	2%	8%	4%	12 feet	Curb & Gutter	Curb & Gutter

Table 11-4 - Ramp Design Criteria

RAMP TYPE	FUNCTIONAL CLASSIFICATION	ACCESS CONTROL	TERRAIN	MIN. DESIGN SPEED (MPH)	DESIGN VEHICLE	MIN. CROSS SLOPE	MAX. GRADE	MAX SUPER	LANE WIDTH	SHOULDER WIDTH	
										LEFT	RIGHT
Loop Ramp	Urban Interstate	Yes	Rolling	20	WB-67	2%	7%	8%	See Note 2 below tables	See Note 2 below tables	See Note 2 below tables
Directional Ramp	Urban Interstate	Yes	Rolling	30	WB-67	2%	7%	8%	See Note 2 below tables	See Note 2 below tables	See Note 2 below tables

Notes for geometric design criteria tables:

1. Where GPLs and PMLs are adjacent, they may be separated with a 4-foot-wide buffer with pylons or similar separator in lieu of providing a 12-foot shoulder on the left of the GPLs.
2. Ramp lane widths and shoulder widths shall be designed in accordance with AASHTO, A Policy on Geometric Design of Highways and Streets.
3. Bridge vertical clearances shall be designed in accordance with MDOT or VDOT guidelines based on the location of the structure.

ARTICLE 12. Pavement

12.1 Scope

The Work includes all pavement engineering for roadway Elements, including but not limited to, pavement investigation, pavement type selection, new pavement design, pavement rehabilitation design, and material selection.

12.2 Design Requirements

Roadway Elements not specifically identified to be Mainline, shoulder, ramp, etc., shall be considered to be a Mainline Element, designed for Mainline traffic. Auxiliary lanes shall be designed for Mainline traffic. Ramp sections shall start at the intersecting roadway and end at the gore. New shoulders shall use the design traffic from the adjacent roadway Element. Existing shoulders proposed to carry traffic shall be designed and improved as necessary to perform under the given loading and environmental conditions for the specified service life periods for travel lane traffic. Existing shoulders not proposed to carry traffic shall receive the same surface as the adjacent lane.

Pavement investigations, testing, research, and analysis necessary to determine and understand the existing surface and subsurface conditions shall be performed. Pavement investigations and analyses shall be both thorough and complete to provide accurate information for the design of pavements resulting in Work that is safe, meets operational standards and Handback Requirements.

The AASHTO Guide for Design of Pavement Structures, shall govern the pavement design unless otherwise indicated. The Mechanistic-Empirical pavement design method shall not be used for pavement design of GPLs. If Mechanistic-Empirical pavement design methods are used for the PMLs, the methodology and input parameters shall be provided.

12.2.1 Pavement Investigation

In collaboration with MDOT, the Phase Developer shall determine the specific locations, frequency, and scope of the pavement investigations, testing, and research necessary to provide the data required for analysis and design.

Proposed boring depths and spacings shall be in accordance with AASHTO Manual on Subsurface Investigations.

Laboratory testing shall be performed by an AASHTO AMRL accredited for each test method to be conducted. The AMRL certification shall be current and valid for the duration of the exploration and testing of the Work. The test methods shall be performed in accordance with the appropriate AASHTO or ASTM standards.

12.2.2 Pavement Design

All pavement design shall be performed in accordance with the AASHTO Guide for Design of Pavement Structures. Subgrade design values shall be based on an evaluation of laboratory test results such as California Bearing Ratio, Resilient Modulus Tests, or Falling Weight

Deflectometer testing. If the use of subgrade improvement techniques such as lime stabilization or soil cement are recommended, the design shall be based on laboratory testing.

Pavement for local roadways shall follow the applicable criteria for that jurisdiction, including Montgomery County, Frederick County, the City of Rockville. Any roadways in the Commonwealth of Virginia shall adhere to design criteria published by VDOT.

Design parameters are provided in the following table:

Table 12-1 - Minimum Pavement Design Parameters

MINIMUM DESIGN PARAMETERS FOR 1993 AASHTO GUIDE FOR DESIGN OF PAVEMENT STRUCTURES		
Input Parameter	Flexible	Rigid
New construction Design Life (Years)	25	25
Rehabilitation Design Life (Years)	15	15
Initial Serviceability	4.2	4.5
Terminal Serviceability	3.0	3.0
Average Annual Daily Traffic	See Note 1	See Note 1
Percent Trucks	See Note 1	See Note 1
Truck Factor	See Note 1	See Note 1
Reliability	95%	95%
Standard Deviation	0.49	0.39
Overall Drainage Coefficient	1.0 (See Note 2)	1.0 (See Note 2)
Maximum Resilient Modulus of Subgrade	10,500 psi	N/A
Maximum Modulus of Subgrade Reaction (static)	N/A	600 psi/in

Table notes:

- (i) Design traffic data included in the Reference Information Documents was obtained from the MDOT SHA Office of Planning and Preliminary Engineering. When using the data provided with the Reference Information Documents, verify it is applicable for the intended use and perform additional data acquisition as needed for the Work. Inform MDOT if errors or discrepancies are discovered in the MDOT-provided information.
- (ii) Select materials and thicknesses below asphalt or concrete and underdrains, as needed, to provide a minimum Overall Drainage Coefficient of 1.0.

If the resilient modulus of subgrade is equal to or less than 4,500 psi or the modulus of subgrade reaction is equal to or less than 200 pounds per cubic inch, stabilize or replace with subgrade within the depth affecting the pavement performance.

12.2.2.1 Non-Specification Pavement and Subgrade Materials

The Phase Developer may elect to propose a pavement section using a pavement material not identified in the current MDOT SHA Standard Specifications for Construction and Materials provided the material is equal or better in performance. In this case, submit subject to review and acceptance by MDOT the following items prior to the submission of the Pavement Design Report:

- material strength and engineering properties;
- construction and placement specification;
- material quality control Plan specification;
- long-term performance history; and
- where the material will be used (subgrade or part of pavement section).

Justification and an explanation of the structural value coefficients shall be provided for a pavement material not identified in MDOT SHA Standard Specifications for Construction and Materials.

12.2.2.2 Pavement Type Selection

Provide either a rigid or flexible pavement structure for all new pavement construction to maintain a consistent pavement surface type throughout each roadway Element.

The pavement section for the widening of any existing roadway Element shall be designed to support the Mainline traffic for that roadway Element.

Design Deliverables and Construction Deliverables shall be complete including all necessary details for the pavement type selected.

12.2.2.3 New Flexible Pavement Design Criteria

Design all flexible pavement sections with hot mix asphalt layers developed using the superpave mix design criteria.

Design each flexible pavement layer based on the minimum thicknesses allowed using the layered design analysis approach per Part II, Section 3.1.5 of the AASHTO Guide for Design of Pavement Structures. For purposes of determining the minimum layer thickness, the layer moduli shall be determined based on laboratory test data performed by a certified laboratory.

12.2.2.4 New Rigid Pavement Design Criteria

If rigid pavement is used, the shoulders shall be rigid pavement and be tied to the Mainline roadway. The resilient modulus for various pavement layers used in the rigid pavement design process used for developing the modulus of subgrade reaction shall be determined based on laboratory test data performed by a certified laboratory.

12.2.3 Temporary Pavement

Temporary pavement shall be designed for the expected duration traffic will use the temporary pavement and the expected traffic volume for loading. Temporary pavement shall meet the performance requirements of Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance).

12.2.4 Widening Pavement

Design of new pavement for widening shall be in accordance with all relevant sections of this document and shall be submitted for review. Submit in accordance with the prepared design and construction schedule. Depict joint and lane line layouts and how the new pavement will tie into the existing pavement.

12.2.5 Preservation/Rehabilitation Work by Phase Developer

When the Phase Developer performs works on the existing pavement, the thickness of the existing pavement upon completion of the Work shall be greater than or equal to the thickness of the pavement prior to the beginning of the Work unless the Phase Developer demonstrates through pavement analysis that a reduced pavement section meets pavement design life requirements. For the area of proposed pavement rehabilitation, the pavement shall be designed so the resurfacing thickness for rehabilitation shall be appropriate for the asphalt mix type used.

12.2.6 Pavement Design Report

Deliverable content will be developed in coordination between the Phase Developer and MDOT. The following outlines general expectations of MDOT.

A Pavement Design Report shall be submitted for each roadway Element (Mainline, ramps, shoulders, county roads, temporary roadways, etc.). A pavement section shall be developed for each roadway Element in the Pavement Design Report. A pavement engineer, who is a registered professional engineer in the State of Maryland or Commonwealth of Virginia, depending on location, shall supervise all work and seal the Pavement Design Report. The Report shall include Plans for addressing the pavement design sections for the following:

- new roadways for Mainline, shoulders and ramps;
- pavement rehabilitation treatments;
- widening and reconstruction for existing roadways and other pavement areas;
- roadway and pavement base/subbase drainage;
- pavement details;
- pavement material selection;
- data from pavement investigation program including pavement cores, subgrade laboratory test data, etc.;
- summary of critical design values and Elements from the pavement investigation;
- subgrade improvement, treatments and stabilization strategies;

- temporary pavement details and design/construction approaches meeting performance requirements during MOT operations;
- specific material selections for each pavement layer within the pavement section for each roadway Element; and
- rehabilitation techniques used for existing roadways.

All information necessary to properly complete the Pavement Design Report shall be obtained during the pavement investigation. The Pavement Design Report shall include the design inputs and calculations used to develop the pavement sections.

The recommendations contained in the Pavement Design Report shall be incorporated into the Plans and specifications developed for the section.

12.3 Pavement Structure Drainage and Frost Protection

The pavement sections shall be of sufficient depth to protect against pavement heaving due to frost. The depth of the pavements for frost protection purposes shall be a minimum of 2/3 of the frost depth. Frost protection pavement depth includes the surface layer, the granular and bound pavement base layers, and the granular and bound subgrade improvement layers.

A positive drainage system to adequately drain the entire pavement structure shall be provided.

Pavement sections shall provide a free draining base pavement layer such as a minimum 4" granular base layer in the pavement section to facilitate pavement drainage, and between the hot mix asphalt layer and any chemically stabilized base/sub-base/subgrade-stabilization.

Geotextiles used in subsurface drainage and separation application shall be designed in conformance with AASHTO M288. The pavement drainage system shall be designed in a manner to minimize future maintenance of the system.

12.4 Construction

The pavement construction Contractor shall have a minimum of ten years of pavement construction experience using superpave materials and any other specialty mixes to be used. Asphalt mix design and testing results shall be submitted prior to construction.

12.4.1 Construction of Pavement Subgrade

Construction of suitable and stable subgrade shall be performed. The top of subgrade shall be test rolled prior to placing the base course in the pavement section. Any movement in the top of subgrade during test rolling shall be an indication of unstable subgrade or the presence of unsuitable material. Unstable or unsuitable areas shall be treated as recommended in the Pavement Design Report.

The results of all subgrade modulus verification testing, including falling weight deflectometer test results shall be submitted.

Results of all subgrade verification or improvement testing shall be submitted.

12.4.2 Repair of Damaged Pavement

Pavement repairs shall be performed for the length of the term of the Section P3 Agreement. Distressed areas shall be defined as any medium and high severity distress in the existing pavement and any low, medium or high severity level for new construction or reconstruction pavement section. All distress and severity levels shall be as identified in ASTM D 6433 "Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys." Any damage to existing or new pavements caused by the Phase Developer's operations shall be repaired. The depth and materials of all permanent patches shall match the depth and materials of the existing pavement and in accordance with the MDOT SHA Pavement and Geotechnical Design Guide.

Perform patching and other necessary repairs to maintain traffic during all construction operations. Final paving shall meet the performance requirements of Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance).

12.5 Performance Criteria

The parameters to be used to evaluate the performance of all constructed pavement include:

- structural capacity;
- skid resistance;
- visual appearance; and
- ride quality.

These parameters shall be evaluated by the Phase Developer and acceptable values developed in coordination with MDOT. If corrective action needs to be taken, coordinate all such activities to minimize disruption to traffic

12.5.1 Structural Capacity

The structural capacity (thickness and strength) of 100% of all pavement sections shall be evaluated during the Section D&C Work. The parameters to be evaluated include thickness, strength, and quality of materials. Provide documented field evidence or data confirming the design thickness for each pavement layer, and tack/bond between each layer was achieved. If the structural capacity is determined to be deficient, take corrective action.

12.5.2 Skid Resistance

Construct a pavement surface meeting or exceeding an average friction number of 45 for each travel lane to provide adequate skid resistance for each roadway Element. The friction number of the roadway shall be collected and determine in accordance with "Standard Test Method for Skid Resistance of Paved Surfaces Using a Full-Scale Tire" (ASTM E 274) and "Specification for Standard Rib Tire for Pavement Skid Resistance Tests" (ASTM E 501). The Phase Developer is responsible for the friction number data collection.

A friction number data test point shall be collected every two-tenths of a lane-mile for each travel lane, at a minimum test frequency. The average of all test points collected for each roadway Element shall meet or exceed a friction number of 45 with no single data point falling below 35. Roadway Elements with pavements exhibiting values less than an average friction

number of 45 or a single data point less than 35 shall require corrective action to provide average friction number values exceeding 45 and is projected to provide that value for at least 5 years. Provide justification and evidence that the corrective action shall provide the friction number of 45 for 5 years. A flexible pavement constructed with a surface layer meeting the requirements of these specifications with a high polish value aggregate source shall be considered as satisfying the skid resistance performance criteria.

12.5.3 Visual Appearance

Provide a pavement for each roadway Element visually free of distress. The pavement surface shall have a consistent color and texture. Minimize the number of construction joints. Construction joints shall be visibly straight and perform as intended. Provide a pavement surface free of any distress. All distress and severity levels shall be identified in accordance with ASTM D 6433 "Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys." A visual survey shall be done on a representative sample of pavement per ASTM D 6433, "Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys.". Take corrective action to ensure a visual appearance in accordance with these Technical Provisions.

12.5.4 Ride quality

Ride quality shall be evaluated in all travel lanes for each roadway Element based on MDOT SHA Special Provision 535 Pavement Surface Profile.

12.6 Deliverables

Table 12-2 – Pavement Submittals

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
Non-specification pavement and subgrade materials	Prior to submission of the Pavement Design Report
Pavement Design Report	With the pertinent Design Deliverable

ARTICLE 13. Drainage, SWM, & ESC

13.1 Scope

Perform design, construction, and Inspection of all drainage, SWM and ESC systems and practices for the Work in accordance with the applicable regulations described herein and the Phase P3 Agreement. Complete the Work so all new, reconstructed, rehabilitated and temporary drainage, SWM and ESC systems cause no adverse impacts within, upstream or downstream of the Worksite throughout the term of the Section P3 Agreement.

13.2 Stormwater Management/Erosion and Sediment Control Manager

Provide a Stormwater Management/Erosion and Sediment Control Manager to ensure all Work complies with Applicable Law, MDE SWM and ESC regulations, and Natural Resources Conservation Service Maryland, Conservation Practice Standard, Pond Code 378 (referred to as "Code 378"), as well as MDOT SHA OHD PRD "Stormwater and Sediment Control Guidelines and Procedures", and all "Dam Safety Policy Memoranda" from the MDE Plan Review Division ("MDE PRD") and MDE Dam Safety Division ("MDE DSD"). The Stormwater Management/Erosion and Sediment Control Manager must have the following qualifications:

- a current MDOT SHA ESC certification (formerly "Yellow Card" certification) and current MDE ESC "Responsible Personnel" certification and corresponding VDOT qualifications;
- 10-years of progressive experience in drainage design and SWM and ESC design;
- experience with transportation projects permitted under MDE regulations and requirements as well as approved under designated authority by the MDOT SHA OHD PRD;
- experience with VDOT SWM and ESC requirements preferred;
- a Professional Engineer's license in the State of Maryland and Commonwealth of Virginia;
- experience as, or ability to, evaluate and submit qualifications to MDE and MDOT for approval for individual(s) acting as the engineer-in-charge as required to inspect and certify embankments and structures as required by the MDE DSD or MDOT; and
- experience implementing Dam Safety Policy Memoranda.

Separate individuals may be provided to meet the requirements for a licensed professional engineer in Maryland and Virginia providing they also each meet the other requirements pertaining to Work in that jurisdiction. The Stormwater Management/Erosion and Sediment Control Manager position must be filled for the duration of the Section D&C Work; the Person holding such position is expected to be on-site in the Section Office and be committed full time. The Stormwater Management/Erosion and Sediment Control Manager position must be filled as needed to perform the required duties during the Operating Period. Qualifications shall be subject to review and acceptance by MDOT. If a replacement is needed to fill the position, the qualifications for the replacement shall be submitted and are subject to review and acceptance by MDOT.

13.3 Water Resources Review and Inspection Management Plan

The Phase Developer shall prepare a Water Resources Review and Inspection Management Plan to address the management of activities specific to water resources. A reference to another

plan (such as the SMP or the QMP) can be used to address some activities, if they are discussed in that Plan. The overall goal of the plan is to present the Phase Developer’s understanding of the procedural requirements for regulatory reviews/inspections and for the proposed staffing of such reviews/inspections should MDOT elect to allow the Phase Developer to provide these services. The Plan is subject to review and acceptance by MDOT. The Plan shall contain the following at a minimum:

- MDOT SHA PRD and MDE coordination;
- SWM/ESC review responsibilities and requirements;
- dam safety/embankment review requirements;
- water quality bank tracking procedures;
- Phase Developer provided staffing;
- location of reviews (MDOT, Phase Office, etc.);
- Submittal procedures including addressing comments;
- phased Submittal requirements;
- procedures for modifying approved designs;
- Inspection procedures;
- As-Built Drawing procedures; and
- approvals for O&M Work

13.4 Regulations and Permit Requirements

Provide all drainage, SWM, and ESC systems and practices required to meet all applicable regulations relative to these components, regardless of operational responsibility between MDOT and the Phase Developer in accordance with the Phase P3 Agreement.

Where designing, constructing and maintaining SWM facilities that are or will be owned by a third party, such as the Commonwealth of Virginia, local jurisdictions, or an adjacent system or facility, follow the requirements of said third party.

Table 13-1 –Codes and Regulations

CODES AND REGULATIONS FOR DRAINAGE, SWM AND ESC		
Component	COMAR Titles	Additional Codes and Regulations Incorporated into COMAR Titles by Reference
ESC	26.17.01: Erosion and Sediment Control	.02.C(2)(b): 2011 Maryland Standards and Specification for Soil Erosion and Sediment Control

CODES AND REGULATIONS FOR DRAINAGE, SWM AND ESC		
Component	COMAR Titles	Additional Codes and Regulations Incorporated into COMAR Titles by Reference
Drainage SWM	26.17.02: Stormwater Management	.01-1.B (1): The 2000 Maryland Stormwater Design Manual, Volumes I & II (including MDE supplements) .01-1.B (2): Natural Resources Conservation Service Maryland Conservation Practice Standard Pond Code 378 .01-1.B (3): 40 CFR §122.26(b)(14)(i)—(xi).
Drainage Assets conveying Jurisdictional Waters and Floodplains	26.17.04: Construction on Nontidal Waters and Floodplains 26.23: Nontidal Wetlands 26.24: Tidal Wetlands	26.23.01.01.B(15): Federal Clean Water Act Section 404

Exhibit 6 Article 13 (Drainage, SWM, & ESC) Table 13.1 (Codes and Regulations) above lists regulations and codes which apply to the Work and are applicable to drainage, SWM, and ESC in Maryland based upon the regulations set forth in the COMAR. Design, construct, inspect, and maintain the drainage, SWM, and ESC components in accordance with these codes and regulations, as well as the codes/regulations incorporated by reference into COMAR. This list is not intended to be all-inclusive and does not include regulations for Virginia, or local codes or ordinances that may be in current use by local municipalities that are required to meet state and federal regulations. In addition, it is the Phase Developer's responsibility to research and comply with all regulations and codes applicable within MDOT and third party right-of-way.

In order to comply with the above regulations, MDOT currently operates under various programmatic and general permits that are anticipated to be necessary and available for the Work. Obtain all approvals necessary to meet the conditions of these permits. Should the Phase Developer elect to develop separate, individual permits to meet the codes and regulations in Exhibit 6 Article 13 (Drainage, SWM, & ESC) Table 13.1 (Codes and Regulations), the development and attainment of those permits shall be at the Phase Developer's risk and any associated cost, schedule impacts, public outreach, or any ancillary impacts shall be the sole responsibility of the Phase Developer.

Table 13-2 - Permits

PERMITS FOR COMPLIANCE WITH FOR DRAINAGE, SWM AND ESC		
Component	Applicable Permits	Regulatory Authority and Responsibility
ESC; Drainage; and SWM	MDE/MDOT SHA National Pollutant Discharge Elimination System ("NPDES") Municipal Separate Storm Sewer	MDOT SHA OHD PRD (Designated Authority): All SWM and ESC

PERMITS FOR COMPLIANCE WITH FOR DRAINAGE, SWM AND ESC		
Component	Applicable Permits	Regulatory Authority and Responsibility
	System ("MS4") Permit 11-DP-3313 (MD0068276) MDE General Permit for Stormwater Associated with Construction Activity 14GP ("MDRC") including renewals of the General Permit	MDE PRD: All SWM and ESC facilities (including roadway embankments) required to meet Code 378 Small Pond/Low hazard embankments MDE DSD: All SWM and ESC facilities (including roadway embankments) required to meet MDE DSD requirements for Significant and High Hazard Dams
*Drainage Assets conveying Jurisdictional Waters and Floodplains	*Clean Water Act Section 404 * USACE Clean Water Act Section 401, Water Quality Certification * 23 CFR Subpart A- Location and Hydraulic Design of Encroachments on Flood Plains	All Governmental Entities for Drainage/ESC/SWM and: MDE Nontidal Wetlands and Waterways Division MDE Tidal Wetlands and Waterways Division USACE Local county and municipalities for floodplain impacts

*See [Exhibit 6 Article 5 \(Environmental Management\)](#)

Note the MDE and MDOT SHA OHD PRD maintain various guidance documents on the MDE and MDOT web pages which may also apply to the Work.

In addition, note that a permit from MDE DSD is required when planning to construct, repair or modify a dam or reservoir in Maryland, including roadway or drainage culverts that are or may be considered dams. Certain small ponds may be exempt from the MDE DSD permit requirements if the Plans and specifications are approved by the MDE PRD or MDOT PRD. The following are noted relative to the definition of dams and small ponds subject to Code 378 or MDE DSD regulations for dams. Refer to MDE guidance, policy and technical memorandum that clarify or supplement the requirements for Code 378 embankments.

"Small pond" approval refers to embankments that are considered low hazard. Small pond approvals are typically issued by MDE PRD or MDOT PRD for state and federal projects. A small pond embankment may or may not be a roadway culvert but should meet the requirements outlined in Code 378.

A dam that that does not meet the specifications of Code 378 must be approved by the MDE DSD under special design criteria. All Code 378 embankments are dams, but not all dams are Code 378 embankments.

Impoundments proposed in Use III, Natural Trout Waters (as classified in COMAR 26.08.02.08 “Stream Segment Designations”) must include design features that mitigate thermal discharges. Any dam located in a Use III watershed must be submitted to MDE DSD for review and approval regardless if it is considered low hazard, small pond or otherwise.

For clarification of regulations for Code 378 Embankments or Dams contact:

Maryland Department of the Environment | Dam Safety Permits Division
1800 Washington Boulevard, Suite 440
Baltimore, MD 21230
410-537-3552 | Toll-free 1-800-633-6101

13.5 Drainage Design

Design all surface drainage conveyances including but not limited to open channels, inlets, closed storm drainage systems, cross culverts (also referred to as “Small Structures” in [Exhibit 6 Article 14 \(Structures\)](#)) and entrance driveway pipes. The Drainage Design Report shall be submitted concurrently with the SWM Submittals and shall be consistent and complete between the documents. The Drainage Design Report shall be prepared in accordance with the MDOT SHA Highway Drainage Manual and these Technical Provisions. These Technical Provisions shall govern where any contradictions are may exist. The Drainage Design Report shall include at a minimum:

- a narrative;
- all computations supporting the design;
- drainage area maps as needed; and
- references to any other reports generated as part of the drainage design, such as hydrologic/hydraulic/geomorphologic reports prepared in support of environmental permitting.

A Waterway Construction Permit (COMAR 26.17.04) is required for Waters of the US. Deliver Submittals for MDE approval to MDOT for review and coordination with MDE. MDOT has established a review and approval process with MDE for the Work. Under the process, MDOT will review and comment on the submitted documents and, once all comments have been satisfied the documents will be submitted to MDE. MDOT will coordinate with MDE to obtain review and approval of the Waterway Construction Permit documents. Additional information can be found in [Exhibit 6 Article 5 \(Environmental Management\)](#).

13.5.1 Drainage Design – General Requirements

The design and construction of the drainage system shall include the repair or replacement of unstable or deteriorating outfalls, inlets, manholes, cross culverts or pipes, or other drainage structures, clean-out of existing clogged inlets, as well as the replacement of any existing brick structures regardless of condition within the Phase. Design also includes the repair of existing outfalls and the replacement of adversely sloped and level (zero-gradient) pipes to remove adverse slopes and provide positive drainage. The reuse of existing drainage systems will be allowed provided the system can be shown to have a minimum of 25 years of residual life at the conclusion of construction and the hydraulic capacity of the system can be proven to be sufficient for the intended use. Design requirements include:

- cleaning all existing and new pipes and drainage structures to be free of debris and sediment at the conclusion of construction;
- inspecting all existing pipes and drainage structures to be incorporated into the final construction;
- assessing for structural integrity and hydraulic capacity of any existing facility to remain;
- compiling a Drainage Facility Inspection Report and submitting for review including photographs and a written report describing the structural integrity and hydraulic capacity of existing drainage structures to remain;
- repairing or replacing all existing pipes and drainage structures failing to meet structural integrity, traffic bearing capacity or hydraulic requirements;
- removing all existing pipes and drainage structures which are not planned for use in the Final Design Deliverables or, if accepted by MDOT, abandon by filling with flowable backfill or similar means, so no conduits or structures presenting voids remain under roadway embankments; and
- providing positive drainage flow in all open and closed systems.

Provide completed designs for all temporary and permanent pipe. Do not construct Work so as to trap water. If during design or construction a portion of the Work is identified as not having positive drainage in preconstruction conditions, provide adequate measures to ensure positive drainage after construction. Provide adequate connections to maintain all existing drainage systems. Ensure adequate drainage is provided during interim paving operations (e.g., constructing asphalt berms to divert flow from base course paving to storm drains in closed sections or other precautions as necessary). No adverse impacts to upstream or downstream properties, infrastructure, or environmental resources are allowed that may require Work to be performed beyond the accepted limits of the roadway improvements. If additional ROW or easements are needed, the Phase Developer shall identify and perform all Work to obtain ROW or easements in accordance with the requirements in Exhibit 6 Article 8 (Right-of-Way).

If not completed as part of the Predevelopment Work, the Drainage Facility Inspection Report shall be prepared as a Preliminary Section Design Activity.

MDOT compiles records of some drainage problems. The known problems are from MDOT's "Hyinfo" database and are summarized in the Reference Information Documents. Each known problem shall be reviewed and mitigated as part of the Work. Provide an itemized response with the Submittal indicating how each problem was addressed with the design.

13.5.2 Drainage Design – Specific Criteria

Below are listed specific criteria to follow in addition to general requirements cited elsewhere in this Exhibit 6 Article 13 (Drainage, SWM & ESC). If conflicts arise between these specific criteria and the general design requirements, the more stringent criteria have precedence.

13.5.3 Roadway Drainage Design

The roadway drainage design criteria shall be consistent with other MDOT facilities, and the following criteria shall apply:

- concentrated flow of runoff over pedestrian paths will not be allowed;

- where practicable, use roadway inlets and drainage structures in MDOT SHA's Book of Standards for Highways and Incidental Structures or equal including:
 - installing type COG or COS inlets or structure that do not interfere with the travel way within the travel or turning lanes;
 - placing concrete aprons around the inlets if it is necessary to use grated inlets within the travel or turning lanes;
 - using bicycle-friendly grates such as reticular (type WR, WRM, NR, NRM) or curved vane (type CV-S, CV-E) grates unless specifically exempted; and
 - ensuring inlets in or immediately adjacent to crosswalks are compliant with the American with Disabilities Act.
- the 25-year hydraulic grade line is to remain below the top of all added, replaced, and existing structures located on interstates;
- drainage design shall consider snowmelt and refreeze to prevent icing conditions on roadways and sidewalks;
- culvert outfalls and inflow points shall have designated access paths (unobstructed by vegetation, sound barriers, guide rail or other barriers preventing access) within MDOT ROW or permanent easements with a minimum width of 12 feet and a maximum grade of 15%;
- the use of corrugated metal pipe for permanent drainage pipes, culverts or other appurtenances is prohibited; and
- any existing corrugated metal pipe used in a permanent application in the Phase shall be replaced in its entirety.

13.5.4 Cross Culverts

Design cross culverts so the 100-year headwater pool at new culverts remains within the ROW or easements. For existing, replacement, or extended culverts, the 100-year storm headwater elevation for the proposed conditions shall be at or below the existing 100-year headwater elevation or contained within the final ROW. In all cases, the 100-year storm shall not overtop the roadway.

13.5.5 Embankments – Pond Code 378 and Dams

In addition to the information contained in Exhibit 6 Article 13 (Drainage, SWM & ESC) Section 13.4 (Regulations and Permit Requirements), the Phase Developer is directed to Maryland Stormwater Design Manual, Volumes I and II Appendix B.1 for Code 378.

Check all culverts and embankments (existing, proposed or modified) for applicability of Code 378. The Phase Developer is alerted that MDOT SHA PRD or MDE will require a screening level check for all culverts, embankments and storm drains, and further detailed investigation and mitigation where applicable, which are the responsibility of the Phase Developer. It is noted the review authority does not currently recognize the exemptions for excavated ponds as described in Code 378, and further Code 378 is subject to revision and interpretation through policy memorandums published by MDE. The review and integration of all such guidance into the supplemental Technical Requirements, Construction Special Provisions, Specifications, reports, etc., is the responsibility of the Phase Developer.

Any emergency action plans necessary to fulfill MDE requirements shall be developed in the most current MDE format and submitted to MDOT prior to submission to MDE. All final dam analysis reports as approved by MDE shall be submitted to MDOT. It is the responsibility of the Phase Developer to ensure all embankments within the Work limits satisfy MDE criteria, regardless of work to be performed on the embankment.

13.5.6 Floodplain and Waterway/Wetland Coordination

Coordinate analysis of applicable drainage crossings with MDE, FEMA, and MDOT in accordance with Exhibit 6 Article 5 (Environmental Management).

All final hydrologic and hydraulics reports shall be submitted to MDOT.

Prior to construction, MDOT may be required to notify property owners adjacent to floodplains and jurisdictional waterways and wetlands of the upcoming construction. Incorporate the time requirements of this notice into the schedule and make available the necessary construction Plans for property owner review, in accordance with MDE Water Management Administration requirements.

13.6 Stormwater Management

Provide all SWM design, analysis, reporting, quality control, and coordination necessary to obtain approvals, permits and to construct and maintain all SWM Assets.

13.6.1 Stormwater Management - General Requirements

MDOT SHA OHD PRD has designated authority from MDE for review and approval of all SWM and ESC Submittals for coverage under the MDRC. Ensure all SWM and ESC designs, Plans, reports, procedures, coordination, Inspection, etc., meet the requirements of MDRC and any subsequent updates, clarifications or re-issuance.

If acceptable to MDOT SHA OHD PRD, provide sufficient MDOT SHA OHD PRD qualified staff to perform expedited SWM and ESC reviews (the "Expedited SWM/ESC Reviewers") for all Design and Construction Deliverables. The IQF shall have the responsibility of identifying qualified Expedited SWM/ESC Reviewers and submitting qualifications subject to review and acceptance by MDOT. At a minimum, Expedited SWM/ESC Reviewers shall have previous experience performing SWM/ESC reviews for MDOT, MDTA, MDE, or other designated authorities (i.e., local municipalities) in Maryland. MDOT reserves the right to perform all SWM/ESC reviews without the use of Phase Developer staff and to reject any reviewers deemed unqualified at their sole discretion. If MDOT allows the use of Phase Developer SWM/ESC reviewers, it shall be the responsibility of the IQF to provide sufficient review staff and manage reviews as required to meet schedules. The Stormwater Management/Erosion and Sediment Control Manager shall submit Design and Construction Deliverables to the IQF who shall certify all Deliverables have been developed and reviewed in accordance with all Applicable Law, regulations, these Technical Provisions, and the Agreement. Obtain approvals from MDOT SHA OHD PRD prior to commencing earth disturbing activities.

All SWM facilities shall be designed, constructed, operated, and maintained in compliance with the applicable MDOT NPDES MS4 Permit. The current MDOT NPDES MS4 permit (No. 11-DP-3313) expires in October 2020 and a new permit is expected to be issued. Comply with any

conditions of any new or re-issued MS4 permits. Additional information regarding MDOT NPDES MS4 permit may be found at:

<https://www.roads.maryland.gov/mdotsha/pages/index.aspx?pageid=336>

For embankments, pipe or culvert outfalls, and other SWM and storm drain systems deemed applicable, submit to the MDE PRD, MDE DSD or both as required, for review and approval. Be advised MDE may require all culverts and SWM facilities be screened for the applicability of Code 378 and other dam safety requirements. With MDE approval, MDE approved expedited review staff from the IOF may be used to augment the MDE staff in the review of such Submittals.

For Work within Virginia, comply with the Virginia Department of Environmental Quality regulations with respect to management and mitigation and its permit program. More information on the Virginia Department of Environmental Quality is available at: <http://www.deq.virginia.gov>

The Phase Developer acknowledges existing drainage and SWM facilities within and adjacent to the Phase are under continuous maintenance and improvements and may change subject to physical configuration, performance or compliance with applicable permits at any time. The Phase Developer acknowledges several SWM facilities within the Phase may be part of joint use agreements, wherein MDOT has entered into agreements with adjacent property owners, managers or property developers for the construction and maintenance of certain SWM facilities. Where such agreements exist, honor all requirements of the agreement, written or implied. Information from the MDOT NPDES database in a geographic information system ("GIS") format is provided with the Reference Information Documents for locations of currently-mapped existing SWM and drainage facilities within and around the Phase. When using the data provided with the Reference Information Documents, verify it is applicable for the intended use and perform additional data acquisition as needed for the Work. Inform MDOT if errors or discrepancies are discovered in the MDOT-provided information.

In accordance with the MDOT NPDES MS4 Permit, MDOT SHA is required to implement restoration efforts to comply with any MDE approved Restoration Plan(s) and total maximum daily load ("TMDL") goal(s) in the watershed(s) within the Phase. Restoration Plans are satisfied, and TMDL goals are met, by treatment in various Best Management Practices ("BMPs") built strategically to provide pollutant removal within specific watersheds and to satisfy Statewide impervious surface area treatment goals. The Phase Developer must coordinate with MDOT SHA Office of Environmental Design ("MDOT SHA OED") for any impacted BMP with the goal of replacement of pollutant load reduction function and associated Restoration Credit(s) using MDOT SHA's current suite of BMPs.

The Phase Developer shall replace all affected TMDL pollutant load reductions/function and Restoration Credit in MDOT SHA's baseline and restoration treatment portfolios. MDOT SHA OED will work with the Phase Developer to establish procedures to confirm the Phase Developer can replace all credit loss in accordance with the methodology described in the MDE document, "Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permits". The Phase Developer may be required to offset increased pollutants loads to the TMDL watershed within the same TMDL watershed and up to 100% of the increase associated with the new impervious surfaces created by the Work. For any BMPs that are constructed to satisfy goals for replacement of TMDL pollutant load reduction and restoration credit during the term of the Section P3 Agreement, the Section Developer will be responsible for all necessary monitoring prior to, during, and after construction for the determination of applicable TMDL pollutant load reductions or Restoration Credit or as required by associated permits or Applicable Law; for

inspections during and after construction as required by the MDOT NPDES MS4 Permit or by associated permits or by regulations. The Section Developer's responsibilities also include routine maintenance and vegetation establishment or management activities necessary to maintain water quality treatment function and for any necessary small-scale or large-scale maintenance or remediation. Large-scale remediation may include the complete replacement of the BMP when remediation cannot be reasonably completed. Following replacement of the BMP, the Section Developer's remains responsible for the same monitoring, maintenance, permit requirements, etc. as before the replacement for the term of the Section P3 Agreement.

The Phase Developer is advised that MDOT SHA cannot always meet conditions established in the MDOT NPDES MS4 Permit by implementation of structural or alternative BMPs and consequently must implement non-structural, operational/annual BMPs or newly established BMP types, as approved by MDE, US EPA, or both, to satisfy certain TMDL goals or goals associated with MDE-approved Restoration Plans. During the term of the Section P3 Agreement, in such cases where MDOT SHA OED, in collaboration with the Section Developer, has determined that only non-structural, operational/annual BMPs or newly established BMP types implemented within the Phase can allow MDOT SHA to meet its TMDL goals or to satisfy its commitments in MDE-approved Restoration Plans, the Section Developer will be responsible for funding and managing implementation of said BMPs as well as any additional activities necessary to maintain associated TMDL pollutant load reductions and/or Restoration Credit from said BMPs that MDOT SHA must claim to satisfy regulatory requirements established in the MDOT NPDES MS4 Permit, including the currently issued MDOT NPDES MS4 Permit or subsequent, future issuances of MDOT NPDES MS4 Permits.

The MDOT NPDES MS4 Permit requires MDOT SHA to implement annual inspections and enforcement to ensure all discharges to and from the MS4 that are not composed entirely of stormwater are either permitted by MDE or eliminated. The MDOT SHA Illicit Discharge Detection and Elimination Program is managed by MDOT SHA OED who is required to identify outfalls to be annually inspected for illicit discharges. In cases where MDOT SHA OED has determined it is necessary to inspect outfalls within the Phase to maintain compliance with conditions of the current MDOT NPDES MS4 Permit or future issuances of the MDOT NPDES MS4 Permit, the Phase Developer will be responsible for ensuring completion of the required inspections for illicit discharges by a qualified inspector before the end of the State fiscal year and for tracing the source of any illicit discharges identified during said inspections to their source to the maximum extent practicable. If tracing determines that the illicit discharge originated from within the Phase and was a result of the Phase Developer's or Section Developer's operations, the Phase Developer will be responsible for all necessary activities to ensure the discharge is permitted by MDE or eliminated. The Phase Developer will coordinate with the MDOT SHA OED Illicit Discharge Detection and Elimination Program, including coordination for associated annual reporting to MDE, during the period where any inspections for, and permitting or elimination of, illicit discharges occur within the Phase in accordance with conditions in the MDOT NPDES MS4 Permit.

13.6.2 SWM Specific Engineering Criteria

Coordinate details for all new SWM facilities and ensure integration of the concepts into the landscaping design in compliance with the provisions of Exhibit 6 Article 15 (Landscaping and Aesthetics). Ensure consistency of facility types, outfall structure designs, detailing, colors, planting palette, landforms, surface area shapes and fencing (if required). Refer to MDOT SHA Stormwater Site Development Criteria for further information regarding landscaping design and SWM.

Locate BMPs so the 2-year water surface elevation limit at its closest point is a minimum distance of 15 feet from the edge of pavement. Set riser structures into embankments or place so they are easily accessed for maintenance. Riser structures shall be placed so they are visually unobtrusive. Refer to the 2000 Maryland Stormwater Design Manual for additional SWM specifications. Use filter diaphragms for embankment seepage control. Anti-seep collars are not allowed. Obtain a BMP number for each structural BMP constructed from MDOT SHA OHD once the SWM concept is accepted by MDOT SHA OHD PRD. The BMP number is obtained by contacting MDOT.

Provide adequate access to SWM facilities for maintenance. Ensure each part of the facility is accessible by the equipment needed to maintain or rehabilitate the facility.

All underground facilities shall be watertight and include watertight testing prior to installation. Monitoring wells shall be provided and installed at the time of facility installation to detect if the facility is leaking into the subbase of the road or adjacent ground. Be advised existing stormwater facilities within the Phase may include joint-use facilities used by MDOT and adjacent developments. All agreements concerning joint use shall be honored. All existing treatment must be replaced, if impacted. Any new facilities proposed for joint use by the Phase Developer shall be subject to review and acceptance by MDOT and the Phase Developer shall prepare new joint use agreements for MDOT approval and signature.

MDOT has investigated downstream issues with Montgomery and Frederick counties. The drainage problems downstream of the Work are included in the Reference Information Documents. This list is not intended to be all-inclusive and is provided for reference only. When using the data provided with the Reference Information Documents, verify it is applicable for the intended use and perform additional data acquisition as needed for the Work. Inform MDOT if errors or discrepancies are discovered in the MDOT-provided information.

SWM facilities, including structural components such as riser structures, shall include mechanisms for spill contain and control. SWM facilities involving underground structures shall have all access points and control structures outside the travel lanes and outside the pavement section on the roadway. Storage chambers for quantity or quality control may be located under the pavement section if properly designed in consideration of features such as structural, geotechnical, and maintenance Elements.

13.6.3 Water Quality Bank

A P3 Program-specific water quality bank has been established for the purposes of providing compensatory water quality treatment for stormwater runoff according to regulations and guidelines, accounting for new impervious area, impervious area removed, redevelopment, loss of existing water quality, and existing treatment provided. No minimum water quality credit is required as part of the Work, however, a net debit for the Work will not be permitted (referred to herein after as a "zero debit" criteria). Water quality summary sheets will be required for each drainage Deliverable. Upon acceptance and signature by MDOT SHA OHD PRD, the bank ledger will be updated by MDOT SHA OHD PRD.

Provide offsite water quality mitigation as required to meet the requirements, including site searches, obtaining any ROW or easements, planning, design, permitting, construction, and maintenance (per [Exhibit 6 Article 25 \(Operations and Maintenance\)](#)). It is noted water quantity control and channel protection volume cannot be mitigated offsite and must be provided on-site as required. This information is provided for reference only, and MDOT does not guarantee this information to be complete or accurate. Coordination for the use of excess land, or any property within the MDOT ROW shall be coordinated with MDOT SHA ORE.

The Phase Developer shall be responsible for tracking the usage of the water quality bank, consistent with the banking agreement between MDOT SHA PRD and MDE.

Any water quality credits provided to the Phase Developer by MDOT and reflected accordingly and correctly on the Water Quality Summary Sheets shall be repaid by the Phase Developer to MDOT in the form of treated impervious acres provided by constructed water quality sites. The exact amount of credits to be repaid versus the amount claimed by the Phase Developer shall be confirmed by the Phase Developer.

13.6.4 SWM As-Built Certification

Inspect SWM facilities throughout construction and furnish a completed SWM Facility As-Built Certification Package to MDOT certifying the SWM facilities have been constructed as specified in the RFC documents. The As-Built Drawings shall be provided in accordance with MDOT SHA Standard Specifications for Construction and Materials, 317 Stormwater Management Facility As-Built Certification, excluding measurement and payment.

13.6.5 Stormwater Facility Routine Maintenance

Attend yearly training provided by MDOT SHA Highway Hydraulics Division ("MDOT SHA HHD") for the Inspection of SWM facilities. Complete all facility Inspections in accordance with the training and guidelines provided by MDOT SHA HHD and in compliance with the MS4 permit.

Prepare maintenance manuals/Plans for all SWM facilities within the Phase. The manuals/Plans shall be consistent with manuals prepared by MDOT for other facilities which can be found here: <https://www.roads.maryland.gov/Index.aspx?PageId=363&d=73>

The manual shall be provided to MDOT after construction and updated as needed to remain consistent with maintenance practices and comply with MDOT NPDES MS4 permit.

13.7 Erosion and Sediment Control

Design and submit to MDOT SHA OHD PRD an ESC Plan and sequence of construction for each facility, construction activity or maintenance activity. Obtain all permits prior to commencing any earth-disturbing activities included in the Work.

Provide Inspection staff to perform and document daily and routine ESC Inspections. MDOT will provide a regional environmental coordinator to periodically oversee the Inspection program through coordination with the IQF. The IQF shall have the responsibility of identifying a sufficient number of qualified and experienced ESC inspectors in accordance with MDOT SHA OED, Quality Assurance Division program for ESC Inspection and Certification. All ESC inspectors shall possess current MDE ESC "Responsible Personnel" certification and shall be experienced in the use of all applicable MDE, VDOT, Virginia Department of Environmental Quality and MDOT standards, including but not limited to, the Quality Assurance Toolkit Construction Field Manual, the web-based MDOT SHA OED, Quality Assurance Division toolkit program for tracking and processing the Inspections and modifications requests for projects under construction, MDOT SHA Field Guide for Erosion and Sediment Control and MDOT SHA Environmental Guidelines for Construction Activities Manual.

13.8 SHA NPDES Database Updates

Assist MDOT in updating and maintaining the database related to MDOT NPDES MS4 permit. A portion of this database is provided as part of the Reference Information Documents. When using the data provided with the Reference Information Documents, verify it is applicable for the intended use and perform additional data acquisition as needed for the Work. Inform MDOT if errors or discrepancies are discovered in the MDOT-provided information.

MDOT SHA OED will facilitate use and interpretation of those datasets for the Phase Developer to ensure decisions regarding the Assets in those datasets are being made with appropriate understanding of the data. Note the following activities and data delivery for MS4 annual reporting which, among other supporting data, the Phase Developer is required to deliver. Activities are required for each fiscal year include but are not limited to:

- Source ID updates (Part IV.C of the MDOT NPDES MS4 Permit) including:
 - Storm drain system GIS updates;
 - update the BMPs in the GIS;
 - Water quality improvement GIS updates (MS4 Impervious Restoration and TMDL BMPs); and
- Preventative maintenance inspections (first year after construction and every 3 years thereafter) Part IV.D.1.d (COMAR 26.17.03)

The Stormwater Management/Erosion and Sediment Control Manager shall be responsible for providing staff to actively update the MDOT NPDES database with drainage and SWM Asset information. This staff shall be available to work onsite at MDOT SHA HHD if necessary, to ensure the database reflects the current status of the Work.

13.9 Owner/Phase Developer Certifications

The Stormwater Management/Erosion and Sediment Control Manager shall sign the engineer's certification for all SWM and ESC Certifications. MDOT will sign all owner certifications. Allow seven days for MDOT to sign owner certifications.

13.10 Deliverables

Table 13-3 – Drainage Submittals

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
Stormwater Management/Erosion and Sediment Control Manager qualifications	With Committed Section Proposal
Water Resources Review and Inspection Management Plan	Prior to beginning the SWM or ESC design
Drainage Design Report	With the appropriate Design Deliverable
Waterway Construction Permit	With Final Design Deliverables

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
Expedited SWM/ESC Reviewers qualifications	As needed to meet the Section Schedule
SWM design	With the appropriate Design Deliverable
Drainage Facility Inspection Report	As part of the Predevelopment Work or as a Preliminary Section Design Activity
SWM Facility As-Built Certification Package	After each facility is completed
Emergency action plan	As applicable to the design
Water Quality Summary Sheet	With each pertinent Design Deliverable
SWM maintenance manuals/Plans	Prior to constructing SWM facilities
ESC Plan and sequence of construction	Prior to commencing earth disturbance activities included in the Construction Work

ARTICLE 14. Structures

14.1 Scope

The Work requires the design of new, reconstructed, rehabilitated and temporary structures as described herein and meeting the requirements of the Phase P3 Agreement.

14.2 Applicable Standards

The AASHTO LRFD Bridge Design Specifications shall govern unless otherwise noted herein. Structures intended only for pedestrian traffic shall be designed in accordance with AASHTO's LRFD Guide Specification for the Design of Pedestrian Bridges.

14.3 Bridge Design

All Mainline Bridges carrying I-270 and I-495 and associated ramp structures carrying traffic to and from the mainline shall be complete replacements.

Structure numbers shall be obtained from MDOT for all Bridges, Small Structures, Retaining Walls, sound barriers, and Sign Structures. The Structure numbers, when provided by MDOT, shall be shown on the applicable layout sheets of the Design Deliverables, Plans, and communications with MDOT pertaining to the Work on such structures. Structure inventory number and year built shall be cast into or displayed on the structure as required by MDOT standards.

14.3.1 Bridge Design Requirements

14.3.1.1 Design Life

The minimum Design Life of new structures (Bridges, Retaining Walls, and Small Structures) shall be 75 years. The American Legion Bridge shall have a Design Life of 100 years, and an operational importance factor of 1.05 shall be used. The 75-year Design Life requirement also applies to new widenings of existing Bridges. For clarity, such 75-year Design Life for the widening of existing Bridges is applicable only to the widened portion of such Bridges.

14.3.1.2 Geometrics

Proposed Bridge geometry for new or replaced Bridges over interstate routes and arterials shall satisfy the minimum horizontal requirements as set forth in AASHTO, A Policy on Geometric Design of Highways and Streets. Vertical clearance requirements shall follow MDOT SHA Office of Structures ("MDOT SHA OOS") "Guidelines and Procedures Memorandum D-75-7(4)." The vertical clearance to Sign Structures shall be 1'-0" greater than the minimum vertical clearance for Bridges over similar roadway elements.

Proposed Bridges replacing existing Bridges shall not reduce the width or span of the existing Bridge or the quantity and type of lanes, shoulders, or sidewalks present on the existing Bridge. The determination of required quantity and type of lanes, shoulder widths, and span

configurations may also be dependent on design requirements detailed in other portions of these Technical Provisions.

Clearances over waterways shall be in accordance with MDOT SHA OOS "Guidelines and Procedures Memorandum D-75-4(4)" or as required by the AHJ, whichever is more stringent.

Bridge width shall be in accordance with MDOT SHA OOS "Guidelines and Procedures Memorandum D-85-32(G)."

Any abutment or pier located within the clear zone of the roadway must be protected in accordance with Section 3.6.5.1 of the AASHTO LRFD Bridge Design Specifications.

14.3.1.3 Rehabilitating, Widening and Lengthening Existing Bridges

When design requires rehabilitation, widening or lengthening of existing Bridges, the design shall include, at a minimum, replacement of Bridge rails and barriers, repair of existing Bridge deck joints, replacement of existing joint seals, zone painting of existing girders and bearings, repair of drainage troughs/scuppers/pipes, and replacement of existing girder bearings, as required. During bearing replacements or jacking operations, no reduction in the number of GPLs is permitted. Jacking scheme and calculations shall be submitted for review prior to implementation.

Rehabilitation shall include a latex modified concrete overlay of the existing Bridge deck and existing approach slabs, as applicable. Only hydro demolition can be used in the removal of deteriorated concrete or existing overlay when preparing the deck surface for the latex modified concrete overlay. Mechanical removal of deteriorated concrete will be permitted only along the parapets and curbs where hydro demolition cannot be used.

Existing Bridges proposed to be widened shall have the widened portion of the superstructure of similar relative stiffness (within 10%) to the existing portion (or Elements of the Bridge as applicable) to ensure the existing and new portions function relative to each other as a single structure.

Any structure that is rehabilitated, widened or lengthened and is included within the O&M Limits, must meet the Handback requirements at the end of the Operating Period, detailed in [Exhibit 6 Article 26 \(Handback\)](#). If the widened or lengthened Bridge is not within the O&M Limits, the completed structure shall have at least 25 years of residual life at the end of the D&C Period

14.3.1.4 Removal of Existing Bridges or Small Structures

Submit a Plan showing or describing the demolition and removal methods to be used for the removal of an existing Bridge or Small Structure, as indicated. Demolition is considered to be the point in time when a portion of the structure is being cut, sawed, drilled, or impacted through excavation or other means that could affect the stability of the structure. Provide the following information within the Plan:

- methods of protection and safety for the general public, Inspection personnel, and construction personnel;
- location and method of protection of utilities;
- phasing and sequence of operations indicating construction equipment to be used for the intent of the operation being performed;

- location and weights of equipment during demolition;
- weights of equipment/materials to be staged/stockpiled on the structure, considering the condition of the existing structure when proposing to place loads on the portion of the structure to be demolished;
- when and how critical sections of the structure are to be removed (i.e., Fracture-Critical Members, arches, rigid frames) and provide analysis to prove the structural stability of partial or complete parts of the structure as it is being demolished; and
- method of providing temporary support for Elements where stability cannot be proven.

Demolition Plans are to be signed and sealed by a Professional Engineer registered in the State of Maryland or Commonwealth of Virginia depending on where the Work is located. Do not proceed with demolition work until the Plan has been reviewed by the AHJ. A pre-demolition meeting is to be held at the structure site prior to the start of demolition. The Phase Developer is responsible for all permits and approvals for hauling and demolition operations.

14.3.1.5 Unaltered Existing Structures

Any existing MDOT inventoried structure or third party inventoried structure not impacted by the Work but will become an MDOT inventoried structure at the end of the D&C Period, shall be reconstructed, rehabilitated or otherwise repaired so that each Element of the structure meets the requirements for Residual Life as identified in Exhibit 6 Article 26 (Handback) Table 26-2 (Residual Life) or an alternate approach as mutually determined with MDOT during Predevelopment Work.

14.3.2 Bridge Types

The following Bridge types for permanent structures are not permitted:

- timber Bridges;
- masonry Bridges;
- structural plate arches;
- cored slab and voided box beam Bridges;
- Bridges with intermediate hinges;
- any Bridge with Fracture-Critical Members (see below for clarification);
- any Bridge with geosynthetic reinforced soil abutments; and
- any bridge where aluminum is used for primary structural members.

The use of Fracture-Critical Members such as straddle bents, integral pier caps, and integral straddle bents (hereafter defined as straddle bents) shall be avoided wherever possible. Where straddle bents are required and permitted by MDOT or VDOT, they shall be internally and system redundant. Members may be classified as system redundant if acceptable refined analysis methods confirm adequate Bridge performance resulting from assumed member failure. The level of analysis, loading cases to be studied, location of potential cracks, and choice of member type shall be agreed upon by MDOT and the Phase Developer. All non-load path redundant tension members shall be fabricated in accordance with the fracture control plan in accordance with AASHTO and the American Welding Society. Additional guidance and requirements for Fracture-Critical Members discussed in FHWA Memorandum HIBT-10

"Clarification of Requirements for Fracture Critical Members" shall be met for both design and fabrication.

If straddle bents are permitted, they shall be designed for collision force as well as protected with an independent crash worthy barrier.

14.3.3 Bridge Design Parameters

All structures shall be designed for exposure to deicing salts. Cathodic protection shall not be used to mitigate expected corrosion effects. Bridges in proximity to electrified traction power systems for rail or transit systems may include cathodic protection as allowed by MDOT.

All proposed structures, including single lane ramps, shall meet the requirements of MDOT SHA OOS or match the approach roadway clear width, whichever is greater. For existing structures not being widened as part of the Work, the bridge clear width (toe-to-toe of parapet or face-to-face of railing or curb) shall match the approach roadway clear width. If an existing structure is being rehabilitated and widened as part of the Work, then the widened structure shall have a minimum clear width of 32'-0" or as otherwise identified in pertinent MDOT and AASHTO criteria.

The low point of a vertical sag curve shall not be located on a newly proposed Bridge or on a proposed bridge that is replacing an existing Bridge. If it can be demonstrated to be impractical to locate the low point off a proposed Bridge replacing an existing Bridge, a waiver shall be requested.

All bridges shall have a minimum of 42 inch "F" shape parapet along the outside of bridge and 42 inch "F" shape median parapet for the median barrier. All parapets shall be TL-5 Bridge Railing conforming to MDOT SHA OOS details.

Bituminous/asphalt overlays are not permitted on new structures at any point during the term of the Section P3 Agreement.

The span to depth ratio shall satisfy the criteria shown in Table 2.5.2.6.3-1 of the AASHTO LRFD Bridge Design Specifications.

Two 3" diameter polyvinyl chloride ("PVC") conduits shall be provided in all newly constructed parapets. These conduits shall be reserved for use by MDOT only.

14.3.3.1 Concrete Strength

Cast-in-place concrete elements for all applications shall be designed using a 500 psi reduction in the specified 28-day concrete compressive strength.

For proposed alternative concrete mixes for concrete decks, the following performance criteria shall be met:

- a 28-day strength greater than 4,000 psi;
- a 28-day shrinkage less than 500 micro strains when evaluated using ASTM C 157 "Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete";

- conductivity less than 1500 coulombs at 56 days when measured using AASHTO T277 (Standard Method of Test for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration);
- a 60% reduction in alkali-silica reaction expansion when measured by ASTM C 441 (Standard Test Method for Effectiveness of Pozzolans or Ground Blast-Furnace Slag in Preventing Excessive Expansion of Concrete due to the Alkali-Silica Reaction); and
- a plastic air content of 6% ($\pm 1.5\%$) and hardened air content between 4.5% and 8.0% with a spacing factor of 0.008 inches.

14.3.4 Load Ratings

Load ratings shall be in accordance with the structure's owner's requirements, and AASHTO Manual for Bridge Evaluation.

Any load rating required for an existing structure due to condition change or modifications shall be a standalone analysis, independent from any existing load rating provided by MDOT, VDOT or an AHJ. New load ratings required shall be signed and sealed by a Registered Engineer licensed in the State of Maryland or the Commonwealth of Virginia, depending on the location of the structure.

14.3.5 Bridge Decks and Superstructure

14.3.5.1 Bridge Decks

Open steel grid decks are not permitted.

Concrete-filled steel grid decks are not permitted.

Non-structural, stay-in-place forms shall not be placed within 10 feet from an adjacent deck joint.

Each Bridge shall be designed with an accommodation for future deck replacement.

14.3.5.2 Deck Joints

Deck joint determination shall accommodate the complete and expected range of movement. Longitudinal deck joints are not permitted, but longitudinal construction joints are allowed.

14.3.5.3 Superstructure

Bridge types shall be those commonly used by MDOT and VDOT, as applicable. Alternate Bridge types and Elements may be used only if:

- it is a bridge type accepted for general use by the FHWA and other departments of transportation located with similar climates in other states; and
- it can be demonstrated to MDOT or VDOT the alternate Bridge type meets these Technical Provisions.

Integral and semi-integral abutments are permitted. Abutment shall be freestanding without the need for tiebacks or other anchoring systems.

Prestressed Concrete Beams are not permitted for use for structure crossing over I-495 or I-270, including associated ramps.

For prestressed concrete beam superstructures, negative camber shall not be permitted at any point throughout the entire length of the beam.

Reinforcement shall be provided for haunches over five inches deep at any point along the beam.

All inserts and items used for attachments and lifting cast into prestressed concrete or precast concrete Elements shall be corrosion resistant (e.g., galvanized or stainless steel). Epoxy coated inserts are not permitted.

Utilities or their support system shall not be suspended below the lowest point of the adjacent component of the Bridge superstructure, within any single component of the Bridge superstructure, attached on the outboard side the Bridge superstructures, or suspended from the bottom of the Bridge deck.

Standpipes shall be provided on structures in accordance with National Fire Prevention Association ("NFPA") 502 Standards for Road Tunnels, Bridges, and Other Limited Highways. Locations of standpipes shall be shown in the preliminary structure design. Details shall be shown in the Design Deliverables.

14.3.5.4 Segmental Concrete and Box Girder Superstructure

Segmental concrete Bridges shall be designed to conform to the following:

- if a monolithically cast overlay is used as part of the deck protection system, develop fully engineered design guidelines for the thickness of the monolithic concrete to be removed and replaced in a manner keeping distress and changes in surface profile at the time of concrete removal to levels that do not reduce the structural integrity of the structure;
- all expansion joints shall be drained or sealed such that no water or contaminants penetrate the joints; and
- the designs, details, and construction of segmental Bridges shall provide for the easy addition of supplemental post-tensioning.

Box girder and tub girder Bridges shall be designed to conform to the following:

- the provisions of AASHTO LRFD Bridge Design Specifications shall be met for the design of box girder and tub girder Bridges and the minimum sizes of members for new structures;
- diaphragms, cross frames, access holes, and lateral bracing shall be provided in box girders as prescribed in AASHTO LRFD Bridge Design Specifications, and the design of these Elements must incorporate the construction sequence and applicable constructability checks;
- box members do not need to be constructed airtight but shall be designed to be closed to influences of weather to inhibit water and moisture from reaching the interior including all crevices sealed;
- drain holes shall be provided to prevent the accumulation of water inside of the sections;

- the interior of the boxes shall be painted white to facilitate Inspection; and
- the inside of the boxes shall be lit.

Design steel, cast-in-place concrete or concrete segmental box girders to be accessible for all Inspection and maintenance activities without impacting traffic. Size the inside depth of these girders with due consideration to interior Inspection. Provide adequate access openings into all cells of the girders to facilitate all Inspection and maintenance activities.

14.3.5.5 Maintenance of Traffic Requirements

All traffic lanes must be maintained during proposed deck replacements, deck widenings, complete Bridge replacements. At no time during deck replacement or staging shall a fracture-critical condition exist. Support documentation shall be submitted showing secondary structural members can provide redundancy if one of the girders fails.

Typical sections shall be included showing a future deck replacement staging scheme meeting the following criteria:

- temporary lane widths for GPLs shall be at least 11-feet-wide plus an additional 1-foot offset to any temporary or permanent traffic barrier;
- no reduction in the number of GPLs is permitted;
- provide a 2-foot offset where a GPL is adjacent to a PML; and
- girder spacing shall accommodate temporary barrier attachment and deck removal at joint locations.

14.3.5.6 Inspection of Structures

All Bridge superstructures, joints, and bearings shall be made accessible for long-term Inspection and shall be designed and detailed for ease of replacement.

Non-fracture-critical steel box beam pier caps shall be inspectable and paintable with conventional means.

Box girders shall be made accessible for interior Inspection. An access opening shall be provided at each end of the Bridge and in each span with a minimum opening of 2.5 feet x 4.0 feet. Maximum access opening spacing shall be 250 feet. Access openings shall not be located directly over travel lanes, Railroads, or waterways. Access opening door shall have latches both inside and outside and shall swing into the box girder. Access openings shall be located midway between stems and shall be located no closer than four feet to a column or bent to facilitate the removal of form lumber. Locate access openings at least eight feet off the ground to deter unauthorized entry into the box. Fall protection shall be provided inside the box around each access opening. Box girders shall be protected from access by vermin. The interior of all box girders shall be lit, and electrical receptacles shall be provided at a maximum spacing of 50 feet inside for use by Inspection personnel. Provide 100-watt, 130 Volt, vibration resistant, and brass base lamps with automatic shut-off every 50 feet.

MDOT shall be contacted a minimum of 30 days prior to the opening of a structure to traffic to allow time for the scheduling of the initial inspection.

14.3.6 Bridge Substructures and Foundations

Spread footings shall not be used in locations with scour potential. The MDOT SHA Manual for Hydrologic and Hydraulic Design shall be used to supplement AASHTO LRFD Bridge Design Specifications.

Bridges with mechanically stabilized earth ("MSE") walls as structural foundations or Bridges subject MSE walls to vertical loads are not permitted. Spread footings may not be constructed within or on top of the reinforced soil mass of an MSE Wall.

Timber piles are not permitted in the permanent construction.

Each independent foundation shall consist of at least two drilled shafts or four piles unless the Phase Developer provides computations showing global and internal stability requirements are met. Single pile or single drilled shaft foundations will not be permitted.

14.4 Retaining Walls

Steel modular Retaining Walls are not permitted.

Modular Retaining Walls employing interlocking blocks shall not be used where surcharge loads from vehicular traffic are present. All components of mechanically fastened systems shall be specified.

Reinforced or unreinforced modular block Retaining Walls four feet tall or more, measured from the proposed ground to the top of the wall, are not permitted.

Timber shall not be used as any part of permanent Retaining Walls.

Retaining Walls shall be designed and constructed to be plumb and level in its final condition unless the type of wall has a fundamental feature that is stepped or sloped and is constructed in accordance with the design Plans.

For global stability requirements, see Exhibit 6 Article 9 (Geotechnical Engineering).

Retaining Wall layout Plans shall be provided addressing slope maintenance above and below the wall and drainage from behind the wall.

Retaining Walls shall be designed and constructed to be free-draining and shall not retain water pressure. Any wall or wing wall drainage outlet pipe shall have an invert elevation above the two-year water surface elevation when applicable.

Utilities except for roadway and storm drainage systems in drainage conduits shall not be placed within the reinforced soil mass of MSE wall systems. All drainage conduits within MSE wall systems or within the fill of MSE wall systems shall have resilient and flexible gasket joints conforming to ASTM C 443. Underground storage facilities shall not be located within the reinforced soil mass of MSE wall system.

For top-down wall construction, the horizontal deflection due to all design loads (including wind load on sound barriers) shall be limited to 1% of the height of wall, where height of wall is measured from the top of caisson or where the steel pile is embedded into the ground for walls where a caisson is not used to the top of wall. The deflection shall be measured from the front face of wall at the head (top) of wall to front face of wall at the top of caisson or where the steel pile is embedded into the ground for walls where a caisson is not used. The effects of wall

movements on adjacent facilities shall be considered in the development of the wall design. Retaining Wall deflections shall not detract from the serviceability, usefulness, or aesthetics of the walls or any structures or facilities supported by the wall. Concrete facing shall be placed so to ensure a vertical face is achieved in the final condition.

Retaining Walls shall be designed in accordance with AASHTO LRFD Bridge Design Specifications and constructed such that:

- they continue to meet design and performance criteria under static and dynamic loading conditions over their Design Life;
- the total and differential settlement over their Design Life is compatible with the function and wall materials;
- all wall Elements (including tiebacks, soil nails, reinforced soil mass, etc.) are within the ROW;
- they do not collapse during the design seismic event;
- the drainage systems remain functional throughout the Design Life;
- they meet the aesthetic requirements in Exhibit 6 Article 15 (Landscaping and Aesthetics);
- the exposed face is not prone to cracking and has a uniform finish acceptable to MDOT
- the minimum strap length shall be 8'-0"; and
- the distance between back faces of adjacent walls shall be in accordance with FHWA publication FHWA-NHI-10-024, "Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes."

14.5 Miscellaneous Structures

14.5.1 Miscellaneous Structures

Sign structures and supports associated with signs, intelligent transportation systems ("ITS") equipment, cameras, traffic signals, tolling gantries, high-mast lighting, and low-level lighting shall be designed in accordance with the requirements of AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and shall have a Design Life of 30 years.

Attachment of sign structures, ITS equipment, cameras, traffic signals, tolling gantries, and associated supports to any superstructure or deck Element is prohibited.

Design and locate toll equipment, equipment cabinets, communications systems, power supply, supporting conduits, splice vaults, pull boxes, junction boxes, and wiring cabinets to be accessible by reasonable means and methods. If necessary, include access platforms in the design. When servicing these items, the number of GPLs shall not be reduced.

Anchor bolt patterns for all new foundations associated with ITS equipment, cameras, traffic signals, and lights shall match the details shown in MDOT SHA's Book of Standards for Highways, Incidental Structures. This requirement facilitates future replacement of a damaged portion without the need to replace the foundation.

All sign, ITS equipment, Camera, Traffic signal, tolling gantries, and lighting supports shall be inspected every 48 months when the structure's age is within its Design Life of 30 years. For any support in service longer than 30 years, the Inspection frequency shall be every 24 months.

Prior to Handback, any support found to have a rating of 5 or less shall be replaced or rehabilitated. During Handback, any support that is found to have a rating of 5 or less, based on MDTA's Facilities Inspection Manual, shall be replaced prior to the end of the term of the Section P3 Agreement to ensure a Residual Life of 10 years is achieved.

Additional requirements are listed in Exhibit 6 Article 17 (Signing, Pavement Markings, Signals, and Lighting); Exhibit 6 Article 19 (Intelligent Transportation Systems); Exhibit 6 Article 20 (Communication Systems); Exhibit 6 Article 21 (Electrical); and Exhibit 6 Article 24 (Electronic Toll Collection Infrastructure).

14.5.2 Structure Drainage Systems

Use an HS-25 loading for the design of drainage structures subject to traffic loading.

14.5.3 Underground Stormwater Management Structures

Underground SWM structures shall meet, at a minimum, the following requirements:

- structural Elements, including pipes shall have a minimum required Design Life of 50 years;
- whenever any of the structural Elements are under a roadway or extend more than 10 feet below the roadway surface, the minimum required Design Life is 100 years; and
- designed using the LRFD method.

14.5.4 Small Structures

New Small Structures and Small Structures extensions shall be designed in accordance with AASHTO LRFD Bridge Design Specifications and be in accordance with Exhibit 6 Article 13 (Drainage, SWM & ESC).

Lengthened portion of Small Structures shall match the existing in material, size, and roughness to ensure similar hydraulic properties are achieved except that the use of corrugated metal pipe is prohibited.

14.5.5 Sound Barriers

Sound barriers shall be designed in accordance with AASHTO LRFD Bridge Design Specifications. Fire department connections and access for first responders and maintenance workers shall be coordinated with local municipalities and MDOT. Door keying shall be coordinated with MDOT.

A single type of post shall be used for the entire length of a sound barrier. The post dimension, size, and weight may vary due to geometric and structural requirements; however, shape, material and appearance shall remain constant.

Consistent post spacing shall be used for the entire length of the sound barrier. Where consistent post spacing is not possible, provide the perception the post spacing is equal through the use of false posts and special double-wide panels.

Design sound barriers so as not to trap or pond water.

No new Bridge mounted sound barriers will be allowed to be constructed or rebuilt. A separate support structure shall be required if a sound barrier is required at any roadway or stream crossing.

Sound barriers currently mounted on top of Bridges may be maintained on top of the Bridge parapet, provided the Bridge parapet is not required to be reconstructed or modified.

14.6 Construction Requirements

Mass concrete shall be defined and addressed in accordance with American Concrete Institute ("ACI") 207, "Guide to Mass Concrete" and ACI 301, "Specifications for Structural Concrete." In addition, a placement of structural concrete with a minimum dimension equal to or greater than five feet shall be considered mass concrete.

14.7 Deliverable Contents

Deliverable content will be developed in coordination between the Phase Developer and MDOT. The following outlines general expectations of MDOT.

14.7.1 Preliminary Structure Design

If not completed as part of the Predevelopment Work, preliminary structure design shall be prepared as a Preliminary Section Design Activity. The preliminary structures design shall include at a minimum:

- type selection reports (basis of design);
- general arrangement drawings;
- construction staging for redecking;
- foundation reports;
- hydraulic report for structures crossing a waterway;
- proposed aesthetic treatments; and
- verification of compatibility with existing structure components or components to be constructed.

14.7.2 Design Deliverables

The Design Deliverables shall include at a minimum:

- Plans;
- general details with dimensions for fabricated Elements such as prefabricated pedestrian Bridges, sound barriers, MSE walls, sign structures, toll gantries, etc.;
- drainage details;
- grounding Plans (if needed);
- Inspection Plans;
- mass concrete control Plan as applicable;

- specifications, if needed;
- technical memos studies or reports;
- calculations;
- independent check calculations (if applicable); and
- load ratings.

All Design Deliverables shall be checked in accordance with the provisions of the Phase Developer's QMP. In addition to the Phase Developer's design check, the following foundation types, structure types and detailing shall have an independent check performed by the IQF, using independent calculations:

- post tensioned concrete girders or beams;
- steel or concrete straddle bents;
- spliced concrete girders or beams;
- segmental concrete superstructures;
- box girder superstructures;
- connection details between precast concrete elements;
- spans with centerline of bearing to centerline of bearing span lengths greater than or equal to 200 feet;
- foundations and substructure units with mudline to beam seat heights greater than or equal to 75 feet;
- highly skewed, curved or splayed girder arrangements; and
- any foundation or structure design, type or detailing modified from an MDOT SHA standard.

The independent calculations check shall be performed by a qualified engineer having a minimum of 15-years' experience designing similar size and type of structures as proposed. The independent calculations shall be sealed and stamped by the engineer performing the independent check and submitted with the design of the Bridge or Element.

14.7.3 Reports

14.7.3.1 Final Structures Computation Report

Final structures computations report shall be a complete set of computations including computer input and output for the final geometry, structure hydrology and hydraulics (where required), and structural analysis for each designed Element of the structure. Final structures computations report shall be signed and sealed by a Professional Engineer registered in the State of Maryland or Commonwealth of Virginia, depending on the location of the structure.

14.7.3.2 Load Rating Report

A separate report shall be developed, including the load ratings and all rating files from the software used to complete the analysis following the requirements of the AHJ. This report shall be signed and sealed by a Professional Engineer registered in the State of Maryland or Commonwealth of Virginia, depending on the location of the Element being rated.

14.8 Deliverables

Table 14-1 – Structures Submittals

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
Preliminary Structure Design Deliverable	As part of the Predevelopment Work or as a Preliminary Section Design Activity
Demolition Plan	Prior to commencing demolition
Final structures computations report	With each Final Design Deliverable containing Structures
Load rating report	With each Final Design Deliverable containing Structures

ARTICLE 15. Landscaping and Aesthetics

15.1 Scope

The scope of Work includes providing designs for aesthetics and landscaping to support the Work. The designs shall include treatments including the use of finishes and colors for:

- landscape buffers and roadside or median plantings;
- structural features such as Retaining Walls;
- Bridges, Small Structures and other structures; and
- ancillary components of the work such as railings, lighting, fences, and abutment slopes.

An innovative, high-quality product shall be designed, produced, documented, and delivered while minimizing environmental impacts, complying with all laws, regulations, and applicable standards.

15.1.1 Landscaping and Aesthetics Design

References to the Aesthetics and Landscaping Guidelines – I-495/I-270 P3 Program (“The Guidelines”) within this [Exhibit 6 Article 15 \(Landscaping and Aesthetics\)](#) are specific to the documents to be prepared by the Phase Developer as described herein and are to be considered as the basis of design. A copy of The Guidelines will be provided during Predevelopment Work. When using the data provided with The Guidelines, verify it is applicable for the intended use and perform additional data acquisition as needed for the Work. Inform MDOT if errors or discrepancies are discovered in the MDOT-provided information.

Use the character segments portion of The Guidelines as reference to inform the development of the Design Deliverables and work collaboratively with MDOT on the implementation of the concepts. All design shall conform to the state and local guidelines and requirements for landscaping as it applies to plantings. The design should further conform to state and local guidelines and requirements as it applies to aesthetic treatments to structures and other Elements within the state or local roadway right-of-way. Review and acceptance from the governing jurisdiction for Work shall be acquired prior to construction.

The Guidelines offer a basis of design for the landscape architectural and aesthetic design treatments of the Phase. The Guidelines identify multiple design Elements including, grading and planting/groundcover design for the Phase outside of the roadway surfaces, form and finish treatments for existing structures, connections to pedestrian and bicycle pathways and their integration within the Work.

In addition to the general image of the corridor as viewed from travelers and from neighboring roadways and properties, the landscape design should address:

- interconnection between areas on either side of the roadway corridor and integration of the corridor into regional and adjacent bicycle and pedestrian pathways and opportunities for future transit and micro-transit;
- reducing mowing and maintenance beyond the vehicle recovery area, while stabilizing the ground plane, increasing permeability, and providing pollinator corridors using options such as meadow seeding for areas beyond turf areas where visibility, clear zones per the AASHTO A Policy on Geometric Design of Highways and Streets or applicable MDOT criteria,

or safe maintenance practices do not allow for permanent climax successional forests/plantings associated with the Mid-Atlantic region;

- providing planting diversity using a broad mix of native tree and shrub species consistent with the local jurisdictional requirements to meet required forest mitigation, forest edge replacement and specimen tree removal compensation;
- providing a long-lasting, viable planting assisting with reduced maintenance, increase biodiversity, provide habitat adjacent to natural areas and parks, reduce runoff, sequester carbon and increase uptake of carbon dioxide;
- providing pollinator habitat and foraging corridors consistent with federal, state and local pollinator goals;
- promoting sustainability and resiliency by salvaging and reusing of materials, purchasing and hiring locally, and reducing/eliminating the use of materials harmful to humans and the environment;
- reducing the need for noxious and invasive weed control;
- providing sufficient depth of "growing medium" with nutrient, moisture-holding and release, tilth, microbial action to support viable and thriving plantings for the term of the Section P3 Agreement; and
- providing quality of growing media by meeting and not exceeding compaction requirements for planting to allow for water percolation and root growth.

For medians and islands provide plantings that are durable, salt-tolerant, and low maintenance and provide for efficient and safe maintenance. When the safety of workers and viability of plantings is not feasible generally in widths of less than 6 feet and less than 200 square feet, use pavement that is durable, easy to maintain, and aesthetically pleasing materials.

Provide a consistent design for each subcharacter segment for ease of maintenance, long-term survivability, and defining subcharacter area and provide a context-sensitive solution wherever possible.

15.2 Deliverable Contents

15.2.1 General

Deliverable content will be developed in coordination between the Phase Developer and MDOT. The following outlines MDOT's general expectations.

Prepare functional design Plans for the Work, which include connecting roads, transit corridors, utility easements, adjacent trail paths with connections to adjacent trail networks. Plans shall include plantings, details for stormwater facilities, on-site reforestation, pathways, and paving details consistent with existing materials at intersections or interconnecting surfaces. Plans must identify existing tree groupings, identify specimen and significant trees, and protect and incorporate existing trees into the Final Design Deliverables whenever practicable. Plans shall include tree preservation measures and details, information on adjacent uses, steep slopes, wetlands, areas of rare, threatened or endangered species, and areas of historical significance.

All Plans shall be prepared and reviewed prior to each Submittal by a Maryland or Virginia licensed Professional Landscape Architect as applicable for the location of the Work designed. Reforestation or Forest Conservation Plans shall be prepared by a "Qualified Professional" as defined by DNR.

Landscape Plans shall be prepared utilizing best landscape practices during design. Construction details for planting and other landscape work shall be prepared to provide pertinent and critical information necessary to achieve a successful implementation and outcome of the work.

The landscape Deliverables shall contain Plans, details and specifications as needed to fully describe the Work to be constructed. The Plans shall include call-outs/keys to the various plants proposed and schedules for the plants which include the proper horticultural nomenclature for botanical and common plant genus, species and cultivars, quantities of plants, sizes, root stock (e.g., balled and burlapped, container grown, etc.) and planting details.

15.2.1.1 Preliminary Landscaping and Aesthetics Design

If not completed as part of the Predevelopment Work, preliminary landscape and aesthetics design shall be prepared as a Preliminary Section Design Activity. The preliminary landscape and aesthetics design shall be prepared to demonstrate an overall approach to bring a cohesiveness to the corridor, guide design development for structures and guide roadside improvements as they relate to landscaping or preservation of the existing or historic native and non-invasive landscape. The Plans shall take into consideration historic, park or sensitive properties; existing structures; proposed landscaping; tree preservation areas; mitigation or stormwater facility planting areas; where screening or buffering should occur; viewsheds to and from adjacent properties; colors of structures; patterns of vertical surfaces and specialty pedestrian paved areas. The Plans should provide recommendations for tying new features or structures to existing features or conditions in order to achieve a high level of visual aesthetics pleasing to motorists, cyclists, and pedestrians.

The Plans can be prepared as a scroll map or series of scroll maps at an appropriate scale necessary to convey the required information.

15.2.1.2 Narrative

A narrative shall be prepared to accompany the preliminary landscape and aesthetics Plans. The narrative shall address all aspects of the Work and approach to soil media, planting design, plant selection; seeding and slope stabilization requirements, paving stone and base materials; structure aesthetics, hardscape Elements, or any other pertinent feature. Evidence of segment characteristics and transitions between segments should be presented.

15.2.1.3 Tree Preservation Plans

Tree preservation Plans shall be prepared for all areas where existing trees are to be impacted, which abut or are on adjacent park, public or private lands. The Plans should indicate the locations of specimen, significant or champion trees as defined by the municipality having jurisdiction, the botanical/common names of the trees, DBH, health/condition, jurisdiction-defined invasive plants, and other comments elaborating on the condition or habit of the tree. Document canopy height and spread as required by the jurisdiction. For MDOT Access Permits, all trees and shrubs over 2-inch DBH shall be identified. The tree preservation Plans shall show the Critical Root Zones ("CRZ") for all state and local specimen and champion trees and trees 24-inch DBH and greater.

15.2.1.4 Aesthetics and Landscape Design Plans

Aesthetics and landscape design Plans shall include plantings for SWMFACs and shall indicate more detailed information on various types of plantings or other landscape improvements. The Plans are to be prepared at a minimum scale of 1":50' but should match the presentation of the roadway plans. The planting schedules shall include the proper nomenclature of botanical and common names of each plant; genus/species and cultivars, quantities, sizes, root, and any comments regarding habits of growth necessary to obtain high-quality material. Turfgrass establishment, meadow establishment, mulching, soil stabilization matting, and other materials shall be included in the schedule. Aesthetics and landscape design Plans shall provide landscape construction details related to planting and tree preservation.

15.2.1.5 Record/As-Built Landscape Plans

Record drawings of the landscape design shall be prepared upon completion of the landscape installation and after final Inspection. The record drawings shall reflect as-built conditions and should indicate final, installed plant species and quantities.

15.2.1.6 Asset Databases

Asset data updates or modifications shall be provided in ARCGIS (as developed by the ESRI Corporation) to MDOT SHA OED. MDOT will provide viewing access to MDOT SHA OED Environmental Assets Viewer. Updates and modifications shall be provided quarterly at the start of the Construction Work involving landscape plantings. A list of databases to update or modify includes:

- MDOT SHA OED Managed Landscape Assets - Landscape Programs Division Assets Next Generation;
- MDOT SHA OED MS4 - Bay Restoration Viewer (NPDES Database) and MDOT Bay Restoration;
- MDOT SHA OED Mitigation Sites - Environmental Programs Division Wetland Databases; and
- Chesapeake and Atlantic Coastal Bays Critical Areas - Maryland iMap and Maryland critical areas – critical feature layer.

15.2.1.7 Landscape Maintenance Plan

A Landscape Maintenance Plan shall be provided to the appropriate Governmental Entities for review and approval. The Landscape Maintenance Plan should address types, frequencies, integrated pest management ("IPM") procedures, schedules, and timelines for required landscape maintenance throughout the Phase. The Landscape Maintenance Plan shall cover two essential periods, the plant establishment period and the long-term plant maintenance period. At a minimum, prepare a Landscape Maintenance Plan, which aligns with the duration of the establishment periods for each type of plant. The Landscape Maintenance Plan should include the maintenance requirements of reforestation mitigation plantings for a duration of five years.

15.2.2 Overview of Work

Design aesthetic treatments to be consistent and complementary with the local landscape, architecture, and site context. Coordinate with Governmental Entities and adhere to Applicable Law to develop an aesthetic concept, including coordination with the State Historic Preservation Office, as applicable, while meeting the design standards for each jurisdiction.

Develop aesthetically pleasing structures. The following minimum items shall be considered for features visible to the public:

- select cohesive materials, finishes, colors, and textures of visible portions of structures;
- pave slope treatments (where applicable) to prevent soil erosion under Bridge abutments or at interchanges and intersections where plant growth will be inhibited due to lack of sun and rain;
- provide aesthetic enhancements that are easy to maintain, durable, and resistant to vandalism and graffiti; and
- fully integrate aesthetic features with the overall landscape design and take into consideration the view of the traveler and the neighbors.

15.2.2.1 Wildlife Vehicle Collision Reduction Methods

Comprehensive methods of reducing vehicle and wildlife collisions shall be incorporated to minimize the risks of personal injury to motorists, reduce wildlife mortality along the corridor, protect endangered and threatened species, and maintain desired roadway efficiency through minimization of delays. Methods for blockage and passage for inclusion in wildlife corridors adjacent to parkland and streams shall be evaluated during design. Preservation and protection of endangered and threatened species and their habitats shall conform to federal, state, and local ordinances.

15.2.2.2 Preservation and Compensation for Loss of Existing Trees and Natural Areas

Compensation for the removal of or damage to existing natural areas, including ecologically significant lands and urban forestry will be assessed by MDOT, Governmental Entities, and the DNR as applicable. Design Plans and calculations will be reviewed by the appropriate Governmental Entity to verify the achievements of compensation for loss of habitat and landscape amenity assets based on COMAR or the local jurisdiction. Compensation for the value of the trees and habitat removed will be offset by new tree planting and new naturalization areas and will be reviewed by the appropriate Governmental Entity. The value of the trees and natural areas protected may be calculated from the plans and data.

A Plan shall be prepared showing which trees and natural areas are to be protected and incorporated into the landscape design and which trees or areas will be impacted. Identify and illustrate the CRZ of specimen and significant trees to be impacted or preserved and trees of 12" DBH or greater, within 30 feet of the LOD (distance may vary per jurisdictional requirements), and locations for protective fencing or other tree preservation measures. Plans for tree removals and tree work within the Phase shall be submitted to DNR or local jurisdiction forestry division for approval and permitting. Plant selections shall be native and appropriate to the Phase and the ecotone for the region.

Include in the Design Deliverables a tree preservation and mitigation design including:

- a Plan showing all trees and natural areas to be protected and the calculations sheet with the estimated mitigation values;
- a Plan showing where mitigation is to be planted;
- a list of the planting proposed by genus and species, both botanical and common name. quantity, size and root stock, including specifications regarding plant form/habit (i.e., multi-stem versus single stem, etc.) shall be identified; and
- a tree summary table indicating the tree identification number, botanical and common name, DBH, condition, and other comments necessary to evaluate the potential for either preservation or removal of the tree.

Natural and native plantings shall be consistent with the micro-climate and biome of the area to ensure maximum viability, maximize establishment potential, reduce plant mortality, and eliminate the introduction of invasive species.

15.3 Existing & Furnished Topsoil

To ensure the long-term viability of plantings and to maximize opportunities for percolation, provide a minimum depth of 4 inches of topsoil on slopes of 4:1 and flatter. Reduce the need for fertilizers to meet the Maryland fertilizer laws and meet the objectives of state and local SWM requirements. Areas steeper than 4:1 should receive no more than 2 inches of topsoil on open areas and shall be stabilized with vegetation.

Each area to receive plantings where topsoil is placed shall be tested using a penetrometer to ensure a maximum reading no greater than 200 pounds per square inch within the top 18 inches of soil in order to sustain plant life and support healthy root growth.

Unless contaminated or unsuitable, existing topsoil should be used on-site to support and sustain viable planting. For large amounts of surplus topsoil, indicate how the material shall be handled and stored in a manner applicable to relevant regulatory requirements. The handling and storage of topsoil is to be included in Phase Developer's operational procedures and should repair the soil to the qualities and conditions of the existing soils prior to development.

15.4 Landscape Design

The species of plants selected, and locations of the landscape plantings should include state or local jurisdictional input. Forest conservation plantings shall be native to the physiographic province of the Maryland counties through which the work is to be implemented and appropriate to the environmental conditions of each planting location, micro-climate, and biome of the area.

Landscaping shall be provided to mitigate impacts within the Phase and impacts to the community. Preservation of existing trees in good to fair condition is a priority. Trees shall be removed within the grading limits except for specimen trees, champion trees, and other trees able to be preserved. Where tree removals cannot be avoided, consult with MDOT or Governmental Entities to demonstrate all avoidance and mitigation measures have been employed or exhausted prior to advancing with Work. Acceptance from MDOT or the Governmental Entities for the trees to be removed is necessary prior to beginning any tree removal. Tree replacement and mitigation shall follow the standards of the Governmental Entities of the impacted areas.

Plantings shall be maintained by watering, mulching, fertilizing, inspecting and treating with IPM methods for pests and diseases for a 100% survivability at the end of the two-year

minimum establishment period and five-year establishment period for plantings associated with reforestation/forest mitigation.

Trees posing a hazard to the public through decline, damage, or as approved by a state certified arborist of the local jurisdiction shall be removed. Remove portions of those trees that are hazardous using methods preventing damage or injury to the facility, property, and nearby vegetation.

Implement measures to prevent the transport and spread and support the eradication of noxious weeds as defined by the Maryland Department of Agriculture. Prevent and eradicate noxious weeds found within the Phase and do not propagate, import, transfer, sell, purchase, transport, or introduce Tier 1 Invasive Plants nor supply Tier 2 Invasive Plants for use in the Work.

15.4.1 Turfgrass Establishment

Perform turfgrass establishment work so viable turf, per the NPDES/State Disposal System requirements, exists in all newly established turf and sodded areas at Final Completion. Seeded or sodded areas shall meet MDE erosion control requirements and provide a minimum of 95% ground cover and have no individual bare area of greater than 5 inches in diameter. Design areas of seeded turfgrass adjacent to roadway shoulders where planting would be otherwise limited or infeasible. Design areas of turfgrass sod in high visibility areas adjacent to walkways, shared-use pathways, and within curbed medians where other types of plantings would be otherwise infeasible.

15.4.2 Meadow Establishment

Perform meadow establishment work so viable meadow, per the NPDES/State Disposal System requirements, exists in meadow areas at Final Completion. Design areas of meadow providing easy maintenance access.

15.5 Construction Requirements

15.5.1 Performance Requirements

Provided qualifications for subcontractors in good standing meeting the qualifications of the state in which work is to be performed. Landscape Contractors shall have a minimum of five years of successful experience working on highway/transportation projects of similar size and type in the Baltimore/Washington metropolitan area.

15.5.2 Limit of Disturbance/Landscape Limit of Disturbance

The LOD is established to limit access to the area needed to construct each Element of the Work. Unless otherwise indicated, Work shall not occur outside of the LOD except when a Landscape LOD is established for temporary impacts involving the installation of individual trees or shrubs, wetland buffer enhancements, ROW fence repair, maintenance activities, and control of noxious and invasive weeds in compliance with local and statewide noxious regulations meeting one day stabilization requirements for earthwork. These activities shall not result in site grading or create any new environmental impacts.

Specimen or champion trees as defined by the governing municipality for areas outside of the LOD shall not be disturbed or removed without the local jurisdiction's approval. Impacts to greater than 30% of a trees CRZ beyond the LOD may require mitigation. Mitigation for trees damaged by construction activities may also be required.

15.5.3 Tree Preservation Area

Identify areas for the preservation of existing trees and note them clearly on the Plans and in the field as tree preservation areas. The limits of these areas shall be delineated with fencing and flagging meeting local tree/forest preservation requirements. Disturbance in tree preservation areas may be subject to fines or penalties as defined by Governmental Entities.

15.6 Deliverables

Table 15-1 – Landscape Submittals

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
Preliminary Design	As part of the Predevelopment Work or as a Preliminary Section Design Activity
Aesthetics and landscaping design narrative	As part of the Predevelopment Work or as a Preliminary Section Design Activity
Tree preservation Plans	As part of the Predevelopment Work or as a Preliminary Section Design Activity
As-Built landscape Plans	After Final Completion of the landscape Construction Work
Asset databases	Quarterly
Landscape Maintenance Plan	Before beginning landscape construction

ARTICLE 16. Railroad Coordination

16.1 Scope

Phase Developer shall be responsible for all design and construction of Railroad relocations, modifications, and enhancements as agreed to with the Railroad owner(s) and operator(s). The Phase Developer is responsible for coordinating and scheduling the Section D&C Work with all Railroads whose facilities are encroached upon or impacted by the Work. The Phase Developer is also responsible for notifying MDOT in the event any Railroad fails to respond to communications in respect to any Work to be undertaken by the Railroad within a reasonable period of time after such communication, or if the Railroad fails to complete such work in accordance with the schedule agreed to pursuant to the relevant Railroad Agreement.

Identify each Railroad owner within or near the Work and coordinate all Work with the potential to impact or encroach on Railroad properties or operations within or near the ROW. Adhere to clearances, crash wall and other requirements as stipulated in any Railroad Agreements executed between MDOT and any Railroad.

16.2 Applicable Standards

In addition to the specific engineering design and maintenance criteria having been established by each Railroad, Applicable Law governs and regulates various aspects of Railroad operation. Additionally, the railroad industry contributes to and maintains a set of recommended engineering practices and Plans for standardized track and signal components under the auspices of the American Railway Engineering and Maintenance of Way Association ("AREMA") which, in the absence of more stringent criteria set forth by a specific Railroad, are the industry standards to be followed. These applicable standards include the AREMA Manual for Railway Engineering.

16.3 Work Affecting Railroads

Work affecting Railroad operations generally is any Work over, under or within the Railroad's right-of-way or within the railroad influence zone as defined by the Railroad in their standards and requirements. Each Railroad has specific requirements, and descriptions of what Work affects their operations—the Work shall comply with all such requirements.

16.4 Railroad Agreements

The following Railroads operate within the Phase and will require coordination of the Work, adherence to specific Railroad requirements, and entering into agreements for construction and any other encroachments in the Railroad's right-of-way. MDOT will strive to enter into agreements needed for the Work. The Phase Developer or the Section Developer may need additional agreements with Railroads to perform Predevelopment Work or Section Work.

16.4.1 CSX Transportation

CSXT owns and operates freight rail facilities within the Phase. At a minimum, the Work shall adhere to the requirements of the CSXT Public Project Manual if the Work affects any CSXT facility.

It is anticipated the Phase Developer may need to enter into a Preliminary Engineering Agreement with CSXT to address CSXT review of Design Deliverables, CSXT attendance at meetings as necessary, and compensation to CSXT for its costs incurred during the preliminary engineering process. Additionally, for any Predevelopment Work requiring access to CSXT property or facilities, the Phase Developer may also need a "Temporary Right-of-Entry Agreement" for investigative work such as surveys, soil borings, Inspections, evaluations, and other non-construction activities.

It is anticipated the Phase Developer, or the Section Developer may need to enter into the following agreements with CSXT:

- Standard Construction Agreement to address anticipated CSXT activities and costs during construction including monitoring of work, flagging costs, attendance at meetings as necessary, Submittal review, and any temporary or permanent impacts to existing CSXT equipment or facilities; and
- "Temporary Right-of-Entry Agreement" required to access CSXT property for investigative work such as surveys, soil borings, Inspections, evaluations, and other non-construction activities.

It is anticipated the Phase Developer, or the Section Developer may also need to enter into temporary and permanent right-of-entry agreements with CSXT to allow other Work activities such as:

- environmental investigations;
- temporary at-grade crossings for construction access;
- Utility Permit/License Agreement for pipeline and wireline construction;
- movement of oversized loads across CSXT tracks at public or private at-grade highway-rail crossings; and
- movement of off-highway construction equipment across CSXT tracks at public or private at-grade highway-rail crossings.

All personnel entering on CSXT property under a temporary or permanent right-of-entry agreement will be required to have been properly trained in the requirements of CSXT's Contractor Safety & Roadway Worker Protection program.

16.4.2 WMATA Agreements

It is not anticipated any WMATA track or Bridge requires modification as part of the Work. Should the Phase Developer find relocation of WMATA track or an impact to WMATA facilities is needed, prepare a draft agreement between MDOT and WMATA on behalf of MDOT for review by MDOT that adheres to WMATA standards for all Work.

All Work affecting WMATA facilities shall follow the requirements of the WMATA Adjacent Construction Project Manual, including but not limited to work over tracks and other WMATA facilities, intrusion into the WMATA zone of influence, construction adjacent to aerial structures,

work near vent shafts and other WMATA tunnel surface features. The Phase Developer is responsible for obtaining a right-of-entry for any encroachment on the WMATA right-of-way.

Unless an alternate agreement is reached, Plan all work such that WMATA operations are not impacted, and shall coordinate carefully with WMATA to not interfere with any extended operating hours for any reason, including special events. In the event impacts to WMATA's operations or facilities occur, coordinate with WMATA to provide a remedy as approved by WMATA.

16.4.3 AMTRAK Agreements

It is not anticipated any AMTRAK track or Bridge requires modification as part of the Work. Should the Phase Developer find relocation of AMTRAK track or an impact to AMTRAK facilities is needed, prepare a draft agreement between MDOT and AMTRAK on behalf of MDOT for review by MDOT that adheres to AMTRAK standards for all Work.

All work affecting AMTRAK facilities shall follow the requirements of the AMTRAK Construction Manual, including but not limited to work over tracks and other AMTRAK facilities, intrusion into the AMTRAK dynamic space and construction adjacent to aerial structures, and work near other AMTRAK surface features.

Unless an alternate agreement is reached, Plan all work such that AMTRAK operations are not impacted, and shall coordinate carefully with AMTRAK to not interfere with any operating hours for any reason. In the event impacts to AMTRAK's operations or facilities occur, coordinate with AMTRAK to provide a remedy as approved by AMTRAK.

AMTRAK issues Temporary Permits to Enter Upon Property for work such as surveys, soil borings for structural design, structures inspections, and other non-construction activities.

All personnel who will be entering on AMTRAK property under a Temporary Permit to Enter Upon Property agreement will be required to attend Amtrak's Safety and Security Awareness Training prior to entering upon AMTRAK property.

16.4.4 MDOT Maryland Transit Administration MARC Agreements

MDOT Maryland Transit Administration ("MDOT MTA") operates MARC train service under an agreement with CSXT for the use of the CSXT tracks. Therefore, all required agreements will be between the Phase Developer and CSXT, who will coordinate all activities with MDOT MTA. No agreements will be required directly with MDOT MTA.

Plan all work such that MDOT MTA MARC train service operations are not impacted and coordinate carefully with MDOT MTA to not interfere with any operating hours for any reason. In the event impacts to operations or facilities occur, coordinate with CSXT on behalf of MDOT MTA to provide a remedy as accepted by MDOT MTA.

16.5 Agreements for Construction, Maintenance, and Use of Railroad Right-of-Way

Follow requirements of all applicable standards for all Railroads for construction, maintenance, and use of the Railroad's right-of-way.

The Railroad owner will provide all necessary flagging operations for Work affecting Railroad facilities. The Phase Developer is responsible for scheduling, coordinating, and payment for all

flagging operations the Railroad deems necessary. Upon final Inspection and acceptance, the Work will thereafter be inspected and maintained by the Railroad owner or as defined in the Railroad Agreement. This acceptance need not coincide with Substantial or Final Completion but will coincide with the conclusion of work affecting the Railroad.

16.6 Approvals

All Assets to be owned, inspected, or maintained by the Railroad, or which may affect operations of the Railroad on a temporary or permanent basis, whether planned or unplanned, shall be subject to review and approval by the Railroad. Temporary track outages for any reason, whether physically affecting the Railroad or necessary for safety, shall require the Railroad's approval.

16.7 Insurance

Insurance approval shall be obtained, per activity, from the appropriate Railroad prior to commencing any activities impacting a Railroad.

16.8 Safety Requirements

All safety requirements must be adhered to for each Railroad. In addition to the Federal Railroad Administration's, Roadway Worker Protection rules, each Railroad has its own safety program, including the following:

- CSXT – Minimum Safety Requirements for Contractors Working on CSXT Property;
- WMATA – Construction Safety and Environmental Manual; and
- AMTRAK – Contractor Safety Orientation Policy.

16.9 Design Requirements

Contact the respective Railroad representative to coordinate design requirements, required Railroad clearances, and future Railroad projects within or in the vicinity of the ROW. Design requirements of all applicable standards and references shall be followed for all Railroad design. Verify and obtain from the Railroad such information as may be pertinent to the Design Work. Design Work shall verify and accommodate all requirements associated with existing Railroad conditions. The Phase Developer may be required to demonstrate accommodation of planned future Railroad as per the Railroad Agreement but shall not be required to construct improvements beyond those which bring current facilities, impacted by the work, into compliance with current standards unless those standards are waived by the Railroad.

16.10 Construction Requirements

Follow the requirements of all applicable standards and references for all Railroad construction. Verify and obtain from the Railroad such information as may be pertinent to the Construction Work, including all requirements associated with the Railroad's guidelines and standards.

16.11 Deliverables

Table 16-1 – Railroad Submittals

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
Required Deliverables per the Railroad Agreement with the Railroad	Prior to any activity within Railroad right-of-way
Design packages	In accordance with the Phase Developer's schedule for the pertinent portion of the Work
Construction Submittals	As required by the Railroad

ARTICLE 17. Signing, Pavement Markings, Signals, and Lighting

17.1 Scope

Traffic control devices ("TCD") for the Work shall be used to regulate, warn, or guide traffic. Design, placement, operation, maintenance, and uniformity shall be considered to ensure road users can easily recognize and understand devices and safely respond to the information provided. Design and construction of all TCDs (temporary and permanent) shall be coordinated with all other disciplines involved with the Work to assure proper clearances and adequate sight distance. Planning, design, specification, installation, and constructing all signing, pavement markings, signalization and lighting Elements shall be in accordance with the requirements of the maintaining agency.

17.2 Design Request Forms

Initiate all new or proposed changes to TCDs by submission of a Design Request ("DR") form. If the DR is not prepared in the Predevelopment Work, it shall be prepared as a Preliminary Section Design Activity.

The Phase Developer shall collaborate with MDOT to determine the functional requirements for the proposed TCD before proceeding with the Work. Advance notice of the DR submission shall be provided to MDOT a minimum of 20 days prior to the draft DR Submittal to MDOT. Following submission of the draft DR, a Functional Requirements meeting will be held with MDOT and Stakeholders in order to confirm and finalize the functional requirements and draft DR contents.

Once the functional requirements are defined and agreed to, submit the final DR and all supporting data for documenting the proposed changes or modifications of the TCD to MDOT. MDOT will process the DR and provide all documents to the MDOT SHA Assistant District Engineer-Traffic ("MDOT SHA ADE-T") and the Director's Office, MDOT SHA Office of Traffic and Safety ("MDOT SHA OOTS") subject to review and acceptance.

For MDOT and City of Rockville signals, prepare MDOT SHA OOTS's "Traffic Control Design Request Form" in accordance with the DR Form Instructions and Guidelines contained in this [Exhibit 6 Article 17 \(Signing, Pavement Markings, Signals, and Lighting\)](#). For Montgomery County signals, prepare Montgomery County Department of Transportation's Traffic Engineering and Operations Division's Traffic Control Device Design Request Form and submit to MDOT. Location and number of signal poles, mast arms, signal indications shall comply with the standard design practices and follow the DR forms.

MDOT will distribute copies of the accepted DR to the Phase Developer, MDOT SHA ADE-T, MDOT SHA OOTS Traffic Operations Division, and the AHJ. Upon receipt of the accepted DR, the Phase Developer may begin design. MDOT may add or delete items on the DR, however only the accepted DR shall be used for the TCD requirements.

Once the Plans have been accepted, MDOT will retain possession of the original signed Plan. A reproducible copy will be made and sent to the Phase Developer along with a cover memo.

17.3 Signing and Supports

17.3.1 Permanent Signing Design Scope

Signing and supports shall be designed in accordance with MDOT SHA Maryland Manual on Uniform Traffic Control Devices ("MD MUTCD"), MDOT SHA Maryland Standard Sign Book, and FHWA standard highway signs, to provide a complete and functional system. Signs located outside the ROW should be designed according to VDOT or AHJ standards as applicable.

Provide all necessary guide, toll highway, preferential and managed lane, supplemental, route marker assemblies, informational, and regulatory and warning signs for the Work. This includes signing outside of the immediate Phase or Section limits, as applicable, which is necessary to lead traffic, guide, and regulate the Work. Signing also includes replacement of all existing general service signs, specific service signs and supplemental guide signs and installation of any new service or guide signs needed for the Work. Sign panel retroreflectivity level shall meet ASTM D 4956, "Standard Specification for Retroreflective Sheeting for Traffic Control," Type XI.

A signing inventory shall be required for all existing signs (guide, supplemental, route marker assemblies, informational, and regulatory and warning signs) within the Phase. Existing signing falling outside the Phase or Section limits, as applicable, shall be included in the signing inventory when it pertains to the roadways/destinations within the Phase or Section, as applicable. Provide information in a GIS database (compatible with ARCGIS as developed by ESRI Corporation). The GIS database will include all field-inventoried information including sign size; sign type; MD-MUTCD sign designation; x, y global positioning system coordinate locations; mounting height; support type; support size; and digital photographs of the front, back and side of each sign and support as well as a close up of the sign identification sticker. The database shall be submitted to MDOT.

Move, modify, or remove any signage outside the Phase no longer appropriate as a result of the Work or if the sign no longer meets MD MUTCD requirements for message and layout or retroreflectivity levels. This signage shall be shown in the Design Deliverables. Maintain all existing signs (to remain in the ultimate condition) during construction, including travel services signs. Maintain all existing signage in its current location for as long as possible and replace with a new permanent sign as soon as practical after removal of the existing sign. Adjust, cover, or replace all signage within the construction phasing limits with messages conflicting with the temporary conditions associated with MOT. For any existing signs requiring (temporary or permanent) relocation or removal during construction, coordinate with MDOT and include a depiction in the Plan Submittal (including sign face, structure type, mounting details, and sign locations) of agreed-upon action prior to relocation or removal. Install all new signs prior to the road being fully opened to traffic and cover until operationally required.

Evaluate and document retroreflectivity levels of all existing signs being reused or modified for the Work. Existing sign retroreflectivity shall be verified by the use of a portable handheld retroreflectometer device as specified in ASTM E 1709, "Standard Test Method for Measurement of Retroreflective Signs Using a Portable Retroreflectometer at a 0.2 Degree Observation Angle." The device shall be properly calibrated per the manufacture's recommendations and certification of calibration shall be provided to the AHJ. Existing guide sign panels with a retroreflectivity level meeting the requirements of ASTM D 4956 Type XI can be reused without sign lighting. If the retroreflectivity level is below a Type XI, it shall be replaced with ASTM D 4956 Type XI. Refer to MD MUTCD Table 2A-3 for minimum maintained retroreflectivity levels.

All Toll Rate Signs shall be included in the signing Plans. The static sign portion of Toll Rate Signs shall be designed according to the requirements of this Exhibit 6 Article 17 (Signing,

Pavement Markings, Signals, and Lighting). The dynamic message signs (“DMS”) shall be designed in accordance with Exhibit 6 Article 19 (Intelligent Transportation Systems) for DMS requirements.

Destination signs and distance signs as detailed in MD MUTCD shall be a maximum of five miles apart, installed downstream of interchange on-ramps.

Mounting permanent signing on Bridge Elements or support of signs by banding signs to Bridge piers is not allowed.

Coordinate and obtain acceptance from MDOT or pertinent Governmental Entities for directional signage (such as guide, wayfinding, street names, motorist services, etc.), new sign structures, and disposal of existing signs and structures.

Additional requirements for sign supports are listed in Exhibit 6 Article 14 (Structures).

17.3.1.1 General Purpose Lane signage:

Incorporate General Purpose Lane (“GP Lane”) signage into the overall signing Plan. Clearly identify:

- entrances from GP Lanes to PMLs;
- access points from PMLs to both GP Lanes and exit ramps; and
- entrances to GP Lanes from cross roads at interchanges.

17.3.1.2 Priced Managed Lane Signage:

Incorporate PML signage into the overall signing Plan. Comply with the signage requirements in Exhibit 6 Article 14 (Structures) and Exhibit 6 Article 23 (Construction). Clearly identify:

- entrances from GP Lanes to PMLs
- access points from PMLs to both GP Lanes and exit ramps; and
- entrances to PMLs from cross roads at interchanges.

Clearly inform drivers about the PML Tolling Point pricing when they are passing the last exit before the next Tolling Point and inform drivers about the pricing associated with the next Tolling Point.

17.3.2 Permanent Signing Plan Requirements

Requirements will be developed in coordination between the Phase Developer and MDOT. The following outlines general MDOT expectations.

17.3.2.1 Preliminary Signing Design

If not included with the Predevelopment Work, prepare and submit a preliminary signing “post-it-note” roll Plan subject to review and acceptance by MDOT as a Preliminary Section Design Activity prior to preparing signing Plan cut sheets. Work collaboratively with MDOT to prepare a Signing Concept roll Plan to be included in the Committed Section Proposal. Existing and proposed roadway alignments, ROW, baseline of construction with stationing, and existing

topography at the tie-in points of the Work shall be shown. The roll Plan shall include the following:

- proposed message, size, and location of all guide, supplemental, route marker assemblies, informational, regulatory, tolling, and warning signing;
- location and messages of all existing signs to be retained, removed, and relocated;
- location and type of delineation devices including pavement markings and snowplowable raised pavement markers ("SRPM"); and
- proposed locations and support type for new signs and structures, for all Mainlines, ramps, interchanges, arterial streets and other roadways containing signing affected by the Work.

Following review of the roll Plan by MDOT, conduct a preliminary signing review meeting to review and discuss comments.

17.3.2.2 Signing Plans

Signing Plan cut sheets shall be prepared at a scale of 1" = 50' (or matching the scale used for roadway Plans). Existing and proposed roadway alignments, ROW, baseline of construction with stationing, and existing topography at the tie-in points of the Work shall be shown. Signing Plans shall include the following:

- existing and proposed signage on Plan view and overhead sign cross-sections;
- proposed message, sign size, legend text and size, MD MUTCD or MUTCD sign designation (if applicable), and location of all guide, toll highway, preferential and managed lane, supplemental, route marker assemblies, informational, regulatory, and warning signing;
- location and messages of all existing signs to be retained, removed, and relocated;
- location and type of delineation devices (including pavement markings and SRPMs);
- proposed locations for new signs, sign structures and Tolling Points for all Mainlines, ramps, interchanges, arterial streets and other roadways containing signing affected by the Work;
- the owner of each sign/structure shall be clearly noted on the Plan sheets if it differs from MDOT;
- proposed guide sign design layouts including dimensions;
- proposed locations for relocating existing signs, for all Mainlines, ramps, interchanges, arterial streets and other roadways containing signing affected by this project;
- locations of all proposed and existing DMS;
- sign structure locations and offsets from roadway edge of pavement;
- types and lengths of proposed sign structures/supports including breakaway and non-breakaway designations;
- sign support spacing and lateral clearance codes/offsets;
- overhead sign cross-sections;
- overhead sign structure identification number designations (provided by MDOT upon request);
- Sign Structure Verification Forms; and

- MDOT’s standard signing Plan sheet format (provided with the Reference Information Documents) SN-1, SN-2 SN-3, SN-4, SN-8, SN-9 or SN-11 as applicable.

17.4 Permanent Signing Materials

- all hardware shall be stainless steel; and
- Design Life shall be:
 - thirty years for overhead, cantilever and butterfly sign structures;
 - ten years for ground mount sign supports; and
 - twenty years for sign panels.

17.5 Permanent Signing Construction

Submit shop drawings showing the details of signing and sign supports, source of supply, and catalog cuts. Use directly applied copy on extruded aluminum. Use direct applied or silkscreen on sheet aluminum.

Signs will be inspected after sign installation is complete. Signs shall be installed to eliminate specular reflection. Inspect each new sign location to determine if clearing is required to provide for the required sight distance. Complete all clearing and disposal as specified. Remove any tree limbs protruding within the limits of clearing. The limits of clearing for each location will be as specified.

Use the following minimum thickness for fabricated sheet aluminum signs.

Table 17-1 – Fabricated Aluminum Sign Thicknesses

LONGEST DIMENSION OF SHEET SIGN IN.	MINIMUM THICKNESS IN.
≤ 12	0.040
12+ to 24	0.063
24+ to 36	0.080
36+ to 48	0.100
> 48	0.125

17.6 Pavement Markings

17.6.1 Pavement Marking Design Scope

Provide pavement markings (temporary and permanent) and delineation in accordance with the standards of MDOT, VDOT or the AHJ, as required. Pavement markings shall be replaced when they are no longer meeting the minimum retroreflectivity requirements for pavement markings set forth within these Technical Provisions. Pavement markings and delineation devices shall be designed to provide a complete and functional system meeting the following:

- separation of PMLs from GP Lanes;
- eradication of all pavement markings, permanent or temporary, where no longer applicable or required such that they do not conflict with current pavement markings;
- modification of pavement surface(s) impacted by the removal of existing pavement marking by milling and overlay conforming to requirements listed in Exhibit 6 Article 12 (Pavement);
- installation of pavement markings and markers in accordance with the manufacturer's procedures and specifications; and
- meet the specific requirements for special markings below.

Install pavement markings for crosswalks at locations where pedestrians are accommodated with new sidewalks and curb ramps that meet the requirements of the Americans with Disability Act. Crosswalk lines shall be high visibility continental crosswalk style with 24" bars and 20" to 36" spaces.

Install SRPMs in accordance with MD MUTCD. When using SRPM on new roadways with a posted speed limit of 50 MPH or greater, use recessed SRPM with dual plastic holders and dual lenses in a groove where alignments allows.

Mark locations of all fire hydrant locations along the Phase with both blue raised pavement markers and blue post-mounted delineators.

All transverse pavement markings such as yield symbols, isosceles triangles (shark's teeth), crosswalks, stop lines, as well as arrows, letters, and other symbols shall be inlaid pavement marking tape. When used on Portland cement concrete, contrast tape shall be applied for lane lines for increased visibility. Use waterborne paint for temporary pavement markings not installed on the final roadway surface. For temporary pavement markings installed on final roadway surface, use temporary marking tape.

All permanent pavement marking products used shall either be listed on MDOT SHA's "List of Qualified Permanent Pavement Markings" or alternate materials accepted through the MDOT SHA's "Maryland Product Evaluation List" program.

17.6.2 Permanent Pavement Marking Plan Requirements

Submit pavement marking designs in the same Plan set with signing. Deliverable content will be developed in coordination between the Phase Developer and MDOT. The following outlines the general expectations of MDOT:

- proposed locations for new pavement markings, for all Mainlines, ramps, interchanges, arterial streets, and other roadways;
- any required modifications to existing pavement markings beyond the Phase to ensure appropriate tie-ins;
- color, size, location, and material type for final pavement markings within the limits of work;
- lanes dimensions based on the typical sections and for each change in the roadway typical section;
- identification of locations where pavement markings change color, width or material;
- the width of each vehicular travel lane wherever a change in travel lane width occurs but not less than two times on each Plan sheet;

- dimensions for placement of arrows, text, route shields, bicycle markings, stop lines, and length of longitudinal turn lane lines; and
- existing pavement markings are to remain and locations where proposed pavement markings tie-in to existing pavement markings.

17.6.3 Permanent Pavement Marking Construction

The Design Life for all pavement markings shall be a minimum of 5 years. Submit shop drawings showing the details of pavement markings and symbols.

17.7 Signalization

17.7.1 Signalization Scope

Provide all necessary traffic operations, signal phasing and timing evaluations, and signal warrant analyses to justify signal installation and modification. If a traffic signal is proposed to be removed with an alternate design or an alternate timing is developed, the change shall be submitted to the AHJ for approval.

Comply with all Third Party MOUs.

Provide the required roadway lighting for signalized intersections. Design of signal pole mounted lighting shall be coordinated with adjacent existing and proposed roadway lighting, if any. Electrical cables for intersection lighting shall be energized directly from the metered service pedestal for the traffic signal and shall not pass through the signal cabinet.

Light-emitting diode ("LED") roadway luminaries shall be used for lighting installed on traffic signal equipment. LED vehicular and pedestrian traffic signal heads shall be used for traffic signals.

All traffic signals impacted or installed as part of the Work shall be interconnected. All existing or new interconnected traffic signal systems shall be a complete installation, including tying into the existing traffic signal communications system. Interconnect cable is not spliced with the exception of Montgomery County where interconnect may be spliced with splice kits with acceptance of MDOT and Montgomery County. All traffic signals shall have video detection cameras for stop line presence and sampling detection. All traffic signals shall have video detection cameras or non-invasive micro-loop probes for all advanced passage detection. All traffic signals shall have Countdown Pedestrian Signals and Accessible Pedestrian Signal push buttons at all locations where signalized crossing are provided. Prepare and submit APS worksheets to the AHJ.

Coordinate with MDOT, Frederick County, Montgomery County, or the City of Rockville as appropriate for controller testing and final turn-on.

All permanent traffic signals shall use mast arm signal poles. The use of diagonal single mast arms for permanent conditions is not permitted. Any proposed alternatives to mast arm requirements shall be submitted subject to review and acceptance by MDOT.

The use of wood poles or strain poles is permitted if the estimated duration of signal operation is less than one year. Span wires may be used for temporary traffic signals.

All conduits crossing roadways shall be installed perpendicular to the roadway being crossed, unless there are constructability or utility conflicts, in which case the proposed conduit route shall be subject to review and acceptance by MDOT and the AHJ. With the exception of conduit being used for non-invasive probes, all conduit crossing underneath a roadway shall be 4-inch Schedule 80 rigid PVC conduit. Conduit used for the installation of non-invasive probes shall be 3-inch Schedule 80 rigid PVC conduit. Two-inch Schedule 80 rigid PVC conduit shall be used between handholes and pedestal poles. Two three-inch Schedule 80 rigid PVC conduits shall be used between handholes and signal poles. Two four-inch Schedule 80 rigid PVC conduits shall be used between handholes and signal cabinets. Two-inch Schedule 80 rigid PVC conduit may only be used for power feeds where acceptable to the Utility Owner providing power. Confirm and use the conduit size required by the Utility Owner providing power. Conduit fill ratios shall not exceed 25% of the conduit area.

Base-mounted National Electrical Manufacturer's Association ("NEMA") size S Maryland State Econolite traffic signal cabinets wired in accordance with AHJ specifications shall be used for all permanent traffic signals. Pole mounted (NEMA size 5) cabinets may be permitted for use at temporary traffic signals only. All signal cabinets, controllers, and rack-mounted modules will be supplied by the AHJ upon reimbursement for said equipment. Deliver the assembled cabinet from the AHJ's shop to the Site and install it. The AHJ will provide final connection of all cables within the cabinet.

Separate power connections and service meters shall be provided for each AHJ.

Use the addition of S cabinet uninterruptable power supply ("UPS") battery backup, when required by MDOT design criteria. UPS battery backup shall be provided for ramps, system master controllers, multiple left or right turn lanes (in the same direction), interactive hazard identification beacons ("HIB"), unusual geometry, and as requested by the AHJ.

Locate push buttons in positions clearly indicating to the pedestrian which crosswalks are actuated by each push button. Furnish all mounting hardware, and drill holes to provide cable and wire entrances.

Ensure all traffic signal heads can be seen by all approaching traffic at the required sight distance at all times. Aim signal heads to be visible in conformance with the minimum requirements of the MD MUTCD. Prepare and submit to the AHJ sightline profiles for all overhead signs and HIBs on traffic signal approaches. The Submittal shall include calculations demonstrating the sight distance will be adequate for vehicles approaching signalized intersections to see the back of the queue and decelerate to a stop condition for all approaches to traffic signals under existing, temporary, and permanent conditions. If sightlines do not meet the MD MUTCD requirements, provide a recommendation for meeting the requirements to the AHJ for approval.

17.7.2 Permanent Signal Plan Requirements

Submit traffic signal and interconnect Plans. Signing and pavement marking designs within proximity of the signal shall be depicted on these Plans. Deliverable content will be developed in coordination between the Phase Developer and MDOT. The following outlines general expectations of MDOT.

17.7.2.1 Preliminary Signal / Interconnect Plan Design

If not included with the Predevelopment Work, prepare preliminary signal/interconnect Plans as a Preliminary Section Design Activity to be submitted to AHJ prior to preparing the signal/interconnect Plan cut sheets. Existing and proposed roadway alignments, ROW, baseline of construction with stationing, and existing topography at the tie-in points of the Work shall be shown. Plans shall also include existing and proposed utilities, landscape features, applicable drainage features, ditch lines, applicable structural facilities, and other information required for coordination of utilities. The preliminary signal/interconnect Plans shall include the following:

- proposed location of all signal and pedestrian/bicycle heads;
- location and messages of all proposed signing;
- location of detectors (video detection, non-invasive probes) and detection zones;
- location of handholes, cabinet, conduit and poles;
- location of APS, CPS, detectable warning surfaces;
- location of intersection lighting;
- location and messages of all existing signs to be retained, removed, and relocated; and
- location and type of delineation devices (including pavement markings and SRPMs).

17.7.2.2 Signal/Interconnect Plan Requirements

Prepare signal/interconnect Plan cut sheets at a scale of 1" = 20' to be submitted to AHJ. Existing and proposed roadway alignments, ROW, baseline of construction with stationing, and existing topography at the tie-in points of the Work shall be shown. Plans shall also include existing and proposed utilities, landscape features, applicable drainage features, ditch lines, applicable structural facilities, and other information required for coordination of utilities. The signal/interconnect Plans shall include the following:

- proposed location, sections, and sizes of all signal and pedestrian/bicycle heads;
- location, messages, size, and MD MUTCD or MUTCD sign designations (if applicable) of all signing;
- location and type of detectors (video detection, non-invasive probes) and detection zones;
- location and type of handholes, cabinet, conduit, and poles;
- location and type of APS, CPS, detectable warning surfaces;
- proposed curb ramp details with dimensions (unless detailed on other Plan sheets);
- location of intersection lighting;
- location and messages of all existing signs to be retained, removed, and relocated;
- location, color, and type of delineation devices (including pavement markings and SRPMs);
- proposed locations for new signs and structures, for all Mainlines, ramps, interchanges, arterial streets, and other roadways containing signing affected by the Work;
- proposed wiring diagram;

- location of signal heads dimensioned on mast arms;
- proposed signal phase chart; and
- clearance to existing and proposed overhead utility lines.

Permanent Signal/Interconnect Construction

The Design Life for permanent signals shall be 25 years. Submit shop drawings showing the details of signals.

17.8 Roadway Lighting

17.8.1 Roadway Lighting Design

Complete a lighting analysis for all areas where new or modified lighting is proposed to be submitted to MDOT prior to preparing the lighting Plans. If lighting analysis was not performed as part of the Predevelopment Work, provide lighting analysis as a Preliminary Section Design Activity. Provide roadway lighting in accordance with the Illuminating Engineering Society of North America ("IESNA") RP-8 "Roadway Lighting." Roadway lighting shall be designed to provide a complete and functional system.

Design and construct a permanent roadway lighting system such that it is entirely separate for GP Lanes and PMLs with all lighting equipment including, but not limited to, conduits, cables, light poles, luminaires, junction boxes, manholes, handholes, cabinets, etc.

All existing lighting impacted by new construction shall be replaced and upgraded to LED fixtures in compliance with applicable standards. Design all new lighting using LED fixtures provided with individual photocells and using a light loss factor of 0.64. Continuous roadway lighting shall not be installed unless justified by an engineering study and accepted by MDOT. In areas with closely spaced interchanges, continuous roadway lighting may be needed to avoid dark spots with spacing less than 600 feet between lit areas. All lighting equipment (devices, poles, cabinets, conduits, cables, manholes, power feed, etc.) regardless of location shall have a Design Life of 30 years.

Lighting at Tolling Points shall be sufficient to capture an image of the front and rear of each vehicle's license plate without the use of flash photography.

Illuminance and veiling luminance calculations shall include uniformity ratios (average-to-min and max-to-min), point-by-point computations, and a summary of the minimum and average maintained lighting levels and the critical veiling luminance ratios. The light loss factor and lamp lumens shall be provided with the illuminance and veiling luminance calculations. For GP Lane LED luminaires, use fixtures listed on the MDOT SHA's "Qualified Products List." All LED fixture choices shall require approval by MDOT SHA OOTS prior to use. Photometric calculations shall be performed with the fixture intended for installation.

At a minimum, intersection lighting calculation grids shall include the area of the intersection bound by the stop lines (or the location where a stop line would be located on an uncontrolled approach). The recommended and optional light poles shown in Figure III-A.1 of MDOT SHA's "Lighting Guidelines" shall be considered required unless waived by the MDOT through the design process. Calculation grids for roundabout intersections shall extend to the nose of the separation median islands. In locations where 600 feet or less is provided between any two light poles, the 600 feet or less shall be lit and included within a lighting calculation grid. All gaps of lighting 600 feet or less shall be lit. Calculation grids for secondary ramp merges or

diverges shall be placed in accordance with Figure III-A.2 and Figure III-A.3 from MDOT SHA's "Lighting Guidelines."

Provide partial interchange lighting on all approaches at grade-separated interchanges, unless otherwise specified. Partial interchange/ramp lighting areas include acceleration and deceleration lanes, ramp termini, intersections. Partial intersection lighting shall be installed for all signalized intersections. The need for intersection lighting for all unsignalized intersections shall be determined based on MDOT SHA's "Evaluation Form for Intersection Lighting." Combine intersection lighting with traffic signals whenever possible.

Design and construct underpass lighting for nighttime hours for roadways with sidewalks and where lighting levels cannot be achieved due to the shadow effect of Bridges. Any daytime underpass lighting shall be designed and constructed by considering existing light levels. All underpass lighting shall be designed in accordance with IESNA RP-22 "Tunnel Lighting."

Quantify and submit calculations summarizing potential light trespass in adjacent neighborhoods for the proposed lighting. For all proposed roadway lighting, the maximum allowable vertical and horizontal illuminance at residential property lines shall not exceed 0.05 foot-candles. Photometric analyses for light trespass at residential property lines is required and the analysis shall utilize a light loss factor of 1.00.

Existing pedestrian lighting shall be maintained throughout construction and proposed pedestrian lighting shall be designed and constructed with lighting levels for pedestrian lighting in accordance with IESNA RP-8 "Roadway Lighting."

Sign lighting for new overhead signs shall not be required unless sight distance to the sign structure is less than one half mile or the new overhead sign contains Toll Rate information. All existing sign lighting, where applicable, shall be upgraded to LED.

Power source for lighting system shall be in compliance with the MDOT SHA Traffic Control Devices Design Manual specified under lighting electrical system. Power supply for roadway lighting shall be metered separately for GPLs, PMLs, traffic signals, tolling equipment, other MDOT equipment and other Governmental Entities. Coordinate with the Utility Owner providing power and AHJ on the availability of service within the proximity of proposed installation location.

All roadway light poles shall be located a minimum of 50 feet from any sign structure, gantry, DMS or similar. High mast lighting for the GP Lanes shall only be considered when photometrics cannot be met with 40 or 50 foot light poles.

All proposed lighting equipment shall be located such that it can be readily maintained by personnel of the maintaining agency. Where possible, locate signal and lighting cabinets in the same quadrant of the intersection/interchange. Each luminaire mounted on a signal structure shall be equipped with a photocell. Power supply for signal structure mounted lighting and the traffic signal may be installed in the same conduit system.

All GP Lane lighting cabinets shall be designed and constructed with at least 20 amperes of usable spare capacity for MDOT's future use. GP Lane lighting circuits shall be direct-buried duct cable unless under roadway surfaces, in structures, or in locations where protection from surface loading is needed. Two conductor duct cables shall be used for all roadway lighting circuits. Four conductor duct cable is permitted for sign lighting circuits. Only the conductors serving the lighting structures shall enter the foundation of the lighting structures. All other conductors shall remain un-spliced and bypass the foundation. Furnish and install single-conductor Type USE cables in Schedule 80 rigid PVC conduit under all roadway surfaces for the GP Lane lighting. Single-conductor cables shall be used any place cables are to be installed in

conduit. For cable runs in Bridges or parapets, cables sizes equal to or less than #6 American wire gauge shall be used.

No foundations or electrical handholes/handboxes/manholes shall be placed in drainage ditches.

Electrical manholes shall be constructed of concrete. Manholes constructed of composite materials will not be permitted.

The stone surrounding electrical handholes/handboxes/manholes shall not be considered a suitable outfall. Underdrain shall be connected to a suitable outlet such as a drainage pipe or structure. If a drainage structure is not available, submit alternative designs to MDOT. Abandon existing conductors between poles to be removed. Power supply for lighting (except when mounted on signal structures) shall be installed in separate conduit (including cabinets, handboxes, handholes, and manholes/vaults).

All light poles not protected by traffic barrier and located within the clear zone as defined in the AASHTO Roadside Design Guide shall be installed on a breakaway transformer base complying with the MDOT SHA Book of Standards for Highways and Incidental Structures. Light poles shall not be installed between moving traffic and traffic barrier.

The lighting system shall use cabinets, conduits, and handboxes/manholes/vaults/junction boxes separate from the traffic signal or ITS equipment. Common metered service pedestals may be used. Place luminaires within one foot laterally of the pavement marking edge line. To avoid foundation conflicts, the luminaire location may be located between 1' inside to 2' outside of the pavement marking edge line. Where such adjustments are made, ensure all other design requirements are being met.

17.8.2 Roadway Lighting Plan Requirements

Deliverable content will be developed in coordination between the Phase Developer and MDOT. The following outlines general expectations of MDOT.

Prepare and present lighting Plans with an appropriate scale, preferably matching the scale of the roadway Plans. Plans shall include existing and proposed geometry, existing and proposed utilities, ROW, landscape features, applicable drainage features, ditch lines, applicable structural facilities, and other information required for coordination of utilities. Plans shall show location of new lighting, type and mounting heights of poles, type and wattage of luminaires, length of luminate arms, removal and relocation of existing lighting, conduit, circuit routings, cable types and installation method, manholes/junction boxes, splice locations with appropriate connector kits, ground rod locations, sights to be lit, electrical service locations, and other details pertinent to the construction.

The lighting Plans shall include standard MDOT identifiers and legends for light poles and manholes, as well as standard designations for cable sizes. The Plans shall include a panel schedule (including pole and base-mounted lighting cabinets and metered service pedestals) showing the circuit breaker loads and equipment connected to each circuit breaker. The Plan shall include a schedule of light poles, a sign lighting schedule, and a schedule of enclosures (manholes/vaults/junction boxes.) Voltage drop calculations shall be provided concurrently with the lighting Plan sheets.

Intersection lighting may be combined with the traffic signal Plans whenever possible.

17.8.2.1 Preliminary Roadway Lighting Design

If not prepared with the Predevelopment Work, a preliminary lighting Plan shall be prepared as a Preliminary Section Design Activity. The preliminary roadway lighting shall:

- be presented in roll plot format;
- show type and layout of luminaires and their spacing;
- show type, location and size of mounting, type and size of lighting structures proposed;
- present preliminary lighting analysis including original files showing photometric calculations conducted using AGI32 software, or other MDOT accepted software, and shall include point-to-point lighting analysis;
- demonstrate lighting levels including average illuminance, uniformity ratios, and veiling luminance meet the requirements specified in IESNA RP-8; and
- include an MDOT SHA "Evaluation Form for Intersection Lighting" at unsignalized intersection locations.

17.8.2.2 Roadway Lighting Plans

Roadway lighting Plans shall:

- be presented in Plan sheet format;
- show lighting equipment layout including type and layout of luminaires and their spacing;
- show type, location and size of mounting, type, location and size of lighting structures proposed;
- detail the electrical system layout showing locations, types, and sizes of power source, conduit layouts, locations, sizes and types of junction boxes and electrical manholes, number and types of cables, locations and types of lighting control cabinets and locations and types of metered service proposed;
- provide an electrical system design showing circuit layout, wire size calculations, voltage drop calculations; and
- include photometric calculations (illuminance and veiling luminance as appropriate) supporting the light locations and voltage drop calculations for all circuits.

Construction

Submit shop drawings showing the details of lighting support structures, mounting arms, foundations. Also submit shop drawings showing the details of lighting, including luminaires and lamps and electrical service equipment for roadway lighting necessary to connect a utility company service to a lighting control cabinet.

Prior to any construction activities, an inventory of the existing lighting system shall be conducted to document which luminaires, including signs and roadway, are operating. For existing lighting, the maximum outage time for luminaires shall be 24 hours unless otherwise accepted by MDOT or the AHJ. All proposed luminaires within the Phase shall be working upon completion of the Work. All existing luminaires to remain within the Phase shall be working upon completion of the Work and are to be maintained throughout the duration of the construction.

Excavate trenches as specified. In areas where conduit or cable is trenched, place a detector tape 6 inches below the finished grade. The tape shall be red and imprinted with a continuous warning message reading "CAUTION: ELECTRICAL LINE BURIED BELOW", repeated every 36 inches. The tape shall be inductively and conductively traceable using a standard pipe and cable locating device.

Bed the duct cable and direct-buried wires into the special backfill material as specified. Backfill and compact the trench and restore to its original condition, including replacing topsoil, re-seeding, and re-sodding.

Install all roadway lighting shown on the lighting Plan within 5 feet of the location shown on the lighting Plan.

Provide electrical manholes (or vaults) and connector kits to splice the conductors but no more than 30 connector kits in each manhole and no more than 50 connector kits in each electrical vault. No in-ground splices of electrical cables shall be permitted for any reason. The use of 'splitbolt' type connectors for splicing conductors shall not be permitted. Use waterproof electrical splice kits (sealed with silicone gel) for splicing conductors in non-breakaway applications such as manholes and other similar underground locations.

All underground lighting conduits shall be constructed of Schedule 80 rigid PVC conduit. All exposed conduit shall be constructed of galvanized rigid steel. PVC coated rigid galvanized steel conduit shall be used from the nearest manholes/handhole below grade to a minimum of 2' above grade. Conduit fill ratios shall not exceed 25% of conduit area. High-density polyethylene conduit with a wall thickness equal to Schedule 80 may be used in lieu of PVC at the discretion and acceptance of MDOT, generally for bored conduits. Splicing of high-density polyethylene conduit to PVC conduit is prohibited. High-density polyethylene conduit, when used, shall be installed from handhole/manhole to handhole/manhole in one continuous piece.

All conductors shall be copper. Unless specified, no cable splicing will be permitted. When specified, lighting cable splices will be permitted only in pull and junction boxes, manholes, and handholes. Do not install cable until the entire related raceway, including manhole, hand hole, and foundation system is in place. Provide 6 ft of cable slack, neatly tied, coiled, and positioned in the bottom of manholes, handholes, and cabinets.

Where temporary lighting is required in locations where existing lighting has been removed and permanent lighting is not installed. temporary lighting shall be designed to maintain the existing lighting levels. Wood poles and cobra head fixtures are allowed, and overhead electrical feed is permitted for non-breakaway poles. Temporary lighting shall also address signs, pedestrian and bicycle movements, ramps, under bridges or any other location where lighting through the Work will improve safety for travelers. Submit a Plan to the IQF for review for any temporary lighting.

17.9 Deliverables

Table 17-2 - Signing, Pavement Markings, Signal and Lighting Submittals

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
Design request form	Prior to beginning Design Work affecting TCDs applicable to the DR form

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
Signing inventory	As part of the Predevelopment Work or within 120 days of the start of Design Work
Preliminary signing Plans	As part of the Predevelopment Work or as a Preliminary Section Design Activity
Accessible pedestrian signal worksheets	With signal design Plans
Sightline profiles for all overhead signs and HIBs on traffic signal approaches	With signal design Plans
Preliminary signal Plans	As part of the Predevelopment Work or as a Preliminary Section Design Activity
Lighting analysis	As part of the Predevelopment Work or as a Preliminary Section Design Activity
Preliminary lighting Plans	As part of the Predevelopment Work or as a Preliminary Section Design Activity

ARTICLE 18. Traffic Analysis

18.1 Scope

The Work requires traffic analysis to complete the planning and design of new, reconstructed, rehabilitated, and temporary roadways meeting the requirements of the Phase P3 Agreement.

18.2 Operational Assessment of the Work

The associated traffic volumes, models, and analysis files evaluating the Reference Design are provided in the Reference Information Documents. When using the data provided with the Reference Information Documents, verify it is applicable for the intended use and perform additional data acquisition as needed for the Work. Inform MDOT if errors or discrepancies are discovered in the MDOT-provided information.

Prepare and submit subject to review and acceptance by MDOT, a complete traffic operational analysis needed to support the Phase Developer's design, Environmental Summary/NEPA Re-evaluation, Interstate Access Point Approval, or other required documentation needed for MDOT or Governmental Approvals. This analysis, including model files, studies, and reports, shall be coordinated with MDOT and submitted as early as possible once the need for the modifications is identified and evaluated. If the operational analysis is not included in the Predevelopment Work, it shall be performed as a Preliminary Section Design Activity.

Additional traffic operational analyses may be required to support the design and construction as the Work progresses.

All traffic analysis completed for the Work shall include both the AM and PM peak periods, at a minimum. These peak periods consist of multiple hours, including a seeding hour and four recording hours during both the AM and PM periods. The analysis methods described below may be required in the preparation of reports, studies or analyses.

18.3 Analysis Techniques and Software

18.3.1 Mainlines, Ramps, and Weaving

All Mainlines, ramp junctions (merge and diverge locations), and weaving sections shall be analyzed using methodologies outlined in the Highway Capacity Manual from the Transportation Research Board. All model files and calculation spreadsheets shall also be provided to MDOT to support the summary of results.

18.3.2 Arterials and Signalized Intersections

For arterials unsignalized (including stop-controlled) and signalized intersections, use Synchro/SimTraffic (from Trafficware) to evaluate operations. Signal timing Plans shall consider corridor-wide cycle lengths and appropriate offsets. All calculation files and traffic models shall be provided to MDOT to support the summary of results.

18.3.3 Freeways and Arterials

For freeway and arterial operations, use VISSIM software (from PTV Group) to simulate and analyze traffic operations. VISSIM results will be considered by MDOT, in conjunction with Highway Capacity Manual and Synchro/SimTraffic analysis. Use the calibrated existing and future-year VISSIM models provided by MDOT in the Reference Information Documents as a basis for operational analysis of the Work. When using the data provided with the Reference Information Documents, verify it is applicable for the intended use and perform additional data acquisition as needed for the Work. Inform MDOT if errors or discrepancies are discovered in the MDOT-provided information.

VISSIM models for analysis of the proposed design shall be developed in accordance with MDOT SHA's "VISSIM Modeling Guidance." Do not modify calibration parameters (e.g., vehicle inputs, vehicle routes, driving behavior, link behavior type, lane change distance, vehicle inputs, vehicle routes, speed distributions, decisions, etc.), unless explicitly documented and justified. For example, VISSIM models developed for evaluation of MOT may require adjustments to driving behaviors; therefore, these shall be noted and explained in the TMP or any Design Deliverable based on such modeling.

VISSIM results, including all output files, shall be submitted to MDOT for evaluation. These results may include, but are not limited to, travel times, speeds, Person/vehicle throughput, density, delay, and queues. All VISSIM model files (native format) shall be provided to support the summary of results.

18.3.4 Queuing Analysis

To determine the appropriate length of turn lanes, auxiliary lanes, merge, diverge, and weaving segments, and other operational components, identify the projected queue lengths. This shall include both the through lane(s) and turn lane(s) where applicable.

Demonstrate ramp queues will not extend from the ramp terminus to the Mainline or side road queues will not extend to adjacent intersections and demonstrate the sight distance will be adequate for vehicles exiting and entering the Mainline at prevailing speeds to see the back of the queue and decelerate to a stop condition. The queuing analysis shall be supplemented with simulation analysis.

18.3.5 Signal Warrant Analysis

Perform signal warrant analyses to determine if signalization is appropriate at all new traffic signal locations, based on the MDOT SHA Maryland Manual on Uniform Traffic Control Devices. Study findings shall be submitted to MDOT in a report outlining the warrants evaluated. Consideration shall be given to traffic volumes, safety, operations, delay, and available gaps in traffic resulting from adjacent signalized intersection(s). Recommendations shall also be included in the report, which will be included as part of the device request Design Request form discussed in Exhibit 6 Article 17 (Signing, Pavement Markings, Signals, and Lighting).

18.3.6 Travel Demand Modeling

If Work includes modifications to the Reference Design expected to result in shifts in travel demand, perform travel demand modeling and traffic volume forecasting using the Metropolitan Washington Council of Governments traffic model (provided with the Reference Information

Documents) and VISUM software (from PTV Group) models. When using the data provided with the Reference Information Documents, verify it is applicable for the intended use and perform additional data acquisition as needed for the Work. Inform MDOT if errors or discrepancies are discovered in the MDOT-provided information. Modifications that would warrant this analysis would include, but are not limited to, modified access to the PMLs or GPLs or modified tie-in operations.

18.3.7 Safety

Safety analysis shall be performed using the AASHTO Highway Safety Manual and supplemented with data available on the Crash Modification Factors Clearinghouse (<http://www.cmfclearinghouse.org/>). Use of crash modification factors shall include consideration given to the local characteristics of the roadway and types of improvements.

18.4 Deliverables

Table 18-1 – Traffic Analysis Submittals

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
Traffic operational analysis	As needed to support Design Work
Signal warrant analysis	As needed to support Design Work
Travel demand modeling	As needed to support Design Work

ARTICLE 19. Intelligent Transportation Systems

19.1 Scope

The Work requires planning, design, specification, construction, installation, commissioning, integrating, testing, training, documentation, operation, and maintenance of ITS. Conduct all Work necessary to meet these Technical Provisions and the performance requirements for ITS devices and systems for the PMLs and GPLs.

The ITS systems for the Work shall provide traffic monitoring and surveillance, motorist information, traffic data, and Incident Management for the operation of the new PMLs as required to maintain the functionality and operation of the existing GPLs ITS systems impacted by the Work.

19.2 Standards, References and Other Agencies Having Jurisdiction

This Exhibit 6 Article 19 (Intelligent Transportation Systems) defines the performance requirements, standards, guidelines, reference information, and other pertinent details related to the development, design, and construction of the PMLs ITS and addresses impacts to MDOT's existing ITS resulting from the Work. For aspects of the development, design, and construction impacts on ITS owned and operated by other AHJs, including but not limited to other states, commonwealths, counties, cities, towns, municipalities, etc., adhere to the requirements, standards, guidelines, reference information and other pertinent details of the respective AHJ on communications systems of other agencies or owners or AHJ, as applicable.

19.3 Staffing

Provide an ITS Lead who oversees the coordination of the design and construction of the ITS system. It is expected the ITS Lead shall have the following qualifications:

- a minimum of 10 years of experience with ITS systems design and construction; and
- preferably experience with MDTA and MDOT Coordinated Highways Action Response Team ("MDOT CHART").

The ITS Lead position must be filled for the duration of the Section D&C Work; the Person holding such position is expected to be on-site in the Section Office and be committed full time. Qualifications shall be subject to review and acceptance by MDOT. If a replacement is needed to fill the position, the qualifications for the replacement shall be submitted and are subject to review and acceptance by MDOT.

19.4 Design Requirements

Design and specify all materials and equipment for the ITS system to meet or exceed the functional, operational, performance, and maintenance requirements using the criteria specified within these Technical Provisions. The ITS shall:

- provide a fully functional ITS system meeting the performance requirements;
- maintain the existing system and components until a replacement device is constructed;

- have new ITS components constructed and integrated at the earliest practical time to improve traffic operations;
- be installed completely within the ROW or acquire additional ROW (permanent or temporary easements) required;
- be based on a systems engineering analysis meeting the requirements in 23 CFR 940.11;
- facilitate and accommodate Routine Maintenance by locating all components where access to equipment will not require temporary traffic control significantly affecting traffic operations;
- include appropriate cybersecurity measures with multiple layers of protection to protect all PML systems, computers, servers, networks, programs, devices, and other digital data Assets;
- provide safe maintenance access to all ITS devices and cabinets;
- be located to avoid existing and proposed underground and overhead utilities;
- be located outside of drainage ditches and areas prone to water buildup;
- be located on a site graded to provide safe access for maintenance including construction of Retaining Walls or other structures with space around the equipment or infrastructure for safe access; and
- be provided with access using stairs and handrails as necessary following Maryland Occupational Safety and Health requirements, or the requirements of the AHJ.

Prepare and present ITS Plans with a scale appropriate for the Work being detailed. The Plans shall include at a minimum:

- existing and proposed geometry;
- existing and proposed utilities;
- existing and proposed ROW;
- existing and proposed landscape features;
- existing and proposed applicable drainage features;
- existing and proposed structures including Bridges, Retaining Walls, Small Structures, major traffic control device structures;
- proposed tolling equipment and infrastructure;
- any other existing or proposed Site features influencing, that could conflict with, or that need to be coordinated with the ITS;
- electrical and communication service connection locations, details, and provider coordination details;
- existing and proposed ITS equipment;
- details of removal and relocation of existing ITS equipment;
- conduit types, quantities, and installation method;
- cable types and quantities;
- enclosure (manholes/handholes/junction boxes) types and details;
- electrical grounding and bonding details;
- equipment cabinet details;

- equipment details;
- equipment installation and mounting details;
- electrical and communications single line diagrams and connectivity; and
- any other details pertinent to the construction of the ITS.

19.4.1 Vehicle Detection Systems

Provide a new vehicle detection system (“VDS”) consisting of all sensors, poles, foundations, mounting hardware, electrical systems, communications systems, control systems, and any other supporting equipment, infrastructure, hardware, software, or firmware necessary for the new VDS. The Phase Developer shall be responsible for selecting the new VDS system equipment and defining the new VDS accuracy performance metrics. The new VDS shall at a minimum collect vehicle data within +/- 10% accuracy when vehicle speeds are greater than 10 mph. The new VDS equipment used for collection of GPLs traffic (MDOT’s portion of the new VDS) shall use a non-invasive technology as no sensors are permitted in GPLs roadways. VDS equipment used for the GPLs shall be subject to review and acceptance by MDOT.

Collect quantitative vehicular traffic data for both PMLs and GPLs for the operation of the PMLs. This vehicular traffic data shall also be provided to MDOT for their use.

Deliver to MDOT vehicular traffic data consisting of volume, average vehicular speed, vehicle classification, occupancy, and travel time for each travel lane and shoulders throughout the Phase, including between all interchanges and at all on- and off-ramps to the PMLs and the GPLs. Collect other data metrics as necessary for the operation of the PMLs. These other metrics shall be made available to MDOT if requested.

The vehicular traffic data shall be delivered in real-time (every minute maximum intervals) to MDOT CHART. Grant MDOT ownership rights to the vehicular traffic data and unlimited and unrestricted use of the data. Other options may be recommended to collect and provide quantitative vehicular traffic data provided it meets MDOT acceptance.

Address all impacts to the existing MDOT VDS as a result of the PMLs construction. This work shall include:

- relocations or repairs to existing MDOT VDS equipment so the functionality and operation of the existing MDOT VDS post-construction meets or exceeds the capabilities and performance prior to construction;
- replacement or supplementing equipment if impacts due to the Work render existing equipment obsolete;
- providing new VDS sensors and infrastructure if interchange or lane configurations proposed alter the roadway conditions such that the existing MDOT VDS cannot be modified in a way that maintains the capabilities and performance of the existing MDOT VDS; and
- meeting MDOT’s equipment and design requirements for new VDS equipment required or proposed for MDOT’s portion of the new VDS.

These requirements pertain to the ability of MDOT’s portion of the new VDS’s to collect vehicular traffic data for the GPLs only. MDOT’s portion of the new VDS will not collect data on the PMLs.

The Phase Developer is responsible for the O&M of the Phase Developer’s portion of the new VDS. MDOT CHART will be responsible for the O&M of MDOT’s portion of the new VDS. Develop

a testing program to ensure the accuracy of the VDS data throughout the term of the Section P3 Agreement. The data will also be subject to testing by MDOT to ensure accuracy.

19.4.2 Regional Integrated Transportation Information System

The Regional Integrated Transportation Information System (“RITIS”) is run by the Center for Advanced Transportation Technology Lab at the University of Maryland and is a regional clearinghouse for traffic information within and beyond the State of Maryland. The real-time and archival data feeds shall be provided to MDOT through RITIS following RITIS’s current nonproprietary, published, open-source application program interface requirements. Submit to MDOT an Interface Control Document (“ICD”) defining the real-time and archived data interfaces. Adapt all interface protocols as required for changes implemented by RITIS over the life of the term of the Section P3 Agreement.

19.4.3 Closed-Circuit Television System

Design and construction of dedicated closed-circuit television (“CCTV”) system of cameras for use with surveillance of the PMLs (the “PMLs CCTV system” or the “CCTV System”) is included in the Work. Cameras should be installed on all PML approaches, interchanges, and ramp terminus intersections.

The PML CCTV system shall provide full overlapping video surveillance coverage of the PMLs and shall enable the Phase Developer and MDOT operators to observe traffic within the limits of the PMLs. Perform a field of view study considering line and grade, Bridges, sign structures, and other potential obstructions to the CCTV field of view, to demonstrate conformance with this requirement.

The CCTV system shall consist of all cameras, poles, foundations, mounting hardware, electrical systems, communications systems, control systems, and any other supporting equipment, infrastructure, hardware, software, or firmware necessary for the CCTV system. The Phase Developer is responsible for the O&M of the PMLs CCTV system. MDOT CHART will be responsible for the O&M of MDOT’s CCTV system.

The PMLs CCTV system shall interface with the MDOT CHART Advanced Transportation Management System (“MDOT CHART ATMS”) so the PMLs CCTVs are viewable in the MDOT CHART ATMS. The Phase Developer may select the Price Managed Lanes CCTV system equipment; however, the Phase Developer shall use cameras and provide any other required equipment, hardware, software, or firmware required to accomplish the CCTV interface with MDOT CHART ATMS. The Phase Developer may choose the encoding and frame/data rates for the PMLs CCTV system; however, CCTV video streams provided to MDOT CHART must be compatible with MDOT CHART’s system. The MDOT CCTV system requirements may be obtained by contacting the MDOT CHART Systems Administrator for the current MDOT CHART ATMS System Architecture.

The 24/7 video of all CCTV’s shall be stored and archived for a minimum of 30 days, or for the duration required to meet the additional requirements of Exhibit 6 Article 23 (Construction). The PMLs CCTV system shall:

- include CCTV cameras producing clear, detailed, and usable high-definition video images of the areas and objects visible from the CCTV;

- produce video, which is a true, accurate, distortion-free image free from transfer smear, oversaturation, and any other image defect negatively impacting image quality under all lighting and weather conditions normally encountered within the Phase;
- provide both color and monochrome modes;
- provide camera enclosures which minimize glare and provide overexposure protection for the camera when pointed directly at the sun;
- be a CCTV system which operates 24 hours a day, every day of the year;
- optimizes the CCTV spacing and line-of-sight distances to provide full (100%) video surveillance coverage without image degradation;
- select CCTV sites to yield the maximum unobstructed camera view of the roadway(s);
- enable identification of the number and vehicle types of all vehicles involved in an Incident at all locations within the surveillance area;
- provide stable video at all zoom settings when viewing objects up to one mile away;
- provide tilting, masking, presets, and privacy zones on the cameras capable of being superimposed on video image/stream and stored in nonvolatile memory;
- include an integrated pan-tilt-zoom ("PTZ") mechanism capable of providing 360-degree continuous pan, presets, programmable tours, and blackout privacy zones;
- provide a camera lowering system for each CCTV with a mounting height greater than 50 feet; and
- furnish and install all video and control cables and connectors for the CCTV in accordance with the manufacturer's recommendations.

Relocate any existing MDOT CCTV cameras impacted by the Work. Relocated cameras shall have the same view or greater view than the existing field of view before relocation. Perform a field of view study considering line and grade to demonstrate conformance with this requirement.

If roadway geometry, structures, or obstructions are introduced as a result of the PMLs construction reducing the field of view of existing MDOT CCTV cameras, new MDOT CCTV sites shall be furnished and installed to restore the field of view to a level equal to or greater than the field of view prior to the PMLs construction. All camera poles and lowering systems installed for MDOT CHART shall meet current MDOT CHART requirements and be consistent with existing poles and lowering systems maintained by MDOT CHART. MDOT CHART shall have final acceptance of the pole, lowering system, and any associated equipment. MDOT CHART will provide new CCTV camera assemblies and hardware only to install at impacted existing MDOT CCTV sites or new MDOT CCTV sites required due to PMLs construction upon reimbursement for said equipment. Coordinate with MDOT CHART to determine mounting requirements and other parameters necessary for the design and construction of the CCTV support structures, ITS equipment cabinets, and other Elements as required. Install and test MDOT CHART furnished equipment. Only MDOT CHART shall have control of any MDOT CCTV camera.

19.4.4 Dynamic Message Signs

Furnish and install a PMLs DMS system to support the operation, dissemination of toll and driver information, and Incident Management on the PMLs. All PMLs DMS installations shall meet the minimum requirements of the MD MUTCD with regards to sign spacing, location, character size and type, quantity, etc. The Phase Developer shall be responsible for the operation and

maintenance of the PMLs DMS system and MDOT CHART will be responsible for the O&M of MDOT CHART's DMS system.

The DMS system shall consist of all DMS, structures, foundations, mounting hardware, electrical systems, communications systems, control systems, and any other supporting equipment, infrastructure, hardware, software, or firmware necessary for the DMS system. The MDOT CHART DMS system requirements may be obtained by contacting the CHART Systems Administrator for the current MDOT CHART ATMS System Architecture. Select the PMLs DMS system equipment as required; however, use DMS system equipment and any other equipment, hardware, software, or firmware necessary to provide the functionality, operation, and interfacing with MDOT CHART systems if required by MDOT in the future. Provide Toll Rate Signs in advance of all entrances to the PMLs following MD MUTCD requirements. Toll Rate Signs shall also be provided prior to each Tolling Point within the PMLs and prior to entrance points from another or connecting PML facility. Determine the additional requirements of the dynamic portion of the Toll Rate Signs, including but not limited to, matrix, color, character and message displays.

A Traffic and Incident Management ("T&IM") DMS shall be installed in advance of all entrances to the PMLs and at a minimum of one every two interchanges, per direction, to provide traffic, Incident Management, and travel time information to motorists to allow drivers to make decisions on whether to use or continue to use the PMLs and to provide drivers with other traffic, safety, and Emergency-related information. Determine the additional requirements of the T&IM DMS, including but not limited to, matrix, color, character and message displays.

All DMS shall conform to the latest version of the National Transportation Communications for ITS Protocol or version required to properly integrate and interface with other systems.

Each Toll Rate Sign shall be provided with a dedicated fixed view CCTV camera aimed at the Toll Rate Sign or with a dedicated PTZ CCTV camera where the default home view is aimed at the Toll Rate Sign so Toll Rates can be visually verified, and video records of broadcasted Toll Rates are maintained. All other DMS shall be located within the view of a PTZ camera so DMS messaging can be visually verified by the camera.

An interface shall be provided between the PMLs DMS and MDOT CHART ATMS so MDOT CHART can view and control the PMLs DMS. This interface is provided so MDOT CHART can report the PMLs Toll Rate DMS and T&IM DMS messages on MDOT CHART portals (i.e. <https://chart.maryland.gov/> website) and so MDOT CHART can place messages on the PMLs T&IM DMS for major Incidents or national security Incidents. It is not MDOT CHART's intent to use the PMLs DMS on a regular basis; however, MDOT CHART requires the ability to place messages on the PMLs DMS during these major events. An arbitration queue shall be established for each DMS or type of DMS establishing the priority of the Phase Developer's and MDOT CHART's messages on the DMS. Coordinate with MDOT CHART and use MDOT CHART's DMS message dictionary to provide and maintain consistency with DMS messages between PMLs and GPLs.

Develop and maintain a DMS message history log. The log shall maintain 12 months of message history data. The message history log shall, at a minimum, include all data points used by MDOT CHART in their DMS message history log.

Coordinate the location of DMS with the signing to avoid over-populating signs and sign clutter. Show all DMS on the signing Plans.

If communication with the PMLs Advance Transportation Management System ("ATMS") is lost, the DMS shall display a user-defined locally stored graphic/message.

Furnish and install the DMS and all control cables and connectors for the DMS in accordance with the manufacturer's recommendations.

Relocate any existing MDOT DMS impacted by the Work and ensure the view of vehicular traffic to the DMS is equal to or better than the existing view. Perform a DMS view study considering line and grade to demonstrate conformance with this requirement. If roadway geometry, structures, or obstructions are introduced as a result of the PMLs construction reducing the view of vehicular traffic to the DMS or functionality of the DMS, new MDOT DMS sites shall be furnished and installed to restore the DMS view and functionality to a level equal to or greater than the DMS view and functionality prior to the PMLs construction.

MDOT CHART will provide new DMS units and controllers only to install at impacted existing MDOT CHART DMS sites or new MDOT CHART DMS sites required due to PMLs construction upon reimbursement for said equipment. Coordinate with MDOT CHART to determine mounting requirements and other parameters necessary for the design and construction of the DMS support structures, ITS equipment cabinets, and other Elements as required. Install and test MDOT CHART furnished equipment. The DMS controller and main incoming electrical and communications equipment shall be installed on the ground in the equipment cabinet, not over the roadway within the DMS assembly. Electrical and communications equipment directly associated with the DMS sign may be installed over the roadway within the DMS assembly.

19.4.5 Ramp Metering

MDOT is currently installing ramp metering systems within the Phase to dynamically control the rate in which vehicles enter the road network. The ramp metering system shall be maintained throughout and after construction. If proposed changes significantly modify an existing ramp with ramp metering so the ramp metering is no longer required, demonstrate through traffic analysis the ramp metering no longer provides a benefit. Ramp metering locations designated for removal shall be maintained until proposed construction improvements are implemented and the ramp metering is no longer required.

New ramp metering may be proposed. New ramp metering system(s) shall consist of traffic signal assemblies, vehicle detectors, signs and ramp meter software, and all applicable equipment. The ramp metering system equipment shall be identical to other ramp metering systems MDOT is currently implementing in the State. The equipment includes, but is not limited to, the following:

- MDOT Intelight MaxView Central software;
- Econolite ASC/3 or Econolite Cobalt controllers;
- Wavetronix SmartSensorHD radar detectors;
- Terra or Encore video detection cameras;
- Moxa or Patton Ethernet switches;
- Sierra Wireless GX450 (Ethernet Model) Cellular modems operating on Sprint cellular network;
- Patton CL1314MDE Ethernet Extenders; and
- MDOT Standard Size 'S' Cabinet with uninterruptable power supply battery backup.

Real-time and anticipated traffic volume data (volume, occupancy, and speed) shall be used to control the vehicle release rate. The ramp meter software shall use queue, demand, passage, and Mainline detectors to determine the release rate. Traffic responsive algorithm(s) shall be

used to optimize local or system-wide traffic conditions. The system must have the functionality to operate with pre-timed (fixed) rates, however, this mode of operation will be the exception, and the ramp meters shall typically operate in adaptive/traffic responsive mode. Ramp meter location(s) may be controlled by a local Mainline traffic detector location installed in the vicinity of the ramp, or multiple ramp meter locations may be controlled by a single Mainline detector location installed near a bottleneck. The ramp metering system shall use traffic signal displays on each of the ramps to release vehicles at a rate of 120 to 1,800 vehicles per hour.

Each location shall be equipped with queue detection. When the ramp queue detector reaches specific thresholds (count or occupancy), the ramp metering system shall increase the release rate to prevent queues from backing onto and therefore impacting operations on the arterial roadways. Stop lines shall be placed to allow adequate acceleration distance from a stopped condition to five MPH less than the posted speed limit.

An advanced HIB assembly, consisting of pedestal pole mounted HIB and signs, shall be installed to ensure all motorist visibility of the HIB(s) in advance of the ramp meters stop line, to warn motorists when ramp metering is in progress. The advanced HIB shall consist of two 1-part circular-yellow LED traffic signal heads which will flash in an alternating pattern when ramp metering is in progress. The advance HIB shall be pedestal mounted unless overhead mounting is necessary based on sight distance or geometry.

A controller with ramp metering software shall be installed at each ramp metering location to control the ramp metering system at each location. The cabinet with controller will be located near the ramp meter stop line and shall be positioned so the ramp signal heads are visible when facing the front door of the cabinet. Ramp metering systems shall all be designed and constructed in accordance with the additional requirements included in Exhibit 6 Article 17 (Signing, Pavement Markings, Signals, and Lighting).

The traffic signal assembly shall consist of mast arm poles mounted downstream of the proposed stop line, three-part (circular-red, circular-yellow, circular-green) LED traffic signal heads mounted to the mast arm pole, and overhead signs mounted between the traffic signal heads.

19.4.6 ITS Equipment Cabinets

The Phase Developer may choose the type and locations of the ITS equipment cabinets used to house and support the PMLs ITS equipment. All ITS equipment cabinets shall meet the requirements of the latest version of the California Department of Transportation, Transportation Electrical Equipment Specifications or the latest version of the Advanced Transportation Controller Standards jointly published by AASHTO, the Institute of Transportation Engineers, and NEMA. All ITS equipment cabinets for PMLs ITS shall be completely separate from cabinets for MDOT equipment cabinets. No sharing of cabinets or equipment within cabinets will be permitted. No access to MDOT ITS equipment cabinets will be provided (except as required to facilitate construction) and MDOT will not have access to the Phase Developer's ITS equipment cabinets.

Operate and maintain the PMLs ITS equipment cabinets. MDOT will be responsible for the O&M of MDOT ITS equipment cabinets. Determine all ITS Equipment Cabinet design requirements including, but not limited to, base mount details, pole mount details, concrete technician pads, heating, ventilation, lighting, and other cabinet equipment, system, and operational requirements.

Base-mounted cabinets shall be designed, furnished, and installed with foundations with integral front and rear concrete technician pads to provide level and dry surfaces for a maintenance technician to stand on while servicing the cabinet sites. This work includes excavation, gravel base, backfilling, and treated timber cribbing. Concrete pads shall be provided for all doors on ITS cabinets. Pole mounted cabinets shall be designed, furnished, and installed with concrete technician pads to provide level and dry surfaces for a maintenance technician to stand on while servicing the cabinet sites. This work includes excavation, gravel base, backfilling, and treated timber cribbing. Concrete pads shall be provided for all doors on ITS cabinets.

All cabinets provided for ITS equipment shall have heating, ventilation, thermostat, and LED lighting systems, and shall have a pull-out "laptop" drawer/shelf situated in an appropriate rack position below the device controller to allow ease of maintenance by technicians.

Relocate, repair or replace existing MDOT ITS equipment cabinets impacted by the Work. Existing MDOT ITS equipment cabinets shall also be relocated if maintenance access to the cabinet is restricted by the finished Work, a device is relocated such that the operating ability of the device is negatively impacted or such that the maintenance access between the equipment cabinet and device is negatively impacted. If equipment cabinet relocation is not practical, a new equipment cabinet shall be provided. Where ITS equipment cabinets are relocated, sequence and schedule the construction and relocation to minimize downtime to the maximum extent possible, subject to review and acceptance by MDOT. If the Phase Developer and MDOT cannot come to an agreement over the workflow of the transition and acceptable downtime, provide new ITS equipment cabinets and devices so downtime through transitions can be eliminated.

ITS equipment cabinets shall be required at each new ITS device location (new devices installed as replacements of existing devices or new devices required due to other PMLs construction impacts). New ITS equipment cabinets shall meet current MDOT CHART standards. Existing ITS equipment cabinets' functions may be expanded to operate new devices, provided spare capacity is maintained and subject to review and acceptance by MDOT. Otherwise, new ITS equipment cabinets shall be provided.

ITS equipment cabinet layouts and details shall be provided for any existing equipment cabinets modified or any newly required equipment cabinets. The equipment cabinet layouts shall show the placement of all equipment within the cabinet and the electrical and communications connections of all equipment within the cabinet. Equipment cabinets shall be designed with at least 25% spare capacity.

ITS equipment cabinets shall be configured for their specific application (e.g., VDS, DMS, CCTV, etc.). Each ITS equipment cabinet shall be identified with a specific cabinet ID using an MDOT naming convention. Coordinate with MDOT for ITS equipment cabinet naming.

19.4.7 ITS Communications and Electrical Systems

Refer to [Exhibit 6 Article 20 \(Communication Systems\)](#) for additional requirements of the PMLs and MDOT communications systems and [Exhibit 6 Article 21 \(Electrical\)](#) for additional requirements of the PMLs and MDOT electrical systems.

19.5 Systems Engineering Analysis

19.5.1 Requirements

FHWA Rule 940 provides policies and procedures for implementing Section 5206(e) of the Transportation Equity Act for the 21st Century (TEA-21), Public Law 105-178, 112 Stat. 457, pertaining to conformance with the National ITS Reference Architecture and Standards. The rule states that the final design of all ITS projects funded with Highway Trust Funds shall accommodate the interface requirements and information exchanges as specified in the regional ITS architecture. The regional ITS architecture is a specific application of the framework specified in the National ITS Reference Architecture, tailored to the needs of the Stakeholders in the region. The Phase Developer will impose significant changes to the regional ITS architecture (Maryland statewide ITS architecture) and will require a significant system engineering effort; therefore, a Systems Engineering (“SE”) Analysis is required.

The Phase Developer shall perform a SE Analysis in accordance with 23 CFR 940.11 Project Implementation, Paragraph (c) and shall include the following minimum components:

- identification of portions of the Maryland ITS architecture being implemented;
- identification of participating agencies’ roles and responsibilities;
- requirements definitions;
- analysis of alternative system configurations and technology options to meet requirements;
- procurement options;
- identification of applicable ITS standards and testing procedures; and
- procedures and resources necessary for operations and management of the system.

19.5.2 Systems Engineering Management Plan

The Phase Developer shall coordinate with MDOT CHART to develop a Systems Engineering Management Plan (“SEMP”) that outlines the Phase Developer’s approach to managing and executing the entire SE effort for the Phase and to ensure conformance with the SE Analysis requirement of 23 CFR 940.11 Project Implementation, Paragraph (c). The SEMP shall identify all activities, resources, and schedule for the systems engineering effort and shall provide direct correlation to the minimum SE Analysis requirements. A significant component of the SEMP is the SE process. The Phase Developer shall utilize an established SE process, such as the SE “V” Process diagram as depicted in Figure 19-1 below.

The completed SEMP shall be subject to acceptance by MDOT, MDOT CHART Mobility Planning & Engineering Division and the FHWA’s Maryland Division.

The Phase Developer’s SE process shall, at a minimum, include all steps of the SE “V” Process and shall provide a high-level overview of the process to be followed for the development and acceptance of the PML systems, including MDOT SHA systems and interfaces as applicable.

The SE “V” Process diagram provides a high-level overview of the SE process to be followed for the development and acceptance of the ITS systems. The feedback arrows indicate that the SE process is iterative, and that one step in the process may require revision of some part of the previous step’s results.

The SE process begins with the ConOps, which lays the foundation for many future decisions on the path to implementation. The SE “V” Process diagram is closed by conducting an independent verification and validation of the delivered system after the system integrator successfully completes the testing.

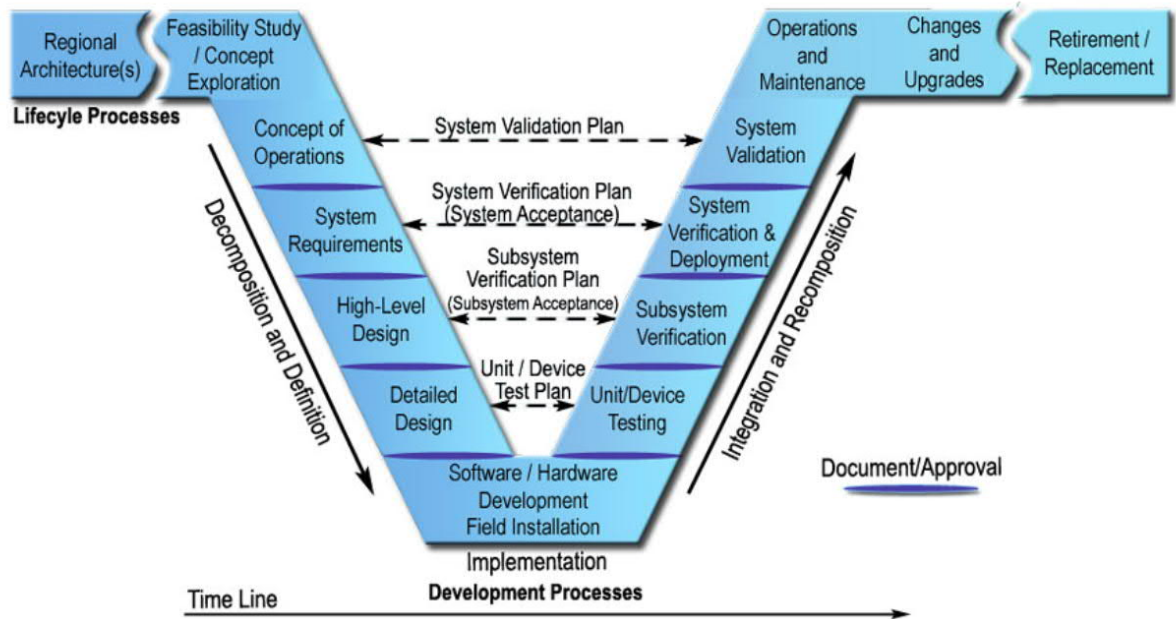


Figure 19-1 - Systems Engineering “V” Process Diagram

The ConOps will review the interoperability with other systems in the region and provide recommendations for planning, design, and implementation of the ITS systems. Functional requirements and detailed design will follow the ConOps. The functional requirements specify what the system must do, but not how the system will do it. The design requirements define the physical architecture and identify how the functions of the system trace back to requirements. Functional requirements and systems design documents will outline such specific requirements as system software, including field to center subsystems, infrastructure, communication, central equipment and processing, and user interfaces.

19.6 Concept of Operations

The ConOps shall be developed in accordance with FHWA Rule 940 and follow FHWA’s report HOP-07-001 “Developing and Using a Concept of Operations in Transportation Management Systems”. A ConOps is a user-oriented document describing system characteristics for a proposed system from the user’s viewpoint and lays the foundation for future steps/decisions in the project’s implementation. The ConOps shall:

- present the operation of the ITS being developed, presenting the system from the point of view of operators, users, owners, the Phase or Section Developer, maintenance, and management;
- provide early agreement among all users (Stakeholders) on all system aspects and provide detailed system requirements;
- identify the roles and responsibilities delegated to each user in the operation and implementation of the proposed ITS;

- identify the geographical limits and physical location of the proposed ITS, include a description of the current conditions, needs and problems, the goals and objectives of the proposed ITS, and the proposed operational approach to the ITS for attaining these objectives, with clear justification for the implementation of the proposed ITS;
- describe the full range of factors needed to support the ITS goals and objectives, including but not limited to:
 - equipment;
 - integration/interfaces with other planned and existing systems and subsystems;
 - facilities;
 - personnel;
 - training;
 - public outreach and education;
 - maintenance; and
 - performance measures;
- provide a physical and functional overview of the ITS to be deployed;
- include scenarios describing how the system will operate from the Stakeholders' perspective;
- identify the time-sequence of activities to be performed to bring the ITS to a fully functional state of completion; and
- identify policies and constraints affecting the ITS.

A critical component of the ConOps is Incident Management and response. The Phase Developer shall coordinate with and engage MDOT CHART in the development of the Incident Management Plan for the proposed improvements. The use of ITS in the Incident Management Plans shall be addressed, including posting of messages on PMLs DMS and use of other PMLs ITS as determined by the Incident Management Plan.

19.7 Advanced Transportation Management System Software

The ATMS software package shall support the real-time operation of the PMLs ITS systems and to facilitate the data exchange, status, view, and control of devices and systems. The ATMS shall:

- support all proposed devices and systems and be expandable to support new future devices and scalable to support future increases in device quantities;
- support default Plans for events or operations to improve operator efficiency;
- provide event logging and record metrics for performance monitoring; and
- operate on an integrated viewing platform with map based and list-based applications for system and device management.

19.7.1 Advanced Transportation Management System Options

The Phase Developer may elect to operate an independent ATMS using commercial off-the-shelf ATMS software or may choose to develop ATMS software. Likewise, the Phase Developer may elect to operate as a separate traffic operations center within MDOT CHART and use MDOT

CHART's existing ATMS software. Regardless of which option is selected for the PMLs ATMS, the proposed ATMS must be compatible with MDOT CHART's existing ATMS, systems, and equipment where the proposed ATMS must interface with MDOT CHART's existing ATMS, systems, and equipment.

19.7.2 Managed Lanes Traffic and Toll Operations Center

Provide a traffic operations center to accommodate equipment and personnel for the traffic management operation of the Section. The Phase Developer may provide its own ATMS or use the CHART ATMS software as described in Exhibit 6 Article 19 (Intelligent Transportation Systems) Section 19.7.1 (Advanced Transportation Management System Option) and Exhibit 6 Article 19 (Intelligent Transportation Systems) Section 19.7.3 (PMLs Operation within MDOT CHART ATMS). For the traffic operations center, the Section Developer shall:

- provide a traffic operations center to monitor traffic, respond to incidents, and perform all other duties as required under the Phase P3 Agreement;
- obtain all permits and other approvals as required by Applicable Law, for the construction and occupancy of the traffic operations center;
- locate the traffic operations center in Maryland and within proximity to the Phase;
- provide a toll operations center located in the United States, where staff responsible tolling operations will be located, and tolling operations performed (the toll operations center may be co-located with the traffic operations center);
- integrate traffic and toll operations support services with MDOT's existing back office operations at Handback, or any early termination of the Section P3 Agreement, and ensure compatibility with MDOT's current system at that time or relocate to the appropriate MDOT tolling and traffic operations office, respectively, at that time;
- comply with MDOT's physical security requirements for all facilities;
- appropriately staff the traffic operations center whether operating on the existing CHART ATMS or separate platform as necessary;
- operate the ATMS 24 hours a day 7 days a week; and
- develop standard operating procedures for traffic and tolling operations across all Sections within the Phase.

The Phase Developer shall not rely on MDOT SHA CHART personnel resources (i.e. CHART traffic operations center managers and highway operation technicians as defined in the Chart Traffic Management Center Operations Standard Operating Procedures) for operation of the PMLs.

19.7.3 PMLs Operation within MDOT CHART ATMS

In the event the Phase Developer elects to operate as a separate Traffic Operations Center within MDOT CHART, the Phase Developer will be required to develop ATMS components/systems separately to control PMLs applications proprietary to the Phase Developer, not supported by the MDOT CHARTS ATMS, or not critical to data, view, and control sharing. As an example, the Phase Developer would be responsible for developing a variable Toll Rate algorithm which the MDOT CHART system cannot provide. The Phase Developer is also responsible for developing an application to interface the variable rate tolling algorithm with the MDOT CHART ATMS so Toll Rates can be displayed on DMS signs integrated in the MDOT CHART ATMS, if the Phase Developer so chooses. There is an existing interface within

MDOT CHART supporting the publishing of Toll Rates to MDOT CHART on 10 minute intervals for display on DMS. The interface supports current MDTA needs. Should the Phase Developer choose to use this interface, all costs and Work required for modifications to support multiple publishers would be the responsibility of the Phase Developer.

Access to certain aspects of MDOT CHART's system will be restricted (e.g., ITS devices or system unrelated to the PMLs ITS system). Likewise, MDOT CHART's access to certain aspects of the PMLs ITS system will also be restricted (e.g., MDOT CHART will not have access to the Phase Developer's variable Toll Rate system).

The MDOT CHART ATMS software is open-source code, and no license is required.

The MDOT CHART ATMS uses arbitration queues to arbitrate the usage of a device by maintaining a prioritized message queue for the associated device. As messages are requested to be displayed or broadcast on a specific device, they are assigned priorities based on a predefined message priority scheme. Coordinate with MDOT CHART to determine the arbitration queue bucket for PML systems operated through the MDOT CHART ATMS.

A yearly transaction fee shall be paid to MDOT to cover the cost of additional state resources required for MDOT CHART to develop, integrate, maintain, upgrade, and troubleshoot the Phase Developer's PMLs ITS systems within the MDOT CHART ATMS. This yearly transaction fee will be negotiated between the Phase Developer and MDOT based on the scale of the Phase Developer's PMLs systems.

MDOT CHART will be responsible for upgrading and developing software or drivers within the MDOT CHART ATMS to support the proposed PMLs ITS systems. This will include support to initially integrate the proposed systems into the MDOT CHART ATMS and to support future upgrades of the systems. Coordinate with MDOT CHART to determine the detailed MDOT CHART ATMS software requirements and a schedule for initial implementation and future upgrades.

MDOT CHART will be responsible for coordinating with the Phase Developer and providing the schedule of proposed system maintenance (updates to the MDOT CHART ATMS software, drivers, and security patches) so the Phase Developer can understand and address any required modifications to the Phase Developer's systems and devices.

MDOT CHART typically performs system maintenance on weekdays during the midday period (10 AM to 2 PM). System maintenance typically lasts 2 to 4 hours, and during this time, there is no automation within the MDOT CHART ATMS; however, manual changes and control can still be made, such as moving a camera.

Current MDOT CHART ATMS system architecture may be obtained by contacting the MDOT CHART Systems Administrator.

19.7.4 ITS Interface and Coordination with MDOT CHART

ITS equipment installed and operated shall be compatible with MDOT CHART's systems where direct interfaces are required. Coordinate with MDOT CHART to ensure the requirements to accept and send information and view and control devices between the PMLs and MDOT CHART systems are met. Develop ICDs describing the interface between the proposed ITS and the MDOT CHART ATMS. The ICDs shall:

- identify the electronic information exchange between the proposed devices, systems, and software and the MDOT CHART ATMS;

- identify all hardware, software, and licenses required;
- define the management and configuration of all devices and systems and whether they reside within the Phase Developer's system or the MDOT CHART ATMS; and
- define priority or arbitration, as required.

All MDOT CHART systems reside on the MDOT Enterprise Network behind firewalls. Access to the network and MDOT CHART systems shall be governed by the policies and procedures of the MDOT Security Work Group. The Phase Developer's systems shall link with the MDOT Enterprise Network via a direct firewalled connection. Connections through the internet shall not be permitted.

The Phase Developer will be required to log event data and push, poll, and archive the same data points in the same format used by the MDOT CHART ATMS for all Phase Developer ITS devices and systems interfacing with the MDOT CHART ATMS. These details may be obtained by contacting the MDOT CHART Systems Administrator for the current MDOT CHART ATMS system architecture.

Coordinate and schedule with the MDOT CHART ATMS system software vendor to determine and identify all required system software development and modifications to the MDOT CHART ATMS required for the implementation of the Phase Developer's proposed ITS. Use the existing MDOT CHART ATMS Architecture to the maximum extent practical to minimize modification. Changes to the MDOT CHART ATMS system can take up to one year to implement and must be coordinated with other MDOT CHART ATMS work.

Coordinate and provide requested data to MDOT CHART for modifications and updates of existing databases to add new or modify existing MDOT ITS field devices and equipment. Updated data shall include device identification, interfaces for fiber-optic communications network and updates to graphical user interfaces. All software and database modifications, and associated modules, files, and documentation to compile updates to the system shall become the sole property of MDOT.

19.8 Construction Requirements

The ITS shall use a construction sequencing approach to minimize impacts to existing MDOT ITS devices and maximize the ability to use temporary or permanent ITS devices to actively monitor and manage recurring and non-recurring traffic congestion, as well as to detect and confirm Incidents during construction activities. Coordinate construction activities around commissioning/testing/integration of ITS equipment. Construction activities shall not interfere with the ITS and Tolling commissioning, testing, and integration activities. The Phase Developer is responsible for providing all necessary MOT required for all proposed PMLs and MDOT ITS construction, commissioning, integration, and testing. Meet the following construction requirements related to MDOT ITS:

- design, construct, install, relocate, integrate and test existing (if impacted), relocated, temporary and permanent MDOT ITS equipment and systems;
- survey and inventory existing ITS field equipment to serve as documentation of conditions prior to the start of Work;
- maintain the operation of all existing ITS components within the Phase throughout the duration of construction, except as otherwise stated herein; and
- maintain the existing and newly installed MDOT ITS until acceptance for maintenance by MDOT.

If existing ITS devices are impacted by the Work, the maximum outage time shall be 24 hours unless otherwise accepted by MDOT. All proposed and existing ITS components within the Phase shall be working upon completion of the Work. Any existing ITS component or system impacted by the Work shall be disconnected, reconnected, and made fully operational by the Phase Developer or permanently removed and replaced with a new component or system as part of the Work. All abandoned cables shall be made safe.

19.9 ITS Integration and Testing

Perform end-to-end ITS integration and testing associated with the PMLs ITS and MDOT ITS. Define the roles of the Section Developer staff and the IQF in the testing. MDOT will provide oversight, audits and quality assurance review of the testing procedures and results. The Phase Developer is responsible for the testing and acceptance of the PMLs ITS. Provide MDOT with testing procedures and results for verification and acceptance. The testing shall demonstrate the device or system meets the performance requirements and compatibility and interoperability with the existing MDOT systems and communication networks, where required.

19.9.1 Configuration, Commissioning, and Integration

Configure all network switches, routers, other specialized communications equipment, and devices for the PMLs. Commission and integrate all equipment into the PMLs systems.

Network switches, routers, specialized communications equipment, and devices for MDOT ITS shall be furnished and installed by the Phase Developer, except where noted; however, all equipment will be configured, commissioned, and integrated by MDOT into MDOT's systems. Collaborate, coordinate with, and support MDOT in this effort.

Following fiber-optic splicing testing and field acceptance testing, commission any network switches, routers, specialized communications equipment, and devices. Coordinate with MDOT and provide access for MDOT as required.

19.9.2 ITS Testing Plan

Develop and submit an ITS Testing Plan for the Work. The ITS Testing Plan shall include both PMLs ITS integration and testing and MDOT CHART integration and testing and shall include at a minimum:

- the scope, requirements, and objectives of the Testing Plan;
- an overall high-level Plan for testing the ITS, including the test stages and processes, and the scheduling of all tests;
- the roles and responsibilities of all those involved with the testing program and any dependencies on third parties, including MDOT personnel; and
- test strategies detailing how the individual system/device testing Plans will demonstrate conformance of the proposed solution, device or system to the various functional, technical, and performance requirements providing the level of detail to ensure compliance with the overall testing requirements.

Testing Plans and strategies shall be based on the application of a systems engineering methodology such as American National Standards Institute("ANSI") Electronic Industries Association 632. A verification cross-reference index shall be developed and documented to

establish the way in which requirements are satisfied. The verification cross-reference index shall use, test, demonstrate, inspect, and analyze for acceptance. Individual system/device testing Plans produced by the Phase Developer for each of the PMLs ITS devices/systems and MDOT ITS devices/systems shall be provided for all devices installed or modified by the Work.

19.9.3 Factory/Bench Testing Plan

If new unproven devices or systems are proposed by the Phase Developer, perform factory/bench acceptance testing to prove the viability of the device or system. Devices that are not commercial off-the-shelf products or a combination of commercial off-the-shelf products where the Phase Developer cannot demonstrate these products as having been previously used together in a system shall be considered unproven.

The factory/bench acceptance testing shall be performed and accepted prior to any production, fabrication, shipment, installation or construction of Elements associated with the unproven devices or systems. Develop all factory/bench acceptance testing Plans and submit them to MDOT for review and acceptance. The test Plans shall fully demonstrate the viability of the device or system and that it meets all performance requirements.

MDOT has the right not to accept devices or systems if the Phase Developer cannot prove their ability to meet the ITS performance requirements or if the device or system poses any health or safety risk.

19.9.4 Field Acceptance Test Plan

Develop and perform field acceptance tests for all ITS devices and systems to demonstrate all equipment, hardware, cables, and connections furnished and installed by the Phase Developer meet the technical and performance requirements at the ITS device site level. These tests shall, at a minimum, demonstrate device signals are present at the control cabinet and control of the equipment can be performed locally at the control cabinet.

19.9.5 System Integration Test Plan

Develop and perform system integration testing of all ITS equipment for the PMLs. Test all equipment installed and provide the results of those tests to MDOT SHA's Communications Division. The Phase Developer must coordinate the testing with MDOT SHA Communications Division personnel. Develop and perform system integration testing on all newly constructed, temporary, or relocated MDOT ITS devices and systems in coordination with MDOT. Demonstrate the control cabinet and equipment have communications capability to and from MDOT's systems. Demonstrate to MDOT's satisfaction that MDOT can remotely view and control the equipment.

19.9.6 System Operational Test Plan

After successful completion of all system integration testing, each site shall be tested for proper functional operation for 30 consecutive days. During the testing period, all equipment shall operate without failures of any type. If any component malfunctions or fails to provide the capabilities specified herein during the 30 day test period, troubleshoot to find the exact cause of the failure. Failed equipment shall be removed and replaced by the Phase Developer.

After the component malfunction has been corrected to the satisfaction of MDOT, the Phase Developer may be required to restart the 30 day test period. In the event of a failure in equipment furnished by MDOT or due to a configuration issue caused by MDOT, the 30-day test will be suspended until these failures are corrected, at which time the test will resume.

19.9.7 Testing Execution

Identify and troubleshoot any issues preventing the successful completion of any tests and maintain a log to track issue identification and resolution. Resolve these issues as necessary to successfully complete all required testing.

All testing for both PMLs and MDOT ITS shall be performed in the presence of MDOT personnel. A minimum notification of seven days shall be provided for the scheduling of all test witnessing by MDOT for tests occurring locally in the Phase. For any tests occurring outside of the Phase limits (i.e., factory/bench testing), the minimum notification shall be 8 weeks.

19.9.8 Certification of Testing Results and Acceptance

Upon successful completion of each test for PMLs ITS, a documentation package of the testing and results shall be certified as completed and accepted by the IQF. The certified testing documentation shall be provided to MDOT.

Upon successful completion of each test for MDOT ITS, a documentation package of the testing and results shall be certified as completed by the IQF and certified as accepted by MDOT. The certified testing documentation shall be provided to MDOT.

No MDOT ITS devices or systems will be accepted for maintenance by MDOT until certified testing documentation for the MDOT ITS has been received.

19.10 Training and Documentation

Develop a training and documentation program for the PMLs ITS devices and systems. Provide operational and maintenance training to MDOT personnel for all MDOT ITS equipment constructed or modified by the Phase Developer prior to acceptance of MDOT ITS equipment by MDOT for maintenance. As part of the training, all Plans, manuals, shop drawings, device configuration cables, and wiring harnesses shall be provided to MDOT.

19.11 Warranties

All original equipment manufacturer warranties for all Phase Developer furnished and installed MDOT ITS equipment shall be transferred to MDOT upon acceptance of the equipment by MDOT for maintenance.

19.12 Deliverables

Table 19-2 - ITS Submittals

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
ITS Lead Qualifications	With the Committed Section Proposal
ITS design Plans	In accordance with the proposed schedule for the pertinent portion of the Work
DMS message history log	Prior to DMSs becoming operational
Systems Engineering Management Plan	As part of the Predevelopment work or as a preliminary Section Design Activity
ConOps	In accordance with the proposed schedule for the pertinent portion of the Work
ITS Testing Plan	Prior to installing ITS equipment
Factory/bench testing Plan	Prior to fabricating ITS equipment
Field acceptance test Plan	Prior to installing ITS equipment
Certification of testing results and acceptance	At the conclusion of system testing
Operational and maintenance training and documentation program for the PMLs ITS devices and system	90 days prior to Substantial Completion

ARTICLE 20. Communication Systems

20.1 Scope

The Work requires designing, developing specifications, furnishing, installing, testing, documenting, and providing warranties for all communications systems to provide a high-quality, efficient, reliable, and redundant communications system serving PMLs ITS and electronic tolling collection system ("ETCS") as described herein. Communications Systems include all existing MDOT systems, new systems that are part of the Work, or temporary equipment and systems interacting with new or existing systems. The Work includes providing a PML Fiber Backbone, a GPL fiber backbone, PML distribution fiber, GPL distribution fiber and last mile connectivity to each and every field device.

20.2 Standards, References and Other Agencies Having Jurisdiction

This Exhibit 6 Article 20 (Communication Systems) defines the performance requirements, standards, guidelines, reference information, and other pertinent details related to the development, design, and construction of the PMLs communications system and to address impacts to MDOT's communications system. For aspects of the development, design, and construction to address impacts on communications systems owned and operated by other AHJs, including but not limited to other states, commonwealths, counties, cities, towns, municipalities, etc., adhere to the requirements, standards, guidelines, reference information and other pertinent details of the respective agencies or AHJ, as applicable.

20.3 Design, Construction, and Operation Performance Requirements

Design, furnish, install, and operate a communications system providing redundant two-way data communications between all GPLs and PMLs ITS field devices, ETCS, the Phase Developer's ATMS, and MDOT systems where required. PMLs critical systems or devices, including PMLs critical systems interfacing with MDOT, shall use a network, solely owned and operated by the Phase Developer to update, poll, monitor, and control ITS and ETCS, as well as exchange data with MDOT. These systems shall not rely on third party internet services.

Furnish, install and operate all infrastructure for the PMLs communications system, including fiber-optic cable, copper cable, or wireless equipment and for all supporting infrastructure including conduits and vaults/manholes/handholes necessary for the PMLs systems.

The Phase Developer's communications infrastructure shall be completely separate from MDOT communications infrastructure, except where interfaces must occur, or as accepted by MDOT. The Phase Developer is not permitted to use or share MDOT's cabling, conduits, equipment cabinets, or other communications infrastructure.

The Phase Developer will not be given access to MDOT's communications infrastructure, except where interfaces must occur or as accepted by MDOT, and MDOT will not have access to the Phase Developer's communications infrastructure.

The Phase Developer is responsible for all third party communications service provider connections, including cost, application, and coordination necessary to provide communications service to ITS devices or systems. Except where specific requirements are noted herein, determine the communications types and methods to be permitted for use on the PMLs

communications system, including but not limited to hardwired, wireless, third party, shared resource, or other communications types and methods. Additionally, determine the components and requirements for the infrastructure supporting the PMLs communications system. Infrastructure components and requirements include, but are not limited to, conduit type and size, conduit duct bank configurations, junction box type and size, spacing requirements, spare capacity, clearance requirements, expansion/coupling requirements, grounding, locating features, load ratings, and installation methods.

Communications lines shall be installed in underground conduit systems or exposed conduit systems on structures where required. No communications lines shall be run overhead.

Determine the PMLs communications network architecture, protocols, and the requirements necessary to ensure operational reliability and redundancy of the communications system. Fiber-optic networks shall be fully redundant designed in a ring topology to provide redundant communications links using spanning tree protocol. Fiber-optic networks shall consist of trunk fiber-optic rings and distribution fiber-optic rings. The trunk and distribution fiber-optic rings shall be in separate fiber-optic cables. Fiber-optic networks shall be designed with geographic redundancy. MDOT will provide 12 fibers in their fiber-optic trunk to achieve geographic redundancy for the PMLs trunk fiber-optic ring. Likewise, the managed lane fiber-optic trunk shall designate 12 fibers for MDOT's use.

Layer 2 network switches shall be industrial, environmentally hardened, gigabit Ethernet switches. Layer 3 network switches shall be industrial, environmentally hardened, 10 gigabit Ethernet switches.

Design the PMLs communications network and develop a requirements definition document defining the connectivity, layers on the network, Internet protocol ("IP") scheme, IP subnet definitions, failover and redundancy, configuration, VLANs, port assignments, etc. The maximum allowed cable length of a Category 5 or 6 Ethernet cable is 328 feet. If a longer running distance is needed, a media converter shall be used to convert Ethernet data to fiber-optic signals.

Outages to existing MDOT communication systems shall be coordinated and scheduled at least 7 days in advance with MDOT and shall last no more than 24 hours. Outages to existing MDOT communications systems will generally be permitted up to 24 hours in duration; however, critical systems, as determined by MDOT, may require temporary communications to avoid outages.

Relocate, repair, or replace existing MDOT communications systems impacted by the Work. Existing MDOT communications systems impacted by PMLs construction shall be relocated, repaired, or replaced with new communications equipment and infrastructure matching the same communications method (fiber, T-1, etc.) currently in use (i.e. replace in-kind, impacts to existing MDOT fiber shall be replaced with fiber). Proposed communications systems for newly required MDOT ITS systems/devices shall use the communications method (fiber, T-1, etc.) in use for nearby similar ITS systems/devices, or the type prevalent within the Phase. All communications system design shall be subject to review and acceptance by MDOT.

Where third party T1 data services are used and where distances between the communications service connection point and the device site require conversion and transmission over fiber, an equipment cabinet shall be provided adjacent to the communications service connection point and another equipment cabinet at the ITS device site. Each equipment cabinet shall contain a fiber patch panel and fiber-optic transceiver unit with 62.5 micron, non-dispersion shifted, 12 strand single-mode fiber ("SMF") with a rodent-resistant outer jacket in a MDOT owned conduit system between them. The Phase Developer is responsible for all communications service

infrastructure, including conduits, 6 pair jelly-filled copper cable, 12 strand multi-mode fiber, and manholes/handholes.

20.3.1 Fiber-optic Cables

Fiber-optic cables shall be labeled at all junctions and terminations with a marking indicating the endpoints, the type of the cable, and the count of the cable. One-hundred feet of slack fiber-optic cable shall be coiled and stored at all fiber-optic cable splice locations. This slack shall be provided on both sides of the splice and for all cables. Where splices are located within ITS equipment cabinets, the fiber-optic cable slack shall be coiled and stored in a vault adjacent to the ITS equipment cabinet. One hundred feet of fiber-optic cable slack shall be provided in all other vaults and manholes. Fifty feet of fiber-optic cable slack shall be provided in all handholes, junction boxes, or other pull boxes. All fiber-optic cable shall be non-dispersion shifted with a rodent-resistant outer jacket and water blocking treatment in a MDOT owned conduit system. Ensure compatibility with the existing fiber in use by MDOT and shall provide all necessary equipment and make necessary connections with existing fiber where required.

20.3.2 Fiber-optic Splices and Terminations

Provide fiber-optic splices and terminations for all PMLs and MDOT fiber-optic cables constructed or modified. All fiber-optic terminations shall be located in appropriate fiber patch panels and shall be terminated using pre-connectorized fiber-optic pigtails.

Fiber-optic splices may be located in underground vaults or manholes, or in above-ground enclosures in ITS equipment cabinets. All fiber-optic splices shall be located in patch panels when in ITS equipment cabinets or appropriate splice enclosures rated for in-ground/submerged use where splicing occurs in vaults/manholes/handholes. Fiber-optic splice enclosures shall accommodate the capacity of the required splices, + 50% spare. Fiber-optic cable splices and splices to pigtails shall be fusion splices; mechanical splices are not permitted.

20.3.3 Fiber-optic Distribution Centers/Patch Panels

Fiber-optic distribution centers/patch panels shall be provided at all fiber-optic cable termination points and shall accommodate the number of fibers being spliced or terminated in the distribution center/panel. Fiber-optic distribution centers/patch panels in cabinets shall be rack-mountable.

20.3.4 Communications Vaults, Manholes, and Handholes

Communications manholes and handholes installed in-ground shall conform to MDOT standards. Communications vaults installed in-ground shall be minimum interior dimensions of 4'x4'x4'. Communications vaults shall be constructed of concrete with cast iron frames and covers. Prepare all necessary details and Plans for any junction boxes or pull boxes to be installed above ground, in barriers or walls, in or on structures, or any other unique application not covered by MDOT standards.

Vaults shall be provided at all in-ground splice locations or adjacent to ITS equipment cabinets where splices are located to provide room for the splice and associated slack cable. Vaults, manholes, and handholes shall not be located within ditches. Vaults, manholes, and handholes shall not be located within roadways, except where no other installation is feasible. When

located within roadways, they shall be located in the shoulder and shall be designed to meet HL-93 loading as specified in the AASHTO LRFD Bridge Design Specifications. Vaults, manholes, and handholes for fiber-optic conduit and cable runs shall be spaced no more than 500 feet apart. Handholes along fiber-optic lines may be placed as needed to facilitate the installation of fiber-optic cable. All vaults, manholes, handholes, and pull boxes shall be installed with underdrain. The stone surrounding these structures shall not be considered a suitable outfall. Underdrain shall be connected to a suitable outlet such as underdrain outlet pipe to a slope or drainage structure.

20.3.5 Communications Conduits

All communications duct banks/conduits shall be sized per the National Electric Code ("NEC") conduit fill requirements, except where other requirements dictate larger conduits with additional spare capacity or spare conduits. The Priced Managed Lane's communications cabling shall be in a separate duct bank/conduit system and use separate vaults, manholes, handholes, and junction boxes from MDOT GPLs' communications cabling. Design and construct all conduits, including all necessary hardware, fasteners, and accessories, in accordance with the requirements of this document. Longitudinal conduits shall not be installed under the paved surfaces except where no other installation is feasible. All underground conduits shall be Schedule 80 rigid PVC or high-density polyethylene standard dimension ratio 13.5. All conduit located above ground shall be rigid galvanized steel. PVC coated rigid galvanized steel conduit shall be used from the nearest underground junction below grade to a minimum of 2' above grade where it can then be transitioned to rigid galvanized steel.

All materials used in the installation of conduit, such as bends, adapters, couplings, and fittings, shall be provided from the same manufacturer of the conduit for a compatible installation. Use complete conduit runs in 20 feet (nominal) lengths when PVC conduit is used and include mid-body gasket to provide watertight integrity. Conduit bends shall be complete with bell and spigot or threaded ends depending on the type of conduit.

Provide flat profile, low stretch polyester, sequential footage marked, 2500 pound tensile strength cable pulling tape in each empty conduit or cell with enough slack to reach out of the junction enclosure and allow for future cable pulling. The mounting rail for the locator wire connection device shall be zinc dichromate plated steel.

Conduit shall be installed so as not to damage any finished surfaces (sidewalk, roadway, curbs, etc.) or other Elements. Any damage by the Phase Developer's operations shall be replaced in its entirety. Place all conduits in the same trench before backfilling and install plugs on all empty conduits inside all vaults, manholes, and handholes. All conduit shall be located away from potential guardrail installations. Conduits shall be installed in a manner allowing the backfill to completely surround all exterior surfaces of the conduit. Multi-duct conduits shall be separated by use of a commercially available conduit spacer. Non-metallic conduit containing a conductor shall conform to the abrasion requirements per the NEC. Grounded bushings shall be installed on the ends of metal conduits per the NEC.

Prepare all necessary details and Plans for any conduits to be installed above ground, in barriers or walls, in or on structures, or any other unique application. Prepare any necessary details and Plans, including all materials, expansion/contraction fittings, and other pertinent details such as attachment methods, passing conduits through parts of the structure, etc.

Install the following cables and conductors in separate conduit runs and junction boxes:

- power service conductors (120 Volts and above);

- communication cables; and
- CCTV coaxial and control cables.

Only fiber-optic cable shall be permitted to be installed in multi-duct conduit.

Construct a communications conduit trunk line for future use by MDOT. The trunk line shall extend continuously through Phase. The trunk line shall consist of two 4 inch conduits, which shall be installed adjacent to the GPLs and not within the PMLs. Vaults, manholes, and handholes for MDOT trunk line shall be spaced at a maximum spacing of 500 feet. One vault shall be installed at a minimum spacing of 2000 feet, and two vaults shall be provided at each interchange (generally 1 vault per side of the interchange along the trunk line) to provide future access locations. The conduit trunk line shall terminate at vaults installed at the Phase limits. The Phase Developer is responsible for installing a 96 count, non-dispersion shifted, SMF optic cable with a rodent resistant outer jacket and water blocking treatment within the conduit trunk line. The fiber optic cable shall be installed with as few splices as possible as cable lengths on a standard reel will permit. Slack fiber cable shall be provided in all vaults, manholes, and handholes following the requirements of this [Exhibit 6 Article 20 \(Communication Systems\)](#). At the ends of the fiber optic cable, cap the cable with a watertight cap, coiled, and stored for MDOT's future use.

20.4 Integration and Testing

The communications system testing shall include a testing of fiber-optic splicing and testing Plans for other communications methods used for the Phase Developer's ITS and ETCS or MDOT ITS, as applicable. For all testing Plans, define the roles of the Section Developer staff and the IQF in the testing. MDOT will provide oversight, audits and review of the testing procedures and results.

Communications system testing shall be performed as a component of and in conjunction with ITS and ETCS testing. Refer to [Exhibit 6 Article 19 \(Intelligent Transportation Systems\)](#) for ITS testing requirements and to [Exhibit 6 Article 24 \(Electronic Toll Collection Infrastructure\)](#) for ETCS testing requirements.

20.4.1 Fiber-optic Splicing and Testing Plan

Circuit tests shall be performed to verify each fiber is connected to the proper circuit, and it is continuous with no breaks or damaged lengths in the fiber. All strands shall meet ANSI/Telecommunications Industry Association ("TIA") ANSI/TIA 568C "family" of standards for communication cabling. Dark fibers and excessive attenuation due to breaks, bends, bad splices, defective connectors, and bad installation practices shall not be accepted and shall be corrected. For fiber-optic testing standards, see TIA-455-171 "Fiber-optic Test Procedure 171, Attenuation by Substitution Measurement for Short-Length Multimode Graded-Index and Single-Mode Optical Fiber Cable Assemblies," TIA 526-14 "Optical Power Loss Measurements of Installed Multimode Fiber ("MMF") Cable Plant" and TIA 526-7 "Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant." All cables shall have connectors installed prior to testing. All testing, for purposes of acceptance of the system, shall be conducted on fully installed and assembled fiber-optic cables.

Upon completion of testing, replace or repair any failed cable(s) with a new fiber or cable, and test the new cable to demonstrate acceptability. Where test results indicate or suggest problems with the test gear or test methods the Phase Developer may be permitted to retest the cable

using improved methods or gear. If passing test results cannot be obtained, the fiber must be replaced and retested until passing test results are achieved.

Insertion loss testing shall be performed and recorded with optical loss test sets ("OLTS") (i.e., light source and power meter) following the Method B procedure (i.e., One Cable Reference) in TIA 526-14 or Method 1A procedure (i.e., One Cable Reference) in TIA 526-7. These tests shall be measured in dB.

Record the linear numbers at each end of a fiber-optic cable under test. If the cable contains splices, the linear numbers closest to the splice point shall also be recorded. These numbers, along with a clear definition of the location they were recorded shall be transmitted along with the OLTS and optical time-domain reflectometer ("OTDR") test results. These tests shall use 850 nanometers and 1300 nanometers light sources for MMF and 1310 and 1550 nanometers for SMF. Tests shall be documented for all wavelengths per fiber type (MMF or SMF), as noted above. Test results shall include bidirectional OTDR trace reports generated from the unidirectional OTDR traces from either end of the fiber under test. The bidirectional OTDR reports shall show the average loss for each splice in the fiber. Test results shall be documented on paper and stored on a computer optical disk (compact disc or digital video disc) and shall be provided to MDOT after testing is complete. Insertion loss measurements recorded and printed by the OLTS is the format preferred over manual records. Results of insertion loss testing and OTDR traces event tables shall be submitted along with paper and electronic formats of cable manufacturer's factory testing documentation, cable endpoint linear numbers, splicing diagrams (i.e., matrices), and other diagrams and data to aid in the understanding of the results submitted to MDOT. Test results shall include both PDF and raw OTDR trace files of all OTDR testing.

The fiber-optic test results shall be organized in a manner clearly identifying the fibers being tested. The naming convention of the fiber in the test reports and their organization shall consistent with the system design the fiber is supporting and consistent with the field labeling applied to the fiber.

An OTDR acceptable to MDOT shall be used to conduct testing. The OTDR shall be calibrated to cable's optical fiber index of refraction found on the manufacturer's datasheet provided at cable delivery. Properly trained technicians shall conduct tests. Documentation of training or certification shall be provided to MDOT.

All OTDR traces shall maximize both the vertical and horizontal scales to the greatest extent possible and still fit the entire trace on the screen. The minimum width and height of an OTDR trace diagram in native format on a letter-sized paper shall be 2.85 by 2.25 inches.

A cable segment shall be deemed a failure if the total loss exceeds the calculated loss for that segment of cable. A cable segment shall fail if any individual splice loss is greater than 0.3 dB, or if any mated connector pair loss is greater than 0.75 dB, or if there is any point loss (over less than 1 foot of cable) of more than 1.0 dB. After the circuit test, a functional test shall be performed. This test shall consist of allowing the system to operate as normal for 30 consecutive days. Any failures shall be repaired, and the test restarted.

20.5 Documentation

Provide documentation of all communications architecture, connectivity, splicing, and terminations, including fiber splicing diagram Plans showing details of every splice and termination for every fiber strand. The number, color, and fiber assignment of each buffer tube

and fiber strand shall be included. Provide As-Built Drawings of all communications equipment and infrastructure.

20.6 Deliverables

Communications system design, construction, testing, and documentation Deliverables/ Submittals shall be made following and in conjunction with the Submittal requirements defined in Exhibit 6 Article 19 (Intelligent Transportation Systems); Exhibit 6 Article 21 (Electrical); and Exhibit 6 Article 23 (Construction).

ARTICLE 21. Electrical

21.1 Scope

The Work includes designing, developing specifications, furnishing, installing, testing, documenting, and providing warranties for all electrical systems to provide a high-quality, efficient, and reliable electrical system serving both PMLs and MDOT GPLs roadside equipment.

21.2 Standards, References and Other Agencies Having Jurisdiction

This Exhibit 6 Article 21 (Electrical) defines the performance requirements, standards, guidelines, reference information, and other pertinent details related to the development, design, and construction of the PMLs electrical system and addresses impacts to MDOT's electrical system. For aspects of the development, design, and construction addressing impacts on electrical systems owned and operated by other AHJs, including but not limited to other states, commonwealths, counties, cities, towns, municipalities, etc., adhere to the requirements, standards, guidelines, reference information and other pertinent details of the respective AHJ.

21.3 Design, Construction, and Operation Performance Requirements

Design, furnish, and install an electrical system providing electrical power to all PMLs ITS, field devices, the ETCS, roadway lighting, traffic signals and any other device requiring power. The operating voltage, phases, and characteristics of the electrical system shall be selected by the Phase Developer.

The Phase Developer is responsible for furnishing and installing all electrical infrastructure for the PMLs electrical system including meters, switches, disconnects, transformers, panels, conductor cables, conduits, vaults/manholes/handholes/junction boxes, and any other electrical infrastructure necessary for the PMLs systems. The electrical system shall be completely separate from MDOT's electrical system. No sharing of meters, switches, disconnects, transformers, panels, conductor cables, conduits, vaults/manholes/handholes/junction boxes, and any other electrical infrastructure will be permitted.

Access to MDOT's electrical system will not be provided, except as required to facilitate construction, and MDOT will not have access to the Phase Developer's electrical system.

Design and install a grounding system and transient protection devices suitable for the specific installation and equipment being supplied for each type of ITS Element. Ensure all equipment, devices, interconnect wiring, communication devices, communication lines, power supplies, antennas, operator controls, and power service are protected from external and internal electrical transient surges and line noise sources, including power surges, lightning, induced voltages, and static discharge. Systems and devices shall be designed and installed in accordance with NEC.

Electrical lines shall be installed in underground conduit systems or exposed conduit systems on structures where required. No electrical lines shall be run aerial overhead. Determine electrical loads and perform voltage drop calculations in accordance with the NEC to size feeder and branch circuit conductors. The minimum conductor size for field wire outside of control cabinets shall be #8 American wire gauge.

At a minimum, all enclosures, service disconnects, and transformer equipment shall be rated NEMA 4X in accordance with NEMA Specification 250, "Enclosures for Electrical Equipment 1000 Volts Maximum" ("NEMA 4X rated").

Existing MDOT electrical systems impacted by PMLs construction shall be relocated, repaired, or replaced with new electrical equipment and infrastructure using the same electrical characteristics (phase and voltage) of the system currently in use (i.e., 120/240 Volt single phase power shall be replaced with 120/240 Volt single phase power).

Proposed electrical systems for newly required MDOT systems/devices shall use an electrical system matching the type of electrical systems in use for nearby similar ITS systems/devices, or the type of electrical system prevalent within the Phase. All electrical system design shall be subject to review and acceptance by MDOT.

Use of existing MDOT electrical services, systems, or circuits for relocated or new MDOT systems/devices shall be permitted, subject to review and acceptance by MDOT, and provided the Phase Developer demonstrates there is adequate spare capacity in the existing electrical service, system or circuit for the relocated or new equipment.

A NEMA 4X rated stainless-steel safety switch shall be installed on the controller cabinet as a service disconnect if the controller cabinet is located more than 50 feet from the metered service pedestal, or across a roadway.

Outages to existing MDOT electrical systems shall be coordinated and scheduled at least 7 days in advance with MDOT. Outages to existing MDOT communications systems will generally be permitted up to 24 hours in duration; however, critical systems, as determined by MDOT, may require temporary electrical service to avoid outages.

All ITS power service points shall use a 120/240 Volt base-mounted metered service pedestal whose design has been approved by the appropriate utility company. Higher voltage services or distribution systems shall not be used with MDOT equipment without MDOT acceptance. MDOT ITS technicians shall not be exposed to arc-flash hazards within the MDOT ITS cabinets. All outlets, wiring, breakers, panels, switches, etc. within the cabinet shall be rated a category 0 arc-flash hazard per NFPA 70E unless approved otherwise by MDOT.

Determine the appropriate load required for each cabinet, perform voltage drop calculations, and size the wire for each cabinet, device, or roadside equipment site. Each cabinet shall include an additional load allowance of 12 Amperes for powering convenience outlets. These calculations shall be part of the Design Deliverable. All new MDOT CCTV sites required for the Work shall have an uninterruptible power supply ("UPS") system in a separate cabinet with sufficient capacity to allow the operation of the camera system for 24 to 28 hours. The CCTV controller cabinet and UPS cabinet shall share a common foundation. Foundation details for ITS cabinets can be found in MDOT SHA OOTS "Shelf Typicals."

21.4 Electrical Services

The Phase Developer is responsible for all Work, materials, and costs associated with obtaining power and maintaining power throughout construction for all ITS and ETCS equipment for new, relocated, or temporary conditions. Coordinate with the appropriate Utility Owner providing power and complete all electrical service applications necessary to obtain service. All materials shall be submitted to the Utility Owner providing power with MDOT copied.

PMLs electric service charges are the responsibility of the Phase Developer. MDOT will take over or assume responsibility for electric service charges for new or relocated GPL ITS devices once they have been fully tested and accepted by MDOT. MDOT shall remain responsible for electric service charges for existing electrical services not disturbed by the Work.

21.5 Electrical Vaults, Manholes, and Handholes

The requirements for communications vaults, manholes, and handholes in Exhibit 6 Article 19 (Intelligent Transportation Systems) shall apply for electrical vaults, manholes, and handholes, except as modified herein for specific electrical applications. Vaults, manholes, and handholes for MDOT electrical conduit and cable runs shall be spaced no more than 250 feet apart. Vaults, manholes, and handholes for PMLs electrical conduit and cable runs shall be spaced no farther than 250 feet apart.

21.6 Electrical Conduits

The requirements for Communications Conduits in Exhibit 6 Article 19 (Intelligent Transportation Systems) and Exhibit 6 Article 20 (Communication Systems) shall apply for electrical conduits, except as modified herein for specific electrical applications. The Priced Managed Lane's electrical wiring shall be in a separate duct bank/conduit system and use separate junction boxes from MDOT GPLs' electrical wiring.

21.7 Uninterruptible Power Supplies and Back-up Power Generation

Use uninterruptible power supplies or backup power generation as required to maintain safety for the traveling public and to keep devices and systems functional including the Electronic Toll and Traffic Management System ("ETTM System") in the event of a power failure.

21.8 Electrical Testing

Perform the following testing:

- ground resistance testing;
- circuits testing; and
- performance testing.

21.9 Documentation

Provide documentation of all electrical circuit connectivity, services, operating phases and voltages, panel schedules, load calculations, voltage drop calculations, splicing. Provide As-Built Drawings of all electrical equipment and infrastructure.

21.10 Deliverables

Electrical system design, construction, testing, and documentation Deliverables/Submittals shall be made following and in conjunction with the Submittal requirements defined in Exhibit 6 Article 19 (Intelligent Transportation Systems); Exhibit 6 Article 20 (Communication Systems); and Exhibit 6 Article 23 (Construction).

ARTICLE 22. Maintenance of Traffic

22.1 Scope

Develop and implement MOT and a TMP. The TMP is to be a flexible, living document to allow adaptation to MOT operational changes as the Work progresses. The objective of the TMP is to produce benefits without impairing the essential functions and characteristics of the Work, such as safety, mobility, traffic operations, durability, desired appearance, maintainability, environmental protection, drainage, and other similar constraints.

Work zone impacts, including impacts on the environment and surrounding communities, shall be kept to a minimum and shall be considered when developing and implementing the MOT and the TMP. The TMP shall include transportation management strategies with a description of how these strategies shall be implemented to manage and minimize work zone impacts.

22.2 Standards, Reference and Other Agencies Having Jurisdiction.

At a minimum, design and construction shall be based on Maryland motor vehicle laws, the MD MUTCD and the FHWA Manual on Uniform Traffic Control Devices.

This [Exhibit 6 Article 22 \(Maintenance of Traffic\)](#) defines the performance requirements, standards, guidelines, reference information, and other pertinent details related to the development, design, and construction of the MOT and TMP with a primary concentration on MDOT requirements, standards, guidelines, reference information, and other pertinent details. For aspects of the development, design, and construction of the MOT and TMP affecting other AHJs, including but not limited to other states, commonwealths, counties, cities, towns, municipalities, etc., adhere to the requirements, standards, guidelines, reference information and other pertinent details of the respective AHJ.

22.3 Transportation Management Plan

The TMP shall include TCPs, as well as transportation operations and public information and outreach strategies. A separate TMP shall be prepared for each Section. The TMP shall:

- be developed in accordance with FHWA requirements and shall be subject to review and acceptance by MDOT;
- evaluate work zone staging and sequencing including identification of key stages, milestones, constraints, and other factors affecting the staging and sequencing;
- address coordination with adjacent Sections or Phases;
- evaluate work zone impacts and develop strategies to mitigate those impacts through the use of improved transportation operations and management of the transportation system. Impacts and strategies shall be documented in a TMP Report;
- include TCPs accommodating site-specific considerations;
- include strategies to communicate with the public and concerned Stakeholders, before and during the Work, through the public outreach Plan; and
- include travel demand management strategies reducing traffic through the work zone.

22.3.1 Transportation Management Plan Contents

Develop a temporary traffic control approach that best meets the performance requirements and required construction activities. Therefore, MOT design shall be done concurrently with a work zone impacts assessment and traffic analysis. This effort shall be documented in the TMP.

The TMP shall include discussion of the following and all supporting documentation:

- work zone impacts assessment for the proposed MOT;
- traffic analyses for each phase of MOT; and
- work zone impact management strategies.

22.3.2 TMP Format

All the pages within the TMP shall be numbered and dated. Revise the TMP as required to keep the TMP current with design and construction activities. The date of the revision shall be placed on all pages. Pages to be added, replaced, or removed shall be designated. All revisions shall be inserted into a conformed version of the TMP and submitted to MDOT. A final conformed copy, including all maps, exhibits, and appendices, shall be delivered to MDOT for their records. Chapters and headings of the report shall be numbered. The TMP shall include:

- an introduction (cover page, table of contents, etc.);
- certifications by pertinent members of the Phase Developer's staff responsible for and overseeing the Work including design, construction, and quality;
- an executive summary;
- a description of roles, responsibilities and contact information;
- Work description, including goals and constraints;
- a description of existing and baseline conditions;
- work zone impacts assessment;
- work zone traffic analysis;
- work zone impact management strategies;
- an approach to access and mobility for businesses and transit;
- a Contingency Plan;
- an Incident Management Plan;
- the process to be used to implement the TMP and the process to be used to monitor the effectiveness of the TMP; and
- a discussion of how the TMP will be used as part of the public information and outreach activities.

22.3.3 Existing and Baseline Conditions

Provide a list of the existing roadways within the Phase impacted by the Work. For each roadway, identify existing year and construction year metrics including, but not limited to capacity,

volume, queues, delay, travel time, diversion rates, crash history, etc. These metrics shall be used as a baseline for comparison to the metric results of the work zone traffic analysis.

22.3.4 Work Zone Impact Assessment

Identify how the construction phasing, temporary traffic control design, and work zone impact mitigation efforts will affect each other, and how they might adversely impact specific areas, if any. Issues to be considered and discussed in this chapter of the TMP include:

- identification of high-level approaches to construction and traffic control, including proposed construction phasing, traffic control, and management, the need for lane closures, total roadway closures, shoulder closures, use of shoulder for travel during construction, use of detour routes and times related to these needs (off-peak, night-work, weekend work, intermittent closures, etc.);
- presentation of high-level MOT Plans including, but not limited to, all major traffic shifts, use of temporary roadways, temporary traffic signals, access modifications to businesses or residences, and the duration of each phase shall be noted on the Plan;
- identification of safety issues, including pre-existing safety issues and safety implications of proposed construction approach(es) and pre-existing safety issues such as crash history, curve and gradient issues, line-of-sight issues, weather-related safety issues, lack of adequate shoulder width or prevailing speeds;
- identification of community impacts and related issues, including accessibility issues and other coordination issues such as the identification of work zone impacts on the community businesses and residents likely to be affected by the Work; and
- identification of combined impacts and coordination issues, including identification of nearby and concurrent projects and assessment of potential combined impacts of these projects at the corridor/network level.

22.3.5 Work Zone Traffic Analysis

Using the opening traffic volumes for the opening year of each Section, analyze all MOT phases to ensure there are no operational or safety issues. Work zone traffic analysis shall be performed in accordance with the methods and tools described in MDOT's Work Zone Lane Closure Analysis Guidelines. Mobility impacts shall be limited to the allowable mobility thresholds as described in this Technical Requirement.

MDOT recognizes specific work activities and time periods may make it infeasible to comply with the required threshold levels. These circumstances shall be outlined in the TMP. For these situations, analyze other MOT alternatives to reduce the mobility impacts below the thresholds. If the MOT alternatives analysis does not produce an option reducing impacts below the thresholds, propose additional impact management strategies (transportation operations and public information and outreach strategies) to minimize the impact.

The traffic analysis portion of the TMP shall include:

- a summary of traffic and travel characteristics in the Phase which may include recurring congestion issues (pre-existing bottlenecks, high-volume areas, etc.) and non-recurring congestion issues (special event traffic issues, weather-related delays, potential for Incident-related traffic congestion, etc.), heavy vehicle volumes, directional traffic, and recreational or seasonal traffic issues;

- a description of how the expected traffic conditions during construction were determined, including source and date of traffic data and any traffic reduction factors or other parameters assumed;
- a list of the measure of effectiveness used for the analysis, such as capacity, volume, queue, travel time, diversion rates, safety, adequacy of detour routes, etc.;
- a listing of the traffic analysis tools used, including a brief summary on how the tool was selected and criteria used to select the most appropriate tool;
- a discussion of construction approaches having the potential to impact mobility during the Work;
- a comparison of existing and construction traffic conditions and operations, with and without work zone impact management strategies to include detour route analysis; and
- traffic analysis to address, in a quantitative manner, the impacts on:
 - access for residences, businesses, and non-Emergency services;
 - access for pedestrians, bicyclists, and Persons with disabilities;
 - first responder impacts (fire, ambulance, police, and hospitals, etc.);
 - safety;
 - adequacy of detour routes;
 - intersection traffic control (signal timing, signage, etc.);
 - heavy vehicle traffic (including over-height, over-weight vehicles);
 - transit operations (bus stops, school buses, other transit operations); and
 - seasonal and holiday traffic impacts (beach traffic, school year, etc.)

22.3.6 Analysis Technique and Software

Select the appropriate software package for the type of work zone analysis being performed. Refer to [Exhibit 6 Article 18 \(Traffic Analysis\)](#) for a listing of software packages acceptable for use with the work zone analysis. The Phase Developer may propose other software packages and analysis techniques, subject to review and acceptance by MDOT.

22.3.7 Key Performance Metrics and Thresholds

The following acceptable thresholds for freeways and arterials shall be used for the evaluation of work zone mobility impacts. Key performance metrics and thresholds for local and collector roadways impacted by the Work shall be governed by the AHJ.

Table 22-1 - Mobility Thresholds for Freeways

ESTIMATED QUEUE LENGTH	QUEUE DURATION LIMIT FOR ACCEPTABLE OR UNACCEPTABLE CONDITIONS
< 1.0 miles	Acceptable for any duration.
1.0 – 1.5 miles	Unacceptable when greater than 2 hours.
> 1.5 miles	Unacceptable for any duration.

Table 22-2 - Mobility Thresholds for Arterials

TRAVEL TIME	MOBILITY THRESHOLD
Existing Travel Time, T	Maximum estimated travel time cannot exceed T + 15 minutes.

Table 22-3 - Mobility Thresholds for Arterial Roadway Signalized Intersections

EXISTING LEVEL OF SERVICE ("LOS")	MOBILITY THRESHOLD
A, B, or C	Maximum LOS D, Control Delay ≤ 45 seconds
D	Maximum increase in Control Delay of 30%
E	Maximum increase in Control Delay of 30%, or Control Delay ≤ 80 seconds
F	No increase in Control Delay

Table 22-4 - Mobility Thresholds for Arterial Roadway Unsignalized Intersections

EXISTING LOS	MOBILITY THRESHOLD
A, B, or C	Maximum LOS D, Control Delay ≤ 45 seconds
D	Maximum increase in Control Delay of 30%
E	Maximum increase in Control Delay of 30%, or Control Delay ≤ 50 seconds
F	No increase in Control Delay

22.3.8 Access and Mobility Plan

Develop an Access and Mobility Plan discussing how access and mobility will be maintained to/for all businesses, residences, schools, communities, public transportation and transit, pedestrian and bicycle facilities, first responder services, and any other public or private facility or entity within the work zone or along routes affected by the work zone. The Access and Mobility Plan shall also discuss the Phase Developer's construction access and depict haul routes and equipment access points. The Access and Mobility Plan shall be submitted to MDOT.

22.3.9 Contingency Plan

Prepare a Contingency Plan specifying actions to be taken to minimize traffic impacts should unexpected events (unforeseen traffic demand, inclement weather, etc.) occur in the work zone. This plan should also address activities under the Phase Developer's control within the work zone. The Contingency Plan shall include:

- information clearly defining trigger points which require lifting lane closures (i.e., inclement weather, length of traffic queue exceeding thresholds);
- a decision tree with clearly defined lines of communication and authority;
- the description of specific duties of all participants during lane closure operations, such as coordination with Maryland State Police or other AHJ;
- plans for removal of TCDs in advance of a major weather event; and
- standby equipment and availability of personnel for callout.

22.3.10 Incident Management Plan

Develop an Incident Management Plan with information necessary for responding to and managing Incidents occurring within the Phase. Coordinate with MDOT and other Stakeholders involved in the response and management of Incidents during the development of the Incident Management Plan. The Incident Management Plan shall include:

- Incident and crash prevention strategies;
- Incident mitigation strategies;
- Emergency response procedures, including:
 - roles and responsibilities identified for response agencies and entities;
 - notification procedures, including a Phase Developer established Emergency response telephone tree with all appropriate Emergency response agencies/personnel identified for immediate response in the event of an Emergency organized into areas of expertise, so the proper people are contacted for specific Emergency situations;
 - response Plans for various types and levels of Incidents;
 - response equipment; and
 - response staging areas and locations;
- Phase Developer reporting procedures and requirements, which at a minimum shall provide documentation to MDOT on the following:
 - the cause of disruption (i.e., whether it is construction-oriented or not);
 - actions being taken to alleviate the problem;
 - responsible parties for the actions; and
 - anticipated duration of the disruption.

22.3.11 Implementation and Monitoring Plan

The Implementation and Monitoring Plan shall define the agencies/entities, roles, responsibilities, and processes to ensure the TMP, including the TCPs and Incident Management Plan, are developed and implemented efficiently and appropriately, and these Plans are kept up-to-date with necessary modifications during the Work. The Implementation and Monitoring Plan shall also include monitoring of work zone performance metrics, including LOS, queuing, delay, travel times, and overall traffic operations, to verify they are consistent with the results and expectations of the work zone traffic analysis. Provide their own personnel to monitor the implementation of the TMP and provide reports on the successes and failures of the implementation in addition to MDOT's own independent oversight of the TMP implementation.

22.3.12 Collaboration with MDOT CHART

Coordinate and collaborate with MDOT CHART and integrate MDOT CHART into the Incident Management and response; public information and outreach; and general work zone information and warnings required for implementation of the Phase Developer's MOT and TMP. The TMP shall document how this coordination is to take place as well as any specific coordination activities required.

22.4 Maintenance of Traffic Requirements

22.4.1 General Requirements

Develop or identify all Plans, specifications, design standards, details, performance requirements, operating conditions, design parameters, coordination items, and any other item necessary for the design and implementation of the MOT required for the Work not already defined or identified within this Exhibit 6 Article 22 (Maintenance of Traffic). Temporary TCDs shall meet the requirements of Exhibit 6 Article 17 (Signing, Pavement Markings, Signals, and Lighting). The Phase Developer's MOT development efforts shall include:

- providing for the safe and efficient passage of vehicle, bicycle, and pedestrian (including those with disabilities in accordance with the Americans with Disabilities Act) traffic on all roadways, trails, sidewalks, bike paths/lanes, or other impacted facilities through and around work zones;
- providing for all temporary TCDs required for the implementation of the MOT, including but not limited to, all guide, regulatory, and warning signing, pavement markings, channelization devices, attenuators, arrow panels, portable variable message signs, protection vehicles, work zone vehicle delineation, roadway and sign lighting, and ITS;
- providing TCDs for the MOT complying with the requirements of the AASHTO Manual for Assessing Safety Hardware;
- sequencing the drainage system and ESC construction so proper drainage is maintained on all active roadways or other facilities;
- minimizing negative impacts on residents, commuters, and businesses;
- providing convenient and logical rerouting of traffic (by using advance warning systems and directional and informational signing, lighting, and striping) to provide "driver-friendly" detours and to maximize the safety of the traveling public;
- coordinating MOT activities with the Maryland State Police, local law enforcement, fire departments, other first responders, and all Governmental Entities to ensure public safety and first responder actions are not compromised; and
- coordinating with all required entities during the development of the TMP and design of the MOT. Coordinate with all required entities during implementation of the TMP and MOT during construction.

In the execution of the Work, ensure all coordination, Design Deliverables, permit applications, and acceptances are obtained, and advance notification of MOT activities and other activities necessary for the implementation of the TMP and MOT are provided to all entities, as required.

22.4.2 Design and Construction Requirements

Coordinate MOT activities and TCPs with other construction projects. Provide TCPs for all impacted facilities within the Work limits for each major phase or sub-phase of construction safely and efficiently accommodating traffic at all times and minimizes conflict. Additionally:

- identify and address all MOT operations necessary for the Work in the appropriate sequence including, but not limited to all lane/shoulder closures, roadway closures, lane shifts, flagging operations, use of law enforcement officers, temporary roadway closures, and pedestrian or bicycle facility MOT operations;
- identify, develop, and implement detours for all full roadway, Bridge, ramp, pedestrian facility, or bicycle facility closures (for any period of time);
- gain acceptance of MDOT or the appropriate AHJ of all closures and detours;
- assess all traffic and operational impacts associated with the MOT implementation and provide mitigation;
- provide construction access for delivery and removal of all construction materials. Coordinate all routes and identify necessary permits with the appropriate agencies;
- provide for work zone ITS to disseminate real-time work zone information, assist in the monitoring of work zone conditions, and assist in the enforcement of work zone regulatory conditions;
- implement the Incident Management Plan and Emergency Response Plan in conjunction with MDOT CHART, Maryland State Police, local law enforcement, and other first responders for any Incidents occurring within the Phase;
- monitor the TMP and MOT during implementation to ensure traffic operations are within the thresholds and conditions anticipated during design;
- modify the MOT as required to meet operation thresholds or mitigate operational concerns;
- coordinate with all affected agencies, associations, groups, boards, organizations, societies, schools, etc., both public and private, affected by the implementation of the MOT during both the design and implementation of the MOT as directed by MDOT;
- coordinate with MDOT and when required, adjust MOT activities and construction activities as necessary to accommodate special events, major weather events or other irregular events or unforeseen circumstances impacting regional traffic operations;
- design temporary TCPs and implement MOT setups using off-peak 85th percentile, prevailing, posted, design, or advisory speeds as applicable standards and references permit to determine buffer and taper lengths, clear zone distances, attenuator arrangements, acceleration, and deceleration length, temporary TCD spacings, and other temporary traffic control Elements;
- provide all material, labor, equipment, and personnel to effectively carry out the TMP and MOT;
- maintain all equipment and tools in good operating condition and in proper adjustment throughout the duration of the Work;
- provide and use all safety equipment including, but not limited to, hard hats, safety vests and clothing required by state and federal regulations;
- arrange and host pre-traffic switch meetings with MDOT, Maryland State Police, local law enforcement, fire departments, other first responders, and all affected agencies at least two weeks prior to switching traffic;

- identify desired full roadway, Bridge or ramp closures (for any period of time) and submit a request in writing to MDOT;
- correct all traffic control deficiencies immediately upon notification or observance of the deficiency;
- design temporary traffic control using temporary raised pavement markers for positive guidance during darkness;
- design temporary traffic control in a manner reducing conflict areas;
- design all geometric aspects of temporary roadways based on the design speed, and appropriate design vehicle (i.e., school bus, farm equipment, WB-67, etc.);
- design all active roadways to accommodate drainage avoiding puddles or icing on the traveled roadway or shoulders;
- design temporary traffic control channelizing devices so adequate space is provided between the channelization device and work area or other area requiring protection (e.g., opposing direction of traffic) to account for the deflection of the channelizing device in accordance with the manufacturer's recommendations or other approved crash testing method;
- design temporary traffic control so all pavement edge drop-offs are located outside of the clear zone, are protected by an approved traffic barrier, or are corrected with temporary wedge material placed at a 4:1 or flatter slopes when not working;
- provide traffic barriers or temporary wedge areas delineated with appropriate signing and channelizing devices based on the type of roadway;
- ensure appropriate MOT and flagging procedures are employed during all phases of construction, including mobilization activities;
- coordinate with MDOT and provide all MOT items (i.e., bathroom facilities, temporary signs, traffic barrier, end treatments, channelization devices, protection vehicles, temporary TCDs, speed display trailers, etc.) including relocating and installing new TCDs as required for each construction phase for deployment of automated speed enforcement; and
- design and implement MOT so it does not prohibit MDOT's ability to respond to winter precipitation events (snow, freezing rain, sleet, etc.) via plowing, brining, salting, etc.

22.4.3 Detours

Design, place, and maintain all traffic detours required during construction. Wherever possible, use state routes of a similar roadway caliber (i.e., similar number of travel lanes and similar roadway classification as the road being closed) for detour routes. Detour routes shall be required when complete road or ramp closures or elimination of a particular movement or movements at an intersection approach are necessary. Proposed detour routes shall be included in the TCPs and reviewed through the design review process. Complete closures of roadways will not be permitted without the express written acceptance of MDOT (or AHJ for non-state roadways) as part of the design review process prior to the closure. Specific identification and written documentation of the proposed closure, including traffic and operational impacts, shall be provided to MDOT during the design review process for each request.

Any construction activity resulting in closing a county or state road and requiring a detour of any movement will need to be coordinated with MDOT, Montgomery County, Frederick County or the AHJ. Existing signs which conflict with proposed roadway closures and detours shall be covered or removed while the closure and detour is being implemented to eliminate conflicting messages/guidance.

It is anticipated some construction activities such as roadway reconstruction, roadway resurfacing, traffic barrier removal, or others on interchange entrance and exit ramps within the Work limits will not be possible using standard temporary traffic control operations and detours of affected interchange ramps may be required. Detour Plans shall be fully designed and subject to review and acceptance by MDOT and other AHJs as required. The following shall apply:

- accepted detours shall be permitted during the hours of 10:00 PM – 5:00 AM the following morning, Monday through Thursday or the requirements in a Third Party MOU, whichever is more stringent;
- modifications to a detour route previously accepted shall be submitted and is subject to review and acceptance by MDOT;
- if any construction by the Section Developer or by another project renders a detour route no longer valid, determine an alternate route and submit it to MDOT;
- for detour routes associated with the closure of I-270 slip ramps between the express lanes and local lanes, adequate detour signing shall be provided in advance of the closure point to direct traffic on a less impactful route, and adequate detour signing shall be provided after the closure point to direct traffic missing the initial route;
- only one I-270 slip ramp between express lanes and local lanes or local lanes and express lanes in one direction is permitted to be closed at a time; and
- ramps with overlapping detour routes or detour routes with overlapping/influencing traffic impacts are not permitted to be closed and detoured at the same time, subject to review and acceptance by MDOT or the AHJ.

22.4.4 Access

Maintain and provide access at all times to residential, commercial, business, educational, or other properties for all owners, tenants, customers, visitors, and first responder vehicles. Maintain access to all businesses, residences, local streets, and private driveways at all times, including all temporary approaches to, crossings of, and intersections with roads and streets. Consider any special access needs of property owners and tenants, such as business hours, delivery schedules, and circulation patterns. Provide temporary roadways, driveways, trails, crosswalks, etc. as required to maintain access.

22.4.5 Pedestrian and Bicycle Traffic

Maintain all existing pedestrian and bicycle access along existing facilities at all times during construction. The pedestrian accessway shall be fully compliant with all applicable regulations for accessibility, as defined by the Americans with Disabilities Act. Whenever an existing pedestrian access route or bicycle route in the public right-of-way is blocked by a construction, alteration, or maintenance activity, an alternate accessible pedestrian route must be provided. Recreational trails, including bicycle paths, shall also be maintained and kept in good condition. Access to all recreational facilities shall be provided and coordinated with the appropriate AHJ.

22.4.6 Public Information and Outreach

Proactively assist MDOT in providing advance information to the public regarding construction phasing, detour routes, and expected travel impacts, and coordinate these activities through frequent meetings with MDOT's Communications Manager. Coordinate and cooperate with

MDOT regarding special events that may affect traffic patterns through and around the Phase and adjust the TMP and TCPs as needed.

22.4.7 Schools and Public Transportation Agencies

Coordinate with local school systems, independent schools, appropriate Boards of Education, and state, county and local public transportation agencies to maintain bus, private vehicle, and pedestrian access to education facilities and public transportation services in the area. Access to bus stops shall also be maintained. Construction impacts on school bus and public transportation routes shall be coordinated with the local agencies. Construction staging shall be developed with the goal to minimize impacts to existing school bus routes.

22.4.8 Work Zone Intelligent Transportation Systems

Use existing MDOT CHART system-wide DMS as part of the TMP. It is the responsibility of the Section Developer to coordinate the operation of these signs and the implementation of the appropriate messages with MDOT CHART. The Section Developer may also use automated speed enforcement with speed display trailers.

22.4.9 Motorist Guidance

Provide guidance and signage to and along the entire length of every detour route to motorists who are diverted around or traveling through the construction areas. Signing not in compliance with MD MUTCD or accepted TCPs shall be corrected within 24 hours, unless the sign is a critical regulatory or warning sign, in which case the sign shall be corrected within 6 hours of notice. If the deficiency is caused by an Incident or crash, the 6 hours begins when access to the area is available.

For closures of surface streets or changes in roadway configurations, provide guide, regulatory, and warning signs in accordance with the accepted TCP for a particular phase. At least seven days before a road closure or major change in the roadway configuration or travel pattern, use portable variable message signs warning motorists of the pending changes. Messages to be displayed shall be submitted to MDOT or the AHJ one week prior to posting the variable message signs. Coordinate motorist guidance activities with MDOT SHA's Community Outreach Manager.

22.4.10 Construction Access and Haul Routes

Provide all construction roads required for delivery or removal of fill, asphalt, concrete, Bridge girders, and all other materials required for the Work. It is the responsibility of the Section Developer to obtain all necessary permits from all applicable agencies for construction, maintenance, and removal of temporary roadways, including construction or haul roads.

MDOT will allow construction traffic to cross roadways intersecting with the Phase as long as the crossing is maintained within the ROW. Proper flagging procedures or temporary traffic signals are required to facilitate construction traffic crossing local roadways. Ensure delays incurred to local roadways as a result of at-grade crossing operations do not exceed the mobility thresholds defined in these Technical Provisions or as accepted by MDOT.

22.4.11 Emergency Response

Cooperate with the Maryland State Police, local law enforcement, and other first responders in their response to crashes, fires, spills, or other situations in any area affected by the Work, including those on the construction Site and on traffic lanes open to the public. Cooperate in all MDOT investigations of crashes and other Incidents along the Phase. Work with first responders and address their concerns about access, which may include installing dedicated entrance points with gates to allow first responders to access roadways within the Phase.

22.4.12 Monitoring of Maintenance of Traffic

Monitor queues and delays during MOT operations. If the mobility thresholds defined in these Technical Provisions or as accepted by MDOT are exceeded, modify the MOT Plans, or incorporate other mitigation strategies to reduce the queues and delays below the threshold levels. All proposed changes shall be submitted and are subject to review and acceptance by MDOT.

22.5 Temporary Traffic Control Devices

All items for the MOT shall be maintained crashworthy in conformance with National Cooperative Highway Research Program ("NCHRP") Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features" or the AASHTO Manual for Assessing Safety Hardware. When conformance with NCHRP Report 350 is required, the manufacturers' certifications that the devices comply with the specified criteria shall be reviewed by the Section Developer and approved in writing, and copies of the certifications and approvals shall be provided to MDOT. All temporary traffic control products and devices, including temporary pavement markings, shall be compliant and maintained in conformance with the applicable standards and references of the performance requirements.

22.6 Work Zone Vehicle Conspicuity and Lighting

At a minimum, all Phase Developer vehicles entering the work zones shall be provided with lighting and reflective striping meeting the requirements of MDOT SHA Standards No. 104.01-18A and No. 104.01-18B.

22.7 Law Enforcement Officer with Patrol Car

Use Maryland State Police Officers in marked patrol vehicles, or other local law enforcement if on a non-state roadway, for MOT activities to raise motorist awareness in the work zone and to provide enforcement. The use of Maryland State Police Officers in marked patrol vehicles or other local law enforcement shall be contracted at no cost to the State. Law enforcement officers shall be used for the following operations:

- short intermittent (15 minute) road closures for Bridge and other structure erection or demolition;
- during MOT phase changes where the temporary roadway configuration is switched from one configuration to another;
- on-site during the next peak hour travel period following a MOT phase change; and
- other operations as determined by the Phase Developer.

22.8 Oversized and Overweight Vehicles

The MOT design shall accommodate (not restrict) any vehicles with respect to weight, height, width, or length currently permitted within the construction limits, unless an existing oversized or overweight vehicle restriction is already in place. This shall include accommodating oversized or overweight vehicles currently permitted within the construction limits through MDOT hauling permits. Oversized and overweight vehicles shall not be detoured to routes with oversized or overweight vehicle restrictions already in place. Any temporary modifications to oversized and overweight vehicle restrictions the Section Developer requests shall be submitted and are subject to review and acceptance by MDOT T and any other AHJ. If a temporary modification is accepted by MDOT and any other AHJ, the Public Relations Coordinator shall provide 60 days' notice to the public prior to the modification being implemented.

22.9 Traffic Control Staffing

22.9.1 Design

Provide a Traffic Control Design Manager to oversee the development of the TCPs and the preparation of the TMP and be the point of contact for issues arising relative to the MOT design. The Traffic Control Design Manager shall have the following qualifications:

- a minimum of ten years' of demonstrated practical experience including large and complex highway and transportation projects;
- be capable of demonstrating working knowledge of traffic signal timing, TCDs, MOT phasing, signing and marking design, construction traffic control on various functional classification roadways, work zone layout and safety, MUTCD, various traffic simulation, and optimization modeling methods and principal arterial roadway management techniques;
- licensed as a Professional Engineer in the State of Maryland; and
- a Professional Traffic Operations Engineer (PTOE®).

The Traffic Control Design Manager position must be filled for the duration of the Section D&C Work; the Person holding such position is expected to be on-site in the Section Office as needed to perform the required duties and be committed as needed to perform the required duties.

22.9.2 Construction

Provide a Traffic Control Construction Manager on-site whose sole responsibility is to supervise and continuously monitor the installation and maintenance of all TCDs. The Traffic Control Construction Manager shall have the following qualifications:

- a minimum of 15 years' experience in construction including large and complex highway and transportation projects, with preferably at least one project in Maryland;
- a minimum 10 years of experience providing traffic control services on projects of a similar complexity;
- an American Traffic Safety Services Association Traffic Control Supervisor certification; and
- excellent communications skills, community outreach skills and experience presenting to and interacting with the public.

The Traffic Control Construction Manager position must be filled for the duration of the Section D&C Work; the Person holding such position is expected to be on-site in the Section Office and be committed full time. Qualifications shall be subject to review and acceptance by MDOT. If a replacement is needed to fill the position, the qualifications for the replacement shall be submitted and are subject to review and acceptance by MDOT.

The duties of the Traffic Control Construction Manager include:

- implementing the TCP, maintaining up-to-date TCPs, and providing a copy to MDOT following any revisions;
- directing traffic changes to ensure safe and continuous traffic flow and directing traffic operations after a traffic Incident has occurred;
- being available at all times and being on-site within a ½ hour throughout the duration of the Work;
- documenting all daily maintenance of the traffic control setups, including but not limited to maximum queue lengths/delays, work zone modifications, Incidents, and suggested improvements;
- closely coordinating the operations with MDOT and supervising the MOT, including operations and MOT involving subcontractors;
- making on-site Inspections of the area affected by the work on a regular basis including Saturdays, Sundays, and holidays, and be available for consultation at all times;
- making daily Inspections during hours of operations and at least one-night Inspection per week and additional Inspections, if requested when the TCP is in place;
- conduct surveillance of any area affected by the Work during non-Work periods such as holidays;
- maintaining a daily log of the Inspections to include the date, time, hours worked, condition of MOT, and any corrective action taken
- furnishing a copy of the daily log to MDOT by the following Business Day;
- providing coordination between adjacent work zone operations to ensure inappropriate or conflicting messages or devices are not displayed to traffic;
- ensuring that TCPs are coordinated with all planned construction activities and are coordinated with other Work;
- communicating TCPs and the TMP to the Public Relations Coordinator;
- notifying MDOT immediately of any accident or Incident within the area affected by the Work; and
- making Inspections during and immediately after adverse weather conditions to ensure the TCDs are clean, undamaged, and in the correct position.

Any failure of the Traffic Control Construction Manager to perform the required duties will be grounds for MDOT requesting a replacement.

22.10 Lane Closure Hour Restrictions

Adhere to the lane closure hour restrictions indicated in the Lane Closure Hour Restriction tables provided below unless prior written consent is obtained from MDOT and the AHJ over the roadway in question. Written approval of a change to the Lane Closure Hour Restriction tables

in accordance Exhibit 6 Article 22 (Maintenance of Traffic) Section 22.10.2 (Request for Additional Lane Closure Hours) will result in a modification to the Lane Closure Hour Restriction tables below. Failure to adhere to the Lane Closure Hour Restrictions (including approved modifications) will result in the assessment of Lane Closure Liquidated Damages against the Section Developer according to the rules set forth in the Section P3 Agreement.

22.10.1 Lane Closure Hour Restrictions

Lane closures are not permitted on the holidays, or Business Days before and after the following holidays:

- New Year's Day, January 1;
- Martin Luther King, Jr.'s Birthday, the third Monday in January;
- Inauguration Day;
- President's Day, the third Monday in February;
- Good Friday;
- Easter Weekend;
- Memorial Day, the last Monday in May;
- Independence Day, July 4;
- Labor Day, the first Monday in September;
- Columbus Day, the second Monday in October;
- Veterans Day, November 11;
- Thanksgiving Day, the fourth Thursday in November; and
- Christmas Day, December 25.

Lane closures shall only be permitted during the hours shown in the following tables for each respective roadway. Long-term lane closures or shoulder closures (hard closures using temporary barrier) will be permitted outside of the days noted above and hours noted below, subject to review and acceptance of the Section Developer's work zone traffic analysis, MOT, and TCPs by MDOT or other AHJ.

Short-term shoulder closures (soft closures using drums or other short-term channelizing device) are only permitted during hours when single lane and two-lane closures are permitted for each respective roadway. Temporary, intermittent 15-minute roadway closures are permitted during the nighttime on Monday through Thursday, from 10:00 PM through 5:00 AM or as approved by the AHJ.

Table 22-5 - Lane Closure Hours - Category 1 - Interstates and Other Expressways/Freeways - Single Lane Closures

Daytime Monday – Friday/Nighttime Sunday - Thursday

Location	Hours																							
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
I-495																								
I-495 Inner Loop from Virginia State Line to MD 355	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✓	✓	✓
I-495 Outer Loop from Virginia State Line to MD 355	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✓	✓	✓
I-270																								
I-270 SB from I-370 to I-270 Spur	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✓	✓	✓
I-270 East Spur EB from I-270 Spur to I-495	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✓	✓	✓
I-270 West Spur SB from I-270 Spur to I-495	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✓	✓	✓
I-270 NB from I-270 Spur to I-370	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✓	✓	✓
I-270 East Spur WB from I-495 to I-270 Spur	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✓	✓	✓
I-270 West Spur NB from I-495 to I-270 Spur	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✓	✓	✓
I-270 SB from Jefferson Street to s/o MD 80	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓
I-270 SB from south of MD 80 to Montgomery County line	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓
I-270 NB from Montgomery County line to south of MD 80	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓
I-270 NB from south of MD 80 to Jefferson Street	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓
I-370																								
I-370 WB from Shady Grove Rd to I-270	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✓	✓	✓
I-370 WB from I-270 to Washingtonian Blvd	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✓	✓	✓
I-370 EB from Washingtonian Blvd to I-270	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✓	✓	✓
I-370 EB from I-270 to Shady Grove Rd	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✓	✓	✓
Clara Barton Parkway																								
Clara Barton Pkwy EB from Carderock to I-495	✓	✓	✓	✓	✓	✓	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓
Clara Barton Pkwy EB from I-495 to Cabin John Pkwy	✓	✓	✓	✓	✓	✓	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓
Clara Barton Pkwy WB from Cabin John Parkway to I-495	✓	✓	✓	✓	✓	✓	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓
Clara Barton Pkwy WB from I-495 to Carderock	✓	✓	✓	✓	✓	✓	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓
Cabin John Parkway																								
Cabin John Pkwy EB from I-495 to Clara Barton Parkway	✓	✓	✓	✓	✓	✓	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓
Cabin John Pkwy WB from Clara Barton Parkway to I-495	✓	✓	✓	✓	✓	✓	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓
I-70																								
I-70 WB and EB between Monocacy Riv. to Exit 49	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓

✓ Indicates lane closure allowed.
✗ Indicates lane closure not allowed.

Table 22-6 - Lane Closure Hours - Category 1 - Interstates and Other Expressways/Freeways - Two-Lane Closures

Nighttime Sunday - Thursday

Location	Hours																							
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
I-495																								
I-495 Inner Loop from Virginia State Line to I-270 West Spur	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓
I-495 Inner Loop from I-270 West Spur to MD 355	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓
I-495 Outer Loop from Virginia State Line to I-270 West Spur	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓
I-495 Outer Loop from I-270 West Spur to MD 355	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓
I-270																								
I-270 SB from I-370 to I-270 Spur	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓
I-270 East Spur EB from I-270 Spur to I-495	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓
I-270 West Spur SB from I-270 Spur to I-495	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓
I-270 NB from I-270 Spur to I-370	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓
I-270 East Spur WB from I-495 to I-270 Spur	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓
I-270 West Spur NB from I-495 to I-270 Spur	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓
I-70																								
I-70 EB - Frederick	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓
I-70 WB - Frederick	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓

✓ Indicates lane closure allowed.
✗ Indicates lane closure not allowed.

Table 22-7 - Lane Closure Hours - Category 2 - Arterials - Single Lane Closures
Daytime Monday – Friday/Nighttime Sunday – Thursday

Location	Hours																							
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
MD 190	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✓	✓	✓	✓
MD 355	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✓	✓	✓	✓
Shady Grove Road	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✓	✓	✓	✓
MD 28	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✓	✓
MD 189	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✓	✓
Montrose Road	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✓	✓
MD 187B	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✓	✓	✓	✓
MD 187	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✓	✓	✓	✓
Democracy Boulevard	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✓	✓	✓	✓
Westlake Terrace	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✓	✓	✓	✓
MD 117	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
MD 124	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
Middlebrook Road	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
MD 118	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
MD 27	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
MD 121	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
MD 109	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
MD 80	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
MD 85	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓

✓ Indicates lane closure allowed.
✗ Indicates lane closure not allowed.

Table 22-8 - Lane Closure Hours - Category 3 - Other Roadways - Single Lane Closures
Daytime Monday – Friday/Nighttime Sunday – Thursday

Location	Hours																							
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Two-Lane																								
MacArthur Boulevard	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
Persimmon Tree Road	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
Seven Locks Road	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
MD 191 (Bradley Boulevard)	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✓	✓	✓
Greentree Road	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
Fernwood Road	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
Grosvenor Lane	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
Tuckerman Lane	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
Game Preserve Road	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
W Old Baltimore Road	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
Comus Road	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
Dr. Perry Road	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
Park Mill Road	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
Baker Valley Road	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
Multi-Lane																								
Wootton Parkway	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✓	✓	✓
Gude Drive	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✓	✓	✓
Muddy Branch Road	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
New Design Road	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗

✓ Indicates lane closure allowed.
✗ Indicates lane closure not allowed.

22.10.2 Request for Additional Lane Closure Hours

The Section Developer may submit a request to MDOT to perform lane closures outside of the hours permitted by the Lane closure Hour Restrictions. The Section Developer's request shall include a description of the activity requiring the request, the duration of the anticipated lane closure, a commitment for the Section Developer to complete the activity within the planned closure duration as well as supporting traffic analysis demonstrating the viability of the request. MDOT or the AHJ will review and approve the Section Developer's request. Any additional TCPs and mitigation strategies to minimize impacts of the extended work hours, as directed by MDOT, are the responsibility of the Section Developer.

The Section Developer and MDOT shall collaborate on a format for the Section Developer to use when requesting additional lane closure hours.

MDOT will monitor traffic during extended lane closure hours and reserves the right to add additional restrictions or terminate extended lane closure hours early. Acknowledge that instances will arise where the Section Developer may not be allowed to implement an acceptable lane closure during hours the lane closures would normally be permitted per the Lane Closure Hour Restrictions in this Exhibit 6 Article 22 (Maintenance of Traffic) because of special events or due to unforeseen circumstances beyond MDOT's or the AHJ's control. Be aware of the increased traffic demand during these special events or unforeseen circumstances and be compliant with MDOT's requests during these times. The Section Developer's construction activities or lane closures impacting traffic during these times may be stopped early or not allowed to proceed. Special events or unforeseen circumstances may include, but are not limited to:

- motorcades;
- special events with regional impact;
- sports events with regional impact;
- major Incidents with regional impact;
- holiday or seasonal traffic patterns; and
- natural or other disasters with regional impact.

22.10.3 Lane Closure Hour Restriction Modifications

In the Section P3 Agreement MDOT reserves the right for the term of the Section P3 Agreement to modify (expand or reduce) the lane closure hour restrictions indicated in this Exhibit 6 Article 22 (Maintenance of Traffic) due to changes in traffic patterns, events, construction impacting roadways, traffic patterns within the Work limits, Incidents, or other unforeseen circumstances impacting traffic. The Section Developer may also request to modify the lane closure hour restrictions or to expand the hours when lane closures are permitted. If the Section Developer wishes to modify the lane closure hour restrictions, the procedures outlined below shall be followed. If more current or applicable methodologies, guidelines, or mobility thresholds are available at the time of the Section Developer's request to modify the lane closure hour restrictions, the Section Developer may present these with their request. In addition to performing the lane closure analysis, other considerations like safety of the lane closure, impacts to adjacent communities, noise generated during lane closures, etc., will be considered in the evaluation of the request. Be aware there is no guarantee requests to modify lane closure hours will be accepted, even if the modification request demonstrates minimal impacts; final acceptance of the Section Developer's request to modify the lane closure hour restrictions shall reside with MDOT.

Freeway and Interchanging Cross-Street Lane Closure Hour Restrictions modification procedure:

- obtain traffic counts within the last 6 months for the roadway segment being considered such as 24-hour vehicle detector data, 48-hour tube counts, or similar;
- determine the analysis year in coordination with MDOT and other AHJ, as applicable;
- determine appropriate traffic growth rate assumptions and develop traffic volumes for the analysis year;
- perform analysis using the following methodologies:
 - freeway analysis shall be performed with the Lane Closure Analysis Program developed by University of Maryland; and
 - interchanging cross-street analysis shall be performed with Synchro software as produced by Trafficware;
- compare the results to the applicable mobility thresholds; and
- submit a detailed analysis memorandum documenting the purpose and need, methodology, assumptions, results, and any other factors for consideration to MDOT and other AHJ, as applicable.

Two-Lane or Multi-lane Overpass/Underpass Roadway Lane Closure Hour Restrictions modification procedure:

- obtain traffic counts within the last 6 months for the roadway segment being considered. 24-hour vehicle detector data, 48-hour tube counts, or similar;
- determine the analysis year in coordination with MDOT and other AHJ, as applicable;
- determine appropriate traffic growth rate assumptions and develop traffic volumes for the analysis year;
- based on the lane configuration of the overpassing/underpassing roadway (two-lane or multi-lane), perform analysis using the following methodologies:
 - Two-Lane Roadway – National Cooperative Highway Research Program Project 03-107 or delay time vs. cycle length comparison; and
 - Multi-lane Roadway – FHWA Methodology
- submit a detailed analysis memorandum documenting the purpose and need, methodology, assumptions, results, and any other factors for consideration to MDOT and other AHJ, as applicable.

22.10.4 Lane Closure Permits and Notification Requirements

A lane/shoulder closure permit request form is required for each lane or shoulder closure and must be submitted to the local MDOT SHA District Office or other AHJ. Lane closures will not be allowed without an approved written closure request. Contact and notify MDOT (or AHJ for non-state roadways) 30 minutes prior to initiating all lane closures and after removing all lane closures. No lane closures are permitted on MDOT roadways without an approved lane closure permit from the local MDOT SHA District Office.

Contact and notify MDOT (or AHJ for non-state roadways) with as much notice as possible for any closure scheduled but is no longer needed. This notice shall apply for any closure requested, whether it has or has not already been accepted by MDOT (or AHJ for non-state roadways).

The lane/shoulder closure permit request form will be provided by MDOT and shall be submitted electronically. The information provided on or attached with the form shall include:

- the MDOT contract number;
- the roadway name or state route number;
- the direction of closure;
- the limits of the work zone;
- the duration of the closure;
- how many lanes are planned to be closed in the closure;
- the specific lane(s)/shoulder(s) to be closed;
- the number of lanes/shoulders on roadway which will remain open during the closure;
- specific ramp(s) to be closed and accepted detours;
- TCPs or appropriate MDOT typical application;
- the nature of work being performed and justification for the use of a lane/shoulder closure;
- contact information for field Inspection and construction supervising personnel;
- the planned use of law enforcement officers; and
- any other pertinent information that may be needed to clarify the lane/shoulder closure request.

Lane/shoulder closure permit request forms shall be submitted to allow time for review and advance notification of the lane/shoulder closure prior to the planned start of the Work. Closures are of the following types:

- Type 1 - Closures of an interstate, arterial or local street; traffic switches; new road openings; changed traffic patterns
- Type 2 - A lane closure having significant impact on traffic, such as temporarily stopping traffic completely (traffic drags), closing two (2) or more lanes
- Type 3 – A lane closure having a minor impact on traffic, such as closing lanes during allowable times
- Type 4 – A shoulder closure

Type 1 and 2 requests will require an extensive media and Stakeholder notification effort and coordination among various local and state agencies. Assist the Public Relations Coordinator with preparing all notifications and cooperate with MDOT for all coordination efforts.

Table 22-9 - Lane Closure Permit Request Review and Public Notification Requirements

TYPE OF LANE CLOSURE REQUEST	APPROXIMATE DAYS FOR MDOT SHA ACCEPTANCE OF LANE CLOSURE PERMIT REQUEST	MINIMUM DAYS ADVANCE NOTIFICATION OF LANE CLOSURE TO PUBLIC*
1	45	30
2	45	10

TYPE OF LANE CLOSURE REQUEST	APPROXIMATE DAYS FOR MDOT SHA ACCEPTANCE OF LANE CLOSURE PERMIT REQUEST	MINIMUM DAYS ADVANCE NOTIFICATION OF LANE CLOSURE TO PUBLIC*
3	21	7
4	14	3

*All advance notification of lane closure to public periods exclude weekends and holidays.

22.11 Traffic Control Plans

TCPs shall be developed for each major phase of construction requiring modification or diversion from existing traffic configurations and operations. The TCPs shall be site-specific for each separate portion of Work and shall not simply reference typical drawings, taper tables, or illustrations in various federal or MDOT standards. Deliverable content will be developed in coordination between the Phase Developer and MDOT. The following outlines general expectations of MDOT:

- a description and depiction of the MOT phase with respect to lane, ramp, or road closures and proposed detour routes;
- the sequence of construction and MOT activity notes;
- changes to signal timing Plans;
- temporary roadway and striping Plans;
- Plans for any off-site modifications to local roads to accommodate detoured or diverted traffic including restoration Plans to return the Site to preconstruction condition;
- appropriate channelizing devices and barrier locations with spacing and type of barricades;
- all temporary TCDs necessary to safely and efficiently construct a particular portion of Work;
- motorist information and guidance;
- temporary signing, signal, and lighting Plans;
- sequence of construction for the drainage system, ESC, and SWM;
- specific sign messages with sign sizes, spacing or referenced distances, and MD MUTCD sign designations;
- details for all proposed non-standard MD MUTCD signs;
- proposed phased construction of permanent signing;
- proposed phased construction of traffic signals;
- proposed phased construction of lighting systems;
- proposed phased construction of ITS and the ETCS;
- specific and clear pavement marking changes with respect to lane widths and pavement marking material, color, location, and widths and include dimensions necessary to assure proper installation of the pavement markings;
- flagging locations; and
- Emergency response information.

22.12 Deliverables

Table 22-10 – Maintenance of Traffic Submittals

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
TMP	Before beginning TCP development
TMP updates	As required based on the progress of the Work
TCPs	In accordance with the proposed schedule for the pertinent portion of the Work
Baseline conditions	Prior to conducting work zone traffic analysis
Work zone traffic analysis	With the pertinent TCP Deliverable
Access and Mobility Plan	With the first TCP Deliverable
Contingency Plan	With the first TCP Deliverable
Incident Management Plan	With the first TCP Deliverable
Implementation and Monitoring Plan	With the first TCP Deliverable
Traffic Control Construction Manager qualifications	With the Committed Section Proposal
Lane/shoulder closure permit request form	For each requested lane or shoulder closure

ARTICLE 23. Construction

23.1 Scope

The Section Developer is responsible for the complete construction of the Work, including all costs and expenses and any furnishing, fabricating, transporting, installing, testing and inspecting of the Work needed. The Work includes providing all tools, equipment, labor or materials needed to provide the complete construction of the Section.

23.2 Coordination

In concert with all other provisions of the Agreement, the Section Developer is responsible for coordinating all Construction operations, which includes but is not limited to any planning, execution, testing and inspection of temporary and permanent Construction Work. The Section Developer is solely responsible for determining and effecting all coordination activities with MDOT, other Governmental Entities, Railroads, Utility Owners, and third parties as necessary to accomplish all Construction Work. Document all such coordination activity and share that documentation with MDOT upon request.

23.3 Mobilization and Demobilization

Submit a written Mobilization Plan to MDOT within 90 days after Section P3 Agreement execution. The Mobilization Plan shall be updated and submitted monthly until MDOT and the Section Developer mutually agree the Section Developer is mobilized for the Work. The Mobilization Plan is not intended to represent in detail the periodic mobilization of lower-tier subcontractors or Suppliers who provide varying types of service, especially those services not required at the outset of the Work. Include in the Mobilization Plan:

- names of construction subcontractors;
- names of material Suppliers, haulers, and vendors;
- the Work location for each entity;
- contact information for each entity;
- the scope of work for each entity; and
- the expected duration of engagement for each entity.

The Mobilization Plan shall include any design services the Section Developer will perform.

Submit a written Demobilization Plan to MDOT 180 days prior to Substantial Completion. The Demobilization Plan shall include details indicating the timing and restoration of the Section to the original or better state as when the Section Developer mobilized. Restore all areas of the Section to a state acceptable to MDOT. This includes, but is not limited to, the removal of all rubble, trash, stockpiled soil and rock, equipment, debris, ESC, signs, cones, barrels, concrete barriers, and any other material MDOT deems to be associated with the construction of the Section.

23.4 Staging

Submit, subject to review and acceptance by MDOT, any request to use ROW for construction staging purposes not already designated for use as a Section staging area. The request shall be a complete submission of all details including, but not limited to, the location, limits, access, usage purpose, and all other aspects of the need and intent for the usage of the location. All staging area requests within the ROW shall include a traffic study indicating ingress to and egress from the staging area has been designed to allow for safe access to the staging area without negatively impacting the traffic operations or safety.

23.5 Phase and Section Offices

23.5.1 Co-location for Predevelopment Work

To facilitate a cooperative and collaborative approach to the P3 Program, the Phase Developer shall Plan and implement co-location with MDOT for both the Predevelopment Work and the Section Work. Office space for the Predevelopment Work (“the Phase Office”) shall be established as soon after the Effective Date as practical, and that the majority of the Predevelopment Work, discussions and collaboration will take place in the Phase Office.

The Phase Developer shall select a location, size, and configuration for the Phase Office, which will foster the collaborative relationship required for the successful completion of the Predevelopment Work. In general, the Phase Office shall:

- be Class B or better office space;
- be located in Maryland in close proximity to the First Section of the Phase;
- provide dedicated office space in both hard-walled offices and dedicated cubicles for [number TBD]³ MDOT staff and consultants;
- provide [number TBD] of shared drop-in cubicle space equipped for short-term use (i.e., monitors and a laptop docking station) for shared use with the Phase Developer;
- be furnished appropriately including chairs, desks, file cabinets, tables, bookcases, etc.;
- include sufficient conference rooms with dedicated audio/visual and presentation capabilities for the total staff in the Phase Office (including # rooms dedicated to MDOT's sole use);
- have the required technology including office internet and Wi-Fi; speakerphones, monitors/projectors in the conference rooms; computer network capability for plotters and printers, etc.;
- be secure, safe and properly climate-controlled;
- have sufficient restroom and break room facilities for the number of staff working from the Phase Office;
- include janitorial service and maintenance of the facility; and
- provide sufficient parking for all staff and guests at no cost to the State.

³ The number of offices and cubicles required will be determined during Predevelopment but are likely to need to accommodate approximately 30 to 40 MDOT staff. A requirement for a physical office may require that the current Covid-19 restrictions are no longer in force.

23.5.2 MDOT Facilities for Section Work

For Section Work, provide office facilities (“the Section Office”) sufficient for the Section Developer’s staff, MDOT staff, and any temporary or visiting staff. The requirements for the Section Office shall be developed in collaboration with MDOT during the Predevelopment Work.

23.6 Control of the Work

Except as herein elsewhere provided, until Final Completion, take every reasonable precaution against injury or damage to any part thereof by weather or natural events, or from any other cause, whether rising from the execution or from the nonexecution of the Work.

The Section Developer, except as herein elsewhere provided, shall rebuild, repair, restore, and make good all damages to any portion of the Work occasioned by any of the above causes before Final Completion and shall bear the expense thereof. Material lost, or structures damaged during construction, or the action of the weather shall be replaced or repaired by the Section Developer at no cost to the State (except to the extent of any applicable Compensation Event). Make good or replace at its own expense (except to the extent of any applicable Compensation Event) and as required any MDOT furnished material which may be broken, lost through fire, theft, or otherwise damaged, or in any way made useless for the purpose and use intended subsequent to delivery to the Section Developer by MDOT and prior to Final Completion of the Work even though such breakage, damage, loss or uselessness may result from causes beyond the control of the Section Developer.

In case of Suspension of Work, be responsible for maintenance and shall take such precautions as may be necessary to prevent damage to the work, provide for normal drainage, and shall erect any necessary temporary structures, signs, or other facilities. During such period of suspension of work, properly and continuously maintain in an acceptable growing condition all living material in newly established plantings, seedings, and sodding furnished under this Agreement, and shall take adequate precautions to protect new growth and other important vegetative growth against injury.

23.6.1 Maintenance of Work

Maintain the Work in a continuous and satisfactory manner. If the IQF or MDOT determine at any time the Work is not being maintained, immediately remedy the situation. Maintain the Work so as not to impede or damage any existing Assets. Provide for the safety and convenience of the general public, the residents and businesses along the roadways, and the protection of Persons and property. Keep the portions of the Section being used by the public, free from irregularities, defects and obstructions presenting a hazard or annoyance to traffic.

Maintain drainage Assets, both permanent and temporary. Use all reasonable precautionary measures to avoid damage or loss that might result from accumulations and concentrations of drainage water and material carried by such water. Such drainage shall be diverted or removed when necessary to prevent damage to excavation, embankments, surfacing, structures, or property. Suitable measures shall be taken to prevent the erosion of soil in all construction areas where the existing ground cover has been removed.

Existing MDOT CHART ATMS devices shall remain operational during construction unless otherwise accepted by MDOT. These TMS devices include but are not limited to CCTV cameras, DMS, ramp metering, detection, mile markers, roadway lighting, and weather stations.

23.6.2 Inspection of the Work

The Section Developer shall conduct quality control measures as the Work advances. The IQF shall provide quality assurance reviews of the Section Developer's Work. Quality control and quality assurance shall be performed in conformance with the QMP and the Section P3 Agreement.

All materials, and each part or detail, of the Work shall be subject to Inspection. The Section Developer will be held in strict compliance with all material, workmanship, and the diligent execution of the Work in accordance with the Section P3 Agreement. Such Inspection may include mill, plant, or shop Inspection, and any material furnished for the Work is subject to such Inspection. The IQF shall be allowed access to all parts of the Work and shall be furnished with such information and assistance by the Section Developer as is required to make a complete and detailed Inspection. Upon request by the IQF, the Section Developer, at any time before acceptance of the Work, shall remove or uncover such portions of the finished Work, as may be required to determine compliance with the conditions of the Section P3 Agreement. After examination, restore said portions of the Work to the standards required. When the United States Government, any Railroad, corporation, Governmental Entity, third party or other agency is deemed by MDOT to have Inspection rights, their respective representatives shall have the right to inspect the work and the Section Developer shall cooperate fully with their respective representatives.

23.6.3 MDOT Right to Inspect the Work

MDOT will perform quality verification and independent audits of the Work. Audits may be conducted on any aspect of the Work at any time and will be of a form and a frequency as determined by MDOT. MDOT shall be allowed access to all parts of the Work and shall be furnished with such information and assistance by the Section Developer as is required to make a complete and detailed quality verification or audit. Upon request by MDOT, the Section Developer shall remove or uncover such portions of the finished Work as may be required to determine compliance with the conditions of the Section P3 Agreement as part of the quality verification or audit. After examination, restore said portions of the Work to the standards required.

23.6.4 Removal of Non-Compliant or Unauthorized Work

The QMP must indicate how Work not conforming to the requirements of the Section P3 Agreement is promptly identified by the Section Developer, MDOT or the IQF. Such Work shall be designated as non-compliant and unless initially identified by MDOT, shall be reported to MDOT within 5 days of identification. The Section Developer shall remedy the non-compliant Work within 30 days of the IQF's disposition of the non-compliant work report.

If the Section Developer fails to comply promptly with any order of the IQF or MDOT regarding a remedy for non-compliant Work, the MDOT or the IQF shall have the authority to cause non-compliant Work to be remedied or reconstructed. If the Section Developer fails to exercise the appropriate oversight of the quality of the Work within the Section with regards to the remedy of defective, deficient, or non-conforming Work, or the prevention of such defective, deficient, or nonconforming Work from re-occurring, MDOT or the IQF shall have the right to stop or suspend the affected Work until such time the defective, deficient, or non-conforming Work is remedied.

23.7 Control of Materials

All materials shall meet all quality requirements of the Section specifications, the RFC Plans and the Section P3 Agreement. In order to expedite the Inspection and testing of the materials, advise the IQF of the need for acceptance testing, approvals or Inspections so as not to impede the progress of the Work.

23.7.1 Storage and Handling of Material

Materials shall be stored as to assure the preservation of their quality and acceptability for the Work. Stored materials, even though examined before storage, may again be inspected and verified prior to their use in the Work. Stored materials shall be located so as to facilitate their prompt Inspection or verification. Portions of the Section may be used for storage purposes upon acceptance by MDOT and for the placing of the Section Developer's equipment; such storage areas must be restored to their original condition, or better. Any additional space necessary for material storage or staging shall be provided by the Section Developer.

Materials shall be handled in such a manner as to protect the surrounding community and environment. The Section Developer is responsible for all permits and approvals for hauling of oversized or overweight loads.

23.7.2 Materials Tracking Log

Be responsible for maintaining an accurate and complete Materials Tracking Log. The log shall track all information related to the source, handling, testing, dates of shipment and receipt, acceptances, etc. of all material used within the Section.

Promptly remove any material used for the Work determined to be unacceptable or non-conforming. The conformance of all material used on the Section shall be tracked in the Materials Tracking Log.

Submit by the 10th of each month the updated and current Materials Tracking Log for the period ending the month prior.

23.7.3 Unacceptable Material

Materials represented by samples taken and tested in accordance with the specified tests, and failing to meet required values, shall be non-conforming regardless of prior tests or acceptances. If materials are used, or Work is performed without following the relevant QMP, MDOT or the IQF shall require the Section Developer to remove and replace non-conforming Work or material. Abide by the relevant QMP in terms of correcting defective, deficient, or non-conforming Work. Prior to the addition of any new Work being constructed on or adjacent to defective, deficient, or nonconforming Work, any such defective, deficient, or non-conforming Work not completely replaced or otherwise remains in place must be acceptable to the IQF and is subject to review and acceptance by MDOT. Acceptance or nonacceptance of non-conforming Work will be given by MDOT within fifteen Business Days of Submittal to MDOT.

Where non-conforming material can be corrected, the Section Developer shall remove the non-conforming Work and replace with Work meeting the requirements of the Section P3 Agreement. If the non-conforming Work cannot be rectified by removal and replacement, the Section Developer shall propose such corrective action subject to review and acceptance by MDOT.

MDOT may accept the corrective action but, in so doing, does not assume responsibility for the success thereof. Retest the material as necessary to determine the acceptability of the material after corrective measures have been taken. The cost of replacing, correcting and removal of non-conforming material shall be the responsibility of the Section Developer. The cost of repairing or replacing other materials damaged by the installation, correction and removal of non-conforming materials shall be the responsibility of the Section Developer.

23.7.4 Existing Material

Validate through testing that any salvaged existing material meets all requirements of the Agreement. With the acceptance of the IQF and concurrence by MDOT, any excavated stone, gravel, sand, or other material conforming to the requirements of the Agreement may be reused in the permanent Work. Replace with other acceptable material all the portion of the excavated material removed and used which was needed for use in the embankments, backfills, and approaches or otherwise. Do not excavate nor remove any material which is not within the limits of excavation, as indicated by the slope and grade lines, without authorization from the IQF.

23.7.5 MDOT Furnished Material

Furnish all material required to complete the Work, except those items specified to be furnished by MDOT. Materials furnished by MDOT will be made available to the Section Developer as specified in the Section P3 Agreement and these Technical Provisions. Secure MDOT furnished items at the discretion of MDOT and from the MDOT-specified location. Make good any shortages or deficiencies of material, from any cause whatsoever, and for any damage which may occur after such delivery. In cases where materials are supplied by MDOT and incorporated into the Work by the Section Developer, materials Inspection and acceptance shall be the same as for any Section Developer supplied material, unless otherwise noted in writing by MDOT.

23.8 Shop and Working Drawings

The design shall be supplemented by shop or working drawings as necessary to adequately control the Work. Working drawings shall show details of all structures, lines, grades, typical cross section of roadway, general cross sections, location, and designation of all units and Elements. The Section Developer shall provide all required working drawings and shall have them adequately checked, after which they shall be reviewed by the Section Developer's designer responsible for that portion of the Work. No items involving the drawings shall be incorporated into the work until the IQF has accepted the drawings for use.

All shop or working drawings shall be clearly marked with the Elements of the Work to which they pertain, show a date on the drawing and the status of revisions, if any.

Falsework systems (design, Plans, and construction) shall be prepared by a professional engineer registered in the State of Maryland or Commonwealth of Virginia as applicable to the location of the Work, who has at least five years' experience in falsework design. The falsework design calculations and Plans shall be signed by the PE and bear the seal of the PE.

23.9 Demolition

Provide a comprehensive Demolition Plan as part of the **SMP**. The Demolition Plan shall address the Section Developer approach to demolishing all existing Assets within the Section. The Demolition Plan shall include:

- identified Asset(s);
- location;
- method of demolition;
- material handling and removal;
- date of demolition; and
- protection of surrounding work.

The Demolition Plan shall be updated monthly to reflect current activities. After demolition, completely remove all demolished material. Demolished material may not be abandoned within Section limits and shall be disposed of properly. The Phase Developer is responsible for all permits and approvals for hauling and demolition operations.

No blasting may occur without the specific acceptance of MDOT. A Blasting and Vibration Monitoring Plan shall be submitted in accordance with Exhibit 6 Article 9 (Geotechnical Engineering). If blasting is accepted by MDOT, the following conditions apply:

- all blasting operations, including the storage and handling of explosives and blasting agents, shall be performed in conformance with the applicable provisions of the Agreement and Applicable Laws;
- all explosives shall be stored in a secure manner, and all storage places shall be marked clearly "DANGEROUS EXPLOSIVES" and shall be in the care of competent watch-persons at all times;
- whenever explosives are used, they shall be of such character and in such amount as is permitted by the federal, state and local laws and all respective AHJ; and
- the use or storage of explosives will not be permitted under, adjacent to, or on any existing structures unless authorized in writing by MDOT.

At least 60 days prior to commencing blasting operations, or any time the Section Developer proposes to change the blasting methods, submit a Blasting and Vibration Monitoring Plan to the IQF. The Blasting and Vibration Monitoring Plan shall contain the full details of the blasting patterns and controls the Section Developer proposes to use. The Blasting and Vibration Monitoring Plan Submittal is for quality control and record-keeping purposes. Acceptance of the use of the blasting by the IQF and MDOT shall not relieve the Section Developer of the responsibility for the accuracy and adequacy of the Plan when implemented in the field. If at any time during the progress of the Work the method of blasting does not produce the desired result, submit a revised Blasting and Vibration Monitoring Plan until a technique is developed to produce the desired results.

Before firing any blast, the rock to be blasted shall be covered with blasting mats. Notify each utility having Assets within 500 feet of the blast location. This notice shall be given sufficiently in advance to enable the utility to communicate to the Section Developer any steps they may deem necessary for the Section Developer to protect the property from damage. This notice shall not relieve the Section Developer of responsibility for any damage resulting from the Section Developer's blasting operations. The IQF and MDOT have the authority to prohibit or

halt the Section Developer's blasting operations when the methods being employed are not obtaining the required results, an unstable condition exists, or the safety and convenience of the traveling public is jeopardized.

No blasting may occur within 300 feet of any concrete placed less than 96 hours prior to blasting.

If any blasting operation requires the temporary stoppage or detour of traffic, the Section Developer will conduct the blasting operation at night (subject to meeting local noise ordinances) unless the AHJ grants approval of daytime blasting. MDOT may consider daytime blasting operations if the traffic stoppage or detour has minimal impact on traffic conditions as determined by MDOT.

23.10 Salvaged Materials

Salvage the following MDOT equipment and material unless otherwise directed by MDOT:

- traffic signals and signal cabinets;
- DMSs;
- ITS cabinets;
- CCTV cameras;
- vehicle detection equipment;
- roadside units; and
- Bridge date and name plates.

Salvaged MDOT material shall be delivered to a designated MDOT delivery location as directed by MDOT; but is anticipated not to be delivered further than 75 miles from the Section limits.

Materials belonging to Governmental Entities, Railroads or third parties shall be salvaged as stipulated in the pertinent Third Party MOU.

23.11 Work Restrictions

No Work shall be performed on any fire hydrant, active or dormant, until approval to commence work is obtained from the Fire Marshall, or designee, having jurisdiction over the fire hydrant. This includes all piping and appurtenances associated with any fire hydrant, standpipe, or other Element associated with the fire hydrant and its intended service. If temporary service is required by the Fire Marshall while work is performed on a fire hydrant or appurtenance, then supply all Work to establish and maintain the temporary service until the Work on the hydrant and appurtenance is complete.

No Work impacting any MDOT Asset in any manner shall be performed until acceptance of the impact that Asset is obtained from MDOT.

No sidewalk, shared-use path, bicycle trail, pedestrian trail, horse trail, or any other similar facility shall be closed or impacted until a detour is accepted by the IQF and the AHJ over that facility. No permanent or temporary sign structure foundation or support shall encroach on an adjacent shared-use path, sidewalk, or shoulder area of any roadway.

If ROW fence or barrier is removed, install and maintain a temporary, 6-foot chain-link fence in place of the removed ROW fence or barrier until such time as the Permanent ROW fence or barrier is installed and complete.

Coordinate and cooperate with other contractors whose work is adjacent to the Section. Make reasonable attempts not to impede the access or progress of any work by other contractors. This coordination shall include attendance at coordination meetings deemed necessary or advantageous by MDOT in order for all work to proceed on adjacent contracts without negative impact to the Section Work.

No drainage grate inlet, manhole, or at-grade drainage structure shall be placed or extended within the travel way of the interstate, the associated interstate ramps, or collector roadways.

No pavement cuts of any type shall be allowed after final surface course has been placed on a roadway or surface parking lot. All utility work shall be completed prior to the installation of pavement.

No direct burial of any power conductor or communication fiber is allowed. All power conductors and communication fiber shall be placed in conduit or duct bank.

No Work shall be performed within the Section unless the Section Developer's Safety Manager or designated representative is on-site.

23.12 Section Closeout

Develop a Plan and process for inspecting and determining all completed Work meets the requirements of the Section P3 Agreement. The Section Closeout Plan shall be submitted to MDOT no less than 18 months prior to the anticipated completion Milestone. The Section Closeout Plan shall include information necessary for the execution of the Inspection and compliance process such that the IQF can adequately inspect all completed Work in a timely fashion before the completion Milestone date(s).

Any Work installed in the ground, or in such a location that it must be covered in order to allow for more Work to be installed over or on it, shall be inspected and confirmed to be ready for the adjacent Work. Ensure all such Work is photographed or videoed in order to demonstrate and document to the IQF and MDOT the Work is conforming.

Create an information tracking system recording all Elements of the Work to be inspected, the portions of the Work not complete or are non-conforming, the actions necessary to complete the Work or bring it into conformance, and the parties with corresponding responsibility. Promptly schedule Inspections of the Work with the IQF. Conduct weekly or bi-weekly coordination meetings with the IQF and MDOT in order to administrate the completed Work confirmation process and resolve any disputed matters arising as a result of the Inspection process. Document all aspects of the Inspection process and provide the necessary tracking information confirming all aspects of the Work were executed properly.

23.13 Deliverables

Table 23-1 - Construction Submittals

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
Mobilization Plan	90 days from execution of the Section P3 Agreement
Demobilization Plan	180 prior to Substantial Completion
Phase Office	120 days after execution of the Phase P3 Agreement
Section Office	120 days after execution of the Section P3 Agreement
Materials Tracking Log	Monthly
Demolition Plan	60 days prior to beginning any demolition activities
Blasting and Vibration Monitoring Plan	60 days prior to commencing blasting or vibration inducing operations
Section Closeout Plan	18 months prior to anticipated completion Milestone

ARTICLE 24. Electronic Toll Collection Infrastructure

24.1 Scope

Phase Developer shall design, develop, fabricate, test, integrate, deploy, construct, operate, maintain, and upgrade to maintain an ETCS supporting all electronic tolling on the PMLs in accordance with the requirements of these Technical Provisions and the applicable requirements of the TSA.

The SMP (see Exhibit 6 Article 3 (Management and Administration of the Work) Section 3.1 (Section Management Plan)) shall set forth an approach, procedures, and methods for the management of the ETCS. The ETCS design shall be included as part of Phase Developer design documents in accordance with the provision of this Exhibit 6 Article 24 (Electronic Toll Collection Infrastructure). Phase Developer shall demonstrate the ETCS design is capable of serving 20% above the maximum traffic volumes expected.

The ETCS shall accurately detect and classify according to the vehicle classification and occupancy, as outlined in the TSA or the Business Rules (as applicable). All vehicles using the PMLs shall be calculated and assigned tolls due for the use of the PMLs based on the vehicle classification and the Base Toll Rate determined according to the TSA and (if applicable) the Business Rules and do so without impeding traffic flow of vehicles using the PMLs facility.

The ETCS shall document and provide proof of use of the PMLs and corresponding toll for all Users, prevent data and images from being tampered with after the fact, protect User privacy, and ensure the traceability of all operations necessary for the accurate generation of proof of passage and toll calculation by Toll Transaction, by Tolling Point, and by Trip.

Over the life cycle of the project, whenever significant upgrades or system life-cycle replacements are performed, the design documents shall be updated and submitted, and the implementation of upgrades coordinated with MDOT and MDTA.

The requirements presented herein for the ETCS are based on current tolling applications within the State. The ETCS shall accommodate alternate and future approaches for ETCS infrastructure and operations, meeting the performance requirements, be compatible with other Maryland tolling facility enhancements and subject to acceptance by MDOT and MDTA. The Section Developer shall carry out upgrades to the ETCS on a regular basis throughout the term of the Section P3 Agreement to implement establish a review of new toll component technology, standards/ best market best practices for toll roads in the US, carry out technology reviews and hold discussions with MDOT/MDTA every 3 years. For any recommendation to include new technology to the manage lanes, the Developer shall prepare a report subject to review and acceptance by MDOT/MDTA.

24.2 Tolling Strategy

24.2.1 Tolling Strategy Requirements

The Phase Developer shall develop a tolling strategy to accommodate:

- ensuring MDTA receives a single Trip for any set of Toll Transactions within the Phase, which includes identifying the parts and value of the Trip that were undertaken within each Section;
- imposing congestion pricing, which may include dynamic tolling with potential Toll Rate changes at frequent intervals, to maintain free-flow conditions of traffic within the limitations specified in the Agreement;
- adopting a variable Toll Rate algorithm;
- using variable Toll Rate notification signage to ensure timely motorist notifications that comply with federal and state requirements and provide sufficient information for motorist choice;
- preparing a Phase-wide ConOps;
- using discount or toll-free User periods to incentivize motorist use; and
- effectively enforcing HOV lane restrictions, as applicable, and coordination with law enforcement.

24.2.2 Tolling Strategy Plan

The Phase Developer shall develop and submit for review a Tolling Strategy Plan for the Work. The Tolling Strategy Plan shall include:

- the steps, processes, and structures to be undertaken and established to ensure compatibility of tolling operations:
 - across all of the Phase;
 - with adjoining phases;
 - with existing MDTA tolling operations and protocols; and
 - with any Maryland or Virginia facilities;
- details of the ETCS to be designed, constructed, tested and implemented on the PMLs;
- a description of the interaction with MDTA and MDOT CHART;
- a narrative describing the Phase-wide ConOps of the Price Managed Lanes, including:
 - the framing and creation of Toll Transactions;
 - vehicle classification;
 - lane operations; and
 - accuracy and reliability measures;
- an approach to minimizing traffic impacts while conducting the maintenance and repair of ETCS Elements;
- a description of the disposition of Toll Transactions from creation to hand-off to MDTA, including how only Valid Trips will be transmitted to MDTA;
- a proposed method for the monthly reconciliation and settlement of Toll Revenue between the Section Developers and MDTA;
- a description of the image review and Trip building processes, including functionality, experienced accuracy and relevant performance indicators used on other projects;

- ongoing quality assurance and quality certification required to maintain high levels of accuracy and reliability;
- the approach to system upgrades, equipment, and system life cycles and incorporation of technology improvements over the term of the Section P3 Agreement;
- a proposed regime for performance assessments and reporting in relation to the PMLs; and
- a description of the system reporting and Toll Transaction data that will be available to MDTA, including data necessary to support MDTA's customer service operations.

24.3 Design Requirements

The ETCS, including but not limited to toll equipment, host and gantry servers, dynamic pricing equipment, equipment cabinets, communications systems, gantries and signs, power supply, supporting conduits, splice vaults, pull boxes, junction boxes, and wiring shall be designed and constructed in accordance with the requirements of this Exhibit 6 Article 24 (Electronic Toll Collection Infrastructure) and all applicable standards, including Tolling Points located along the managed lane main travel lanes or direct connect ramps. Design of interfaces and Tolling Points shall be coordinated across all Sections within each Phase.

The SMP shall set forth the Phase Developer's approach, procedures, and methods for the implementation of the ETCS supporting tolling on the PMLs. Phase Developer shall specifically identify in the SMP how the performance requirements of this Exhibit 6 Article 24 (Electronic Toll Collection Infrastructure) and the TSA are met along with state and federal standards. Proposed deviations from the tolling requirements shall be addressed in accordance with the requirements of Exhibit 6 Article 2 (Technical Provisions) Section 2.2 (Standards, References, and Specifications).

24.4 ETCS Operational Requirements

Phase Developer shall determine the components of the ETCS needed to satisfy the ETCS functional requirements set forth in these Technical Provisions. The ETCS equipment and infrastructure shall provide for safe and secure access to all ETCS components for maintenance and repairs without disruption to the GP Lanes. Additional operational requirements are identified in Exhibit 6 Article 25 (Operations and Maintenance).

24.5 ETCS Performance Requirements

The ETCS performance requirements are identified in Exhibit 6 Article 25 (Operations and Maintenance).

24.6 Staffing

Provide a Tolling Lead who oversees the coordination of the design and construction of the tolling system. Together with the Toll Systems Integrator, the Tolling Lead delivers a functional system. The Tolling Lead shall have the following qualifications:

- a minimum of 10 years of experience with tolling systems design and construction;
- demonstrated past experience with all electronic open road tolling design and installation; and

- preferably experience with MDTA and MDOT CHART.

The Tolling Lead position must be filled for the term of the Section P3 Agreement; the Person holding such position is expected to be on-site in the Section Office and be committed full time. Qualifications shall be subject to review and acceptance by MDOT and MDTA. If a replacement is needed to fill the position, the qualifications for the replacement shall be submitted and are subject to review and acceptance by MDOT and MDTA.

24.7 Toll Systems Integrator and Toll Systems Operator

Provide a Toll Systems Integrator who is responsible for integrating, testing, and commissioning all the individual Elements of the ETCS and the portions of the ITS impacting tolling. Together with the ITS/Tolling Lead, the Toll Systems Integrator delivers a functional system.

Provide a Toll Systems Operator who is responsible for the day-to-day implementation of the ETTM System, integration of the ETTM System with other systems as applicable roadside tolling services, and performance of the responsibilities outlined in the TSA including the development of Toll Transaction data.

24.7.1 Minimum Qualifications

The Toll Systems Integrator and Toll Systems Operator must satisfy all of the applicable minimum qualifications subject to review and acceptance by MDOT and MDTA.

An entity proposed as the Toll Systems Integrator or Toll Systems Operator will not be required to satisfy those qualifications that do not correspond to the Work that entity would perform as Toll Systems Integrator or Toll Systems Operator. For example, a Toll Systems Integrator or Toll Systems Operator only being proposed for image review services will not be required to satisfy requirements for toll lane design.

The Toll Systems Integrator and Toll Systems Operator must satisfy the minimum qualifications below by:

- having at least 3 currently operational clients using toll lanes designed and built by the Toll Systems Integrator or Toll Systems Operator. For each client:
 - the lanes must be multilane all electronic tolling type (or multilane open road tolling);
 - the lanes must accept time-division multiplexing protocol as at least one of the supported protocols; and
 - the lanes must use the same design as proposed for the Phase;
- having designed and maintained at least 20 all electronic tolling type toll lanes and 8 Tolling Points within the United States;
- having at least 2 currently operational clients where the Toll Systems Integrator or Toll Systems Operator is performing Trip building. For each client:
 - must demonstrate current ability to assemble Trips from multiple Tolling Points (minimum 3 Tolling Points) for a Mainline toll road;
 - the client must respond to a direct reference questionnaire from MDOT on behalf of MDTA;
 - the response must confirm use of the Toll Systems Integrator or Toll Systems Operator's Trip building systems and processes; and

- the response must indicate successful, accurate, and reliable Trip building;
- having at least 2 currently operational clients where the Toll Systems Integrator or Toll Systems Operator is performing image review services:
 - in the United States;
 - using multi-state plate identification;
 - identifying plate types;
 - if not performing all 50 states identification and plate type, must demonstrate an ability to extend to all 50 states, including plate type identification;
- the clients must respond to a direct reference questionnaire from MDOT on behalf of MDTA and the response must:
 - confirm use of the Toll Systems Integrator or Toll Systems Operator's image review systems and services; and
 - indicate successful, accurate, and reliable image review; and
- having at least 1 operational client where the Toll Systems Integrator or Toll Systems Operator is performing both Trip building and image review.

The Toll Systems Integrator will be required for the Construction Work as needed to comply with the Section Developer's ITS and tolling system testing Plans.

24.7.2 Proposal for Toll Systems Integrator and Toll Systems Operator

The Phase Developer shall submit a proposal to engage its preferred Toll Systems Integrator and Toll Systems Operator subject to review and acceptance by MDOT and MDTA in accordance with Article 20 (Toll Systems Integrator and Toll Systems Operator) of the Agreement. The Toll Systems Operator may be the same entity as the Toll Systems Integrator.

Any proposal under Article 20 (Toll Systems Integrator and Toll Systems Operator) of the Agreement must include:

- the identity of the preferred Toll Systems Integrator and Toll Systems Operator and detail the work that each of them will perform;
- confirmation that the Toll Systems Integrator and Toll Systems Operator satisfy the minimum qualifications requirements in Exhibit 6 Article 24 (Electronic Toll Collection Infrastructure) Section 24.7.1 (Minimum Qualifications) together with sufficient documentation to demonstrate those requirements have been satisfied;
- relevant experience of each proposed entity in the planning, design, construction, testing, documentation, installation, integration, implementation, maintenance, and operation of an ETTM System;
- past experience and present contracts of each proposed entity for toll facilities of a similar size, complexity, and nature as the Phase;
- with respect to the experience referred to above, provide details of the system hardware and software utilized, facilities management, system operations, system maintenance, and any other appropriate information related to the development, implementation, and operation of the programs;
- with respect to the experience referred to above, provide details of the client and contact information necessary to enable MDOT and MDTA to verify the asserted experience;

- documented experienced accuracy, Performance Measures and reliability from each proposed entity's current projects; and
- such other relevant information as MDOT and MDTA may require of the Phase Developer.

The Phase Developer shall ensure that all referenced clients of the proposed Toll Systems Integrator and Toll Systems Operator respond to a direct reference questionnaire from MDOT to confirm the assertion of the proposed entity's experience as necessary.

24.8 Testing and Commissioning

Phase Developer's commissioning agent shall conduct ETCS concept validation testing and formal on-site system acceptance testing as per the ETCS Testing Plan. Before testing activities begin, the test Plan is to be submitted by the Section Developer as a component of the SMP.

Testing activities for ETCS shall demonstrate the ETCS meets the performance requirements defined in this Exhibit 6 Article 24 (Electronic Toll Collection Infrastructure) and the TSA. Prior to any testing, Phase Developer shall provide 30 days' notice to MDOT and MDTA of the time and location(s) for any testing. Testing shall be conducted by the IOF to evaluate system compliance with MDOT and MDTA being given the option to observe all tests. The IOF shall provide quality assurance review of all testing.

Phase Developer shall be required to demonstrate during the ETCS Demonstration Period the ETCS reliably meets the performance requirements as defined in this Exhibit 6 Article 24 (Electronic Toll Collection Infrastructure) and the TSA under operating conditions for a sustained period.

24.8.1 Testing Program for ETCS

Section Developer shall conduct both concept validation testing and on-site system integration testing. The objectives of the testing activities for ETCS are:

- to verify the proper functioning of the equipment and of the systems and sub-systems, as described in the design documents;
- to demonstrate the equipment, systems, and sub-systems meet the performance, and reliability requirements as set out in the TSA, and Exhibit 6 Article 25 (Operations and Maintenance) along with this Exhibit 6 Article 24 (Electronic Toll Collection Infrastructure); and
- to demonstrate the mechanisms for the exchange of information between the Parties and between Phase Developer and any third party (e.g., law enforcement authorities, etc.) function properly.

Concept validation testing shall be completed to demonstrate the proposed equipment meets the ETCS performance requirements in a controlled environment.

For all proposed system Elements meeting concept validation testing criteria, on-site system acceptance testing shall be completed to demonstrate:

- the entire system, equipment, and facilities are ready for commencement of operations;
- the equipment meets performance requirements with vehicles traveling at all speeds including a full range of vehicle types;

- the equipment meets performance requirements when used in a wide range of lighting and weather conditions;
- all external interfaces operate properly; and
- all aspects of Toll Transaction collection and transmission meet performance requirements.

Prepare an ETCS Testing Plan for concept validation testing and on-site system acceptance testing, including:

- an introduction stating the purpose of the document, any supporting documents attached and points of contact for the Work;
- a description of how the testing program is used in conjunction with the Quality Management System;
- the testing process and methodology including:
 - Testing Plan objectives;
 - testing methods;
 - assumptions;
 - source documents;
 - environmental needs;
 - training needs; and
 - qualifications of testers;
- problem identification and resolution;
- test script;
- pass/fail criteria;
- issue tracking and use of a traceability matrix;
- the disposition of signed scripts and ETCS final acceptance signature sheet;
- an estimated schedule for testing and locations;
- ETCS final acceptance sign off (when all scripts are accepted); and
- application of the Quality Management System to the testing program.

24.8.2 Interface for ETCS Services

Phase Developer shall notify MDTA in writing at least 24 months prior to the anticipated date of Substantial Completion of the completion of the first operable portion of the ETCS (or future upgrades/new system deployments) in order for MDTA to prepare to perform its ETCS Services. Phase Developer shall accompany such notice with a Work Plan, including a schedule, for MDTA to perform MDTA system interface Work and testing in accordance with such Work Plan. Upon MDTA's receipt of such notice, Phase Developer and MDTA shall cooperate with each other in order to prepare for the system interface work and testing and subsequent operations of the PMLs.

24.8.3 Demonstration Period for ETCS

The objectives of the ETCS demonstration period are the same as those set forth for the testing program for ETCS, but the ETCS demonstration period will be carried out while the PMLs are in normal operating conditions.

The ETCS demonstration period shall be initiated at the time of Substantial Completion for each Section. The Phase Developer's commissioning agent shall monitor the system during the demonstration period.

In order to successfully complete the ETCS demonstration period, the ETCS shall meet the performance requirements in this Exhibit 6 Article 24 (Electronic Toll Collection Infrastructure) and the TSA for the duration of the ETCS demonstration period.

The ETCS demonstration period for the first operable portion of the ETCS (or Tolling Point of a Section where testing can occur) achieving Substantial Completion shall be a minimum of 60 consecutive days. If the initial ETCS does not function as required during the demonstration period, the testing will be considered unsuccessful and the period shall be extended until such time as the performance requirements have been met but not longer than a consecutive 90 day period. If at the end of 90 days the ETCS is still not functioning as required, the ETCS shall be repaired, replaced or otherwise modified. Following repair, a new testing regime shall be conducted, and the demonstration period shall start anew. This process shall be repeated as many times as need until the ETCS is complete, functioning as intended, and is acceptable to MDOT and MDTA.

A report on the demonstration period shall be provided to MDOT and MDTA.

24.9 ETCS Design

Deliverable content will be developed in coordination between the Phase Developer and MDOT and MDTA. The following outlines general expectations of MDOT and MDTA.

24.9.1 Preliminary ETCS Design

If not completed as part of the Predevelopment Work, preliminary ETCS design shall be prepared as a Preliminary Section Design Activity. Preliminary ETCS design shall include at a minimum:

- a ConOps, prepared in conformance with the Institute of Electrical and Electronics Engineers Standard P1362 V3.2, and ANSI/American Institute of Aeronautics and Astronautics Standard G-043-1992 Guide for the Preparation of Operational Concept Documents; and
- a presentation of the overview and architecture for the ETCS to include:
 - the general physical layout (including Tolling Points, Toll Rate Signs and ITS device locations);
 - Tolling Point functionalities, configuration, and equipment;
 - host computer functionalities, configuration, and equipment;
 - Toll Transaction consolidation;

- communication and interface with MDTA and adjacent Phase, Section, and state tolling providers; and
- maintenance and support.

Perform necessary Work for the ITS architecture and system engineering in compliance with FHWA Rule 940.

24.9.2 ETCS Design Deliverables

ETCS Design Deliverables shall present at a minimum the following:

- lane configurations;
- Tolling Points configuration;
- Tolling Point locations;
- traffic monitoring station locations;
- curative maintenance management system equipment and locations;
- roadside system and technology;
- Toll Rate Sign locations and details;
- a description of the Toll Rate-setting approach and how it is communicated to all devices;
- equipment installation locations;
- a performance specification traceability matrix;
- network design;
- system hardware and software;
- technical interface with existing MDOT or MDTA systems;
- technologies to be used for enforcement;
- performance reporting and auditing tools; and
- product cut sheets for all ETCS equipment and communications gear.

All roadside ETCS components, including Tolling Points and Toll Rate Signs, shall be developed in conformance with other requirements described in other portions of this [Exhibit 6 \(Predevelopment Work Activities\)](#).

24.9.3 Concept Validation Testing

The Section Developer shall provide MDTA with certified documentation demonstrating successful completion of concept validation testing, including interoperability requirements within 15 days of passing the testing.

24.9.4 Substantial Completion

The Section Developer shall submit documentation to MDOT and MDTA demonstrating successful completion of on-site system acceptance testing as a condition for achieving Substantial Completion of a Section in accordance with the Section P3 Agreement.

24.10 ETCS Reporting Requirements

The Section Developer shall prepare a monthly report describing the ETCS activities and performance, traffic volumes, speeds, and revenue figures as described herein. Section Developer shall submit a template of each monthly activity report to MDOT and MDTA no less than 30 days prior to Substantial Completion. Phase Developer shall submit a report for each calendar month to MDOT and MDTA no later than 5 Business Days after the end of the month.

Tolling data must be submitted to MDTA on a consolidated basis across the entire Phase. Trip data for any vehicle traveling on the PMLs in multiple Sections of the Phase as part of a continuous period of travel within the PMLs in the same direction shall be consolidated into a single Trip before it is submitted to MDTA in accordance with the TSA.

24.10.1 ETCS Daily Check Report

Perform daily monitoring and checking of the ETCS for compliance with Performance Requirements. Provide MDOT with a copy of this report.

24.10.2 ETCS Activity Monthly Report

From Substantial Completion to the end of the term of the Section P3 Agreement, the ETCS Activity Monthly Report shall be submitted to MDOT and MDTA and include:

- a detailed discussion of all instances of Noncompliance Events occurring in the month pertaining to the ETCS performance, as required by Exhibit 6 Article 25 (Operations and Maintenance), describing the Element name and reference number, the commencement time, duration, entity who identified such events first, details regarding the cure of such Noncompliance Events including the steps taken and the time it took to cure, applicable cure period, the reasons why the prescribed performance goals were not met, the status of such events as of the end of the month, Noncompliance Points incurred by Phase Developer if any associated with each such ETCS Noncompliance Event, and the changes (if any) made to the Phase Developer's operations based upon such events;
- detailed calculations of Noncompliance Points associated with ETCS Noncompliance Events incurred by Phase Developer and accrued for the past month and total balance for the past 365 days and liquidated damages assessed, including details of each assessment; and
- a summary of monthly ETCS maintenance activities, support activities for applications and databases, and technology enhancements if any.

24.10.3 Traffic and Revenue Monthly Reports

From Substantial Completion to the end of the term of the Section P3 Agreement, for the current month, the Traffic and Revenue Monthly Report shall be submitted to MDOT and MDTA and include:

- a listing of the dynamic Toll Rates used for the current month and the previous three months;
- the schedule of all toll discounts to Users, if any, for the current month and the previous three months;

- traffic counts on the PMLs for the current month and the previous 14 months, with such traffic counts performed at the same specific locations each month (at a minimum covering one location per Tolling Point in each direction);
- a detailed presentation and explanation of any suspension of tolls in accordance with the Section P3 Agreement, including the following information on all such events:
 - the nature, location, direction, if applicable, date, and time (rounded to the nearest minute) of the suspension of tolls; and
 - a description of the impact (location, magnitude, and duration) on the traffic on the PMLs and GP Lanes;
- a detailed presentation and explanation of any Noncompliance Event, to the extent such Noncompliance Event affected traffic on the PMLs and GPLs, including the following information on all such events:
 - the nature, location, direction, if applicable, date, and time (rounded to the nearest minute) of the detection of each Noncompliance Event;
 - the name of the Person or the agency having identified the event;
 - description of the impact (location, magnitude, and duration) on the traffic on the PMLs and GPLs; and
 - the date and time (rounded to the nearest minute) of the cure of the Noncompliance Event and return to normal traffic flow.

The monthly report package shall be delivered to MDOT and MDTA within 5 Business Days of the end of the month.

The Section Developer shall maintain indicative averages (which may include historical or other relevant information) for a minimum of the previous 180 days (or such lesser period if less than 180 days since tolling operations commenced), broken out by Tolling Point and direction during a minimum of every hour during non-AM or PM peak periods and every half hour during AM and PM peak periods of Base Toll Rates on the Priced Managed Lanes or as otherwise approved by MDTA, and the applicable Tolling Points, Classifications Multipliers, and [Image-Based Transaction premiums]. The Section Developer will make this information available, to any member of the public, on a website[, through a telephonic request and upon request at the Section Developer's offices during reasonable business hours, by facsimile copy without charge or by mailing a copy if the written request is accompanied by a self-addressed stamped envelope].

24.10.4 Traffic and Revenue Annual Reports

On an annual basis, Phase Developer shall create a Traffic and Revenue Annual Report to be submitted to MDOT and MDTA. Annual reports shall be delivered to MDOT and MDTA no later than July 30th of any year. Phase Developer's Traffic and Revenue Annual Report shall contain:

- a summary of all Traffic and Revenue Monthly Reports and ETCS Activity Monthly Reports from the preceding 12-month period;
- a statement of all adjustments to the Traffic and Revenue Monthly Reports and ETCS Activity Monthly Reports from the preceding 12-month period (if any);
- a calculation of the average annual daily traffic on the PMLs, on the GPLs, and for all lanes in the same highway location as the traffic counts reported monthly;
- a calculation of the average annual daily traffic for the preceding 12-month period; and

- a summary of the information requested by MDOT or MDTA (corrected if necessary) by month during the preceding 12-month period (if any).

24.10.5 HOV Declaration Monthly Report

From the toll facility opening date of revenue service until the end of the term of the Section P3 Agreement, for the current month, the HOV Declaration Report shall be submitted to MDOT and MDTA and include the following:

- location of each Toll Transactions (Tolling Point and lane number);
- the HOV status;
- the Transponder number; and
- Toll Transactions date and time stamp.

24.11 Deliverables

Table 24-1 - ETCS Submittals

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
Tolling Lead qualifications	With the Committed Section Proposal
Toll Systems Integrator and Toll Systems Operator proposal	Submittal in compliance with the timing set out in the <u>Phase P3 Agreement Article 20 (Toll System Integrator and Toll System Operator)</u> .
Tolling Strategy Plan	In accordance with the Phase Developer's Schedule for the pertinent portion of the Work
ETCS Testing Plan	Before installation of tolling equipment
ConOps	As part of the Predevelopment Work or as a Preliminary Section Design Activity
Preliminary Design	As part of the Predevelopment Work or as a Preliminary Section Design Activity
Concept validation testing results	15 days after test completion
ETCS Activity Monthly Report	Monthly from Substantial Completion
Traffic and Revenue Monthly Reports	Monthly from Substantial Completion
Traffic and Revenue Annual Reports	Yearly from Substantial Completion
HOV Declaration Monthly Report	Monthly from Substantial Completion

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
O&M manuals	Following Substantial Completion
As-Builts Drawings	Following Substantial Completion

ARTICLE 25. Operations and Maintenance

25.1 Scope

Section O&M Work shall be performed during the time periods specified in the Section P3 Agreement. Provide the resources, equipment, materials, and services required to perform the Section O&M Work in accordance with the requirements of the Section P3 Agreement. Provide sufficient levels of properly trained personnel, on-Site and off-Site facilities, storage areas, garages, fleet vehicles, computer hardware and software, tools, resources, equipment, materials and other items as required to perform Section O&M Work. Operate and maintain safe, reliable, and customer-focused roadways and facilities in accordance with the Section P3 Agreement. Coordinate, Plan, and perform the Section O&M Work required by the Section P3 Agreement, including this Exhibit 6 Article 25 (Operations and Maintenance), in a manner that shall provide safe conditions for workers including the Section Developer's staff, MDOT staff, third parties, and the traveling public while minimizing traffic disruptions. Obtain and comply with all permits for Section O&M Work.

Monitor all PMLs open for Toll Revenue, operate and maintain for 24 hours per day, seven days per week with the appropriate staff levels for these hours of operation to achieve or exceed the O&M Performance Requirements and provide superior customer service in accordance with the Section P3 Agreement. Ensure the communication of Toll Rates to Users and accurate Toll Transactions for the associated vehicle.

The requirements presented herein for O&M are based on current practices used within the US. The Section Developer's O&M Plan shall accommodate alternate and future approaches for O&M but must meet the O&M Performance Requirements; must be compatible with other Maryland tolling facility enhancements; and will be subject to acceptance by MDOT and MDTA.

25.2 O&M Scope

The Section O&M Work includes maintaining the O&M Limits in accordance with the requirements of and in conformance with the:

- Section P3 Agreement;
- SMP;
- O&M Plan; and
- Renewal Work Plan ("RWP");

all as provided by the Section Developer and reviewed by MDOT.

The Section O&M Work includes Section O&M Work performed by the Section Developer during the D&C Period and Section O&M Work performed during the Operating Period.

25.2.1 Section O&M Work

25.2.1.1 Section O&M Work

Except as otherwise provided in the Section P3 Agreement, provide Section O&M Work for all Relevant Infrastructure within the O&M Limits except for those Elements and activities identified as Non-Maintained Work. Relevant Infrastructure and Section O&M Work includes:

- Roadways;
- drainage facilities, underdrains, drains and catch basins;
- structural Elements associated with PML structures;
- pavement markers, object markers, barriers, and delineators;
- pavement marking striping;
- permanent signs and sign support;
- fences walls and sound abatement;
- landscaping;
- earthworks and embankments;
- environmental protection facilities and features;
- roadway lighting and electrical systems;
- litter and obstructions/debris removal/sweeping;
- guardrails and safety barriers;
- impact attenuators;
- Incident Management;
- ITS;
- roadside systems;
- winter operations (snow and ice control and removal including pre-treatment salting and snow plowing);
- graffiti removal;
- ETCS;
- BMPs; and
- the Section Developer's O&M facilities.

In addition, provide Section O&M Work for certain Shared Assets or Assets outside of the limits of the PMLs as noted in the Asset Operations and Maintenance Responsibility Matrix shown in Table 25-5 (Asset O&M Responsibility Matrix) and described in this Exhibit 6 Article 25 (Operations and Maintenance).

25.2.1.2 Section O&M Work during D&C Period

D&C Section O&M Work includes Routine Maintenance for repair from normal wear and tear due to traffic and weather, Incidents, as well as damage resulting from the Section Developer's Work. Perform D&C Period Section O&M Work on the Section once Construction Work has

commenced in that Section or Interim Completion Segment. A meeting with MDOT shall occur 90 days prior to commencement of Construction Work in any Section or Interim Completion Segment and provide the schedule and work Plan for D&C Period Section O&M Work for that Section or Interim Completion Segment subject to review and acceptance by MDOT. From the start of construction until an Element has been accepted by MDOT or the AHJ, the Section Developer shall be responsible for temporary traffic signal equipment, Incident Management and roadside assistance, and operations of ITS equipment in accordance with Exhibit 6 Article 19 (Intelligent Transportation Systems).

D&C Period Section O&M Work includes:

- the roadway, underdrains, and roadside within the construction zone;
- guardrails, barriers, and impact attenuators;
- pavement markings and striping;
- signage;
- haul routes within D&C Limits;
- elements within the construction zone damaged by normal wear, forces of nature, or acts of third parties;
- temporary roads (including crossovers) and temporary sound barriers;
- temporary structural works required for the Work;
- other temporary facilities constructed by the Section Developer not used by the public or open to traffic;
- Non-Maintained Work prior to Handover in accordance with the Section P3 Agreement;
- mowing and landscaping;
- winter operations (snow and ice control and removal including pre-treatment salting and snow plowing);
- sweeping, litter pick-up, and graffiti removal; and
- debris removal.

D&C Period Section O&M Work will commence once construction has started in any portion of the Section or when any of the following occurs in a Section:

- any lane shifts for MOT;
- installation of concrete barriers; or
- significant work on any roadway shoulders.

At such time, D&C Period Section O&M Work shall occur for the entire Section until the Section reaches Substantial Completion and is handed over to the AHJ or becomes subject to Section O&M Work performed by the Section Developer.

25.2.2 Non-Maintained Facilities and Non-Maintained Work

The Section D&C Work includes design and construction of Non-Maintained Facilities that will be handed over to MDOT or others upon Substantial Completion. The Section D&C Work also includes design and construction of Non-Maintained Work, which will be handed over to others as set out in the Section P3 Agreement.

Non-Maintained Facilities means:

- elements constructed/reconstructed by the Section Developer within the D&C Limits that are handed over to MDOT to operate and maintain;
- elements constructed/reconstructed by the Section Developer that are owned by the municipalities; and
- MDOT ITS equipment.

Non-Maintained Work means:

- Non-Maintained Facilities; and
- SWM Work and Work to comply with environmental permits that will be constructed by the Section Developer outside the ROW but will be operated or maintained by MDOT.

Section Developer is not responsible for the maintenance of the Non-Maintained Work during the Operating Period. The Non-Maintained Work is subject to a Warranty period in accordance with the Section P3 Agreement.

25.2.3 MDOT Responsibilities

The term of the Section P3 Agreement includes the D&C Period and the Operating Period. MDOT will have the following responsibilities for O&M during the term of the Section P3 Agreement:

25.2.3.1 D&C Period

During the D&C Period, MDOT and its subcontractors will be responsible for maintenance of MDOT traffic signal timing and bridge inspections for existing structures.

25.2.3.2 Operating Period

During the Operating Period, MDOT and its subcontractors are responsible for the following:

- MDOT GPLs and ROW outside the O&M Limits;
- Tolling Back-Office Systems for Toll Transaction processing;
- MDOT traffic signals and traffic signal timing;
- maintenance and operations of MDOT ITS equipment; and
- MDOT responsibilities for shared elements.

25.2.4 Shared Operations and Maintenance Responsibilities

The Section D&C Work includes design and construction of certain Elements where the O&M responsibilities are shared between the Section Developer and MDOT during the Operating Period. The nature of the shared responsibilities is dependent on the Element as identified in the Asset O&M Responsibility Matrix shown in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-5 (Asset O&M Responsibility Matrix). Shared O&M Responsibilities may include:

- SWMFACs;
- structures; and

- pipes and drainage.

Shared O&M Protocols to be developed and coordinated in collaboration with MDOT. See Exhibit 6 Article 25 (Operations and Maintenance) Section 25.3.14 (Shared O&M Protocols) for requirements to be met prior to Substantial Completion.

25.3 O&M General Requirements

Except when specifically stated otherwise in the Section P3 Agreement, perform the Section O&M Work within the O&M Limits during the relevant portions of the term of the Section P3 Agreement in accordance with these Technical Provisions.

Establish a self-monitoring program to ensure a safe and reliable roadway system with the main objective of maximizing public safety, reliability, and availability. Coordinate, Plan and perform the Section O&M Work required under the Section P3 Agreement in a manner that will provide safe conditions for the maintenance staff and the general public, while minimizing traffic and other disruptions.

Perform all Section O&M Work-related tasks and activities, including the following:

- operate and maintain the Section in a manner appropriate for a facility of the character of the P3 Program and in compliance with the requirements of the Section P3 Agreement;
- minimize delay and inconvenience to the traveling public;
- identify and correct all Defects and damages to the Work;
- minimize the risk of damage, disturbance to or destruction of third party property during the performance of maintenance activities to the extent reasonably practicable;
- coordinate with and enable MDOT, MDOT's contractors and, as applicable, others with shared responsibilities, statutory duties or functions in relation to the Section to perform such responsibilities, duties, and functions;
- perform operations, systematic Inspections, periodic maintenance, Routine Maintenance, and Renewal Work in accordance with the provisions of Section Developer's O&M Plan and Section Developer's SaMP;
- provide an O&M Plan that identifies all functions, procedures, and manuals necessary to maintain all Elements in accordance with the requirements of the Section P3 Agreement; and
- provide all resources necessary for the performance of the Section O&M Work and as required to comply with the Section P3 Agreement, the O&M Plan, and Handback Work Plan.

Perform the Section O&M Work within the O&M Limits such that the PMLs and Relevant Infrastructure are available 24 hours per day, seven days per week, and every day of the year throughout the term of the Section P3 Agreement.

25.3.1 PML Operations and Maintenance

The O&M Limits are shown in the O&M Limit Drawings prepared in the Predevelopment Work. The O&M Limits generally include the PML roadways and the median separation. Certain Elements outside of the PML roadway are included in the O&M Limits and are further defined in this Exhibit 6 Article 25 (Operations and Maintenance) Table 25-5 (Asset O&M Responsibility Matrix). These matrices indicate whether the Section Developer or MDOT is responsible for

Section O&M Work for a specific Element or whether in certain cases there is a shared responsibility for an Element between the Section Developer and MDOT.

Provide an update to conceptual O&M Limits and Asset O&M Responsibility Matrices within 90 days prior to NTP. Prepare final O&M Limits Drawings and Asset O&M Responsibility Matrices identifying O&M Limits and O&M responsibility consistent with the Section P3 Agreement. Submit final O&M Limits Drawings and Asset O&M Responsibility Matrices to MDOT for review within 90 days after NTP. Final submission of PML Operations and Maintenance Limits Drawings and O&M Responsibility Matrices are to be submitted to MDOT for review two years prior to Substantial Completion.

For all Elements where Section O&M Work is shared, prepare a draft Shared O&M Protocol Agreement between the Section Developer and MDOT 180 days prior to Substantial Completion of any Section or Interim Completion Segment. Submit final Shared O&M Protocol Agreements subject to review and acceptance by MDOT 90 days prior to Substantial Completion.

25.3.2 Operations and Maintenance Plan

Prepare and submit the O&M Plan as a component of the SMP. Develop and implement the O&M Plan for the term of the Section P3 Agreement. Include O&M responsibilities during the D&C Period and Operating Period in the O&M Plan. Submit the draft D&C O&M Plan as a condition of Financial Close for the Section. Submit the draft O&M Plan for review within 45 days following NTP.

Submit the final D&C O&M Plan subject to review and acceptance by MDOT prior to NTP. Submit the final O&M Plan subject to review and acceptance by MDOT within 90 days after NTP. Update the O&M Plan at least 45 days prior to the planned date of Substantial Completion. On July 1 of each Fiscal Year after O&M Commencement Service Date, submit the updated O&M Plan subject to review and acceptance by MDOT.

The O&M Plan may be updated more frequently, as necessary, to indicate changes to O&M protocols, permits, agreements and interactions with other entities and to indicate the revised O&M requirements for equipment and systems that have been revised, upgraded and, as applicable, replaced. The component parts of the O&M Plan are identified in the table below.

Table 25-1 O&M Plan Components

OPERATIONS AND MAINTENANCE PLAN COMPONENTS
D&C O&M Plan
O&M Shared Responsibility Protocols
Regulated Substances Plan
O&M SaMP
O&M QMP
Renewal Work Schedule
RWP
Vegetation Management Plan
Storm Water Management Program Plan
Maintenance of Traffic Plan

Communications and Outreach Plan
Emergency Response Plan
Incident Management Plan
Operations Plan
ETCS, ITS and Tolling O&M Plan
Snow and Ice Control Plan

The O&M Plan shall identify O&M protocols, agreements and interactions with other entities, including Governmental Entities.

The O&M Plan shall include procedures and protocols for all ITS, roadside systems, and traffic control necessary to operate and maintain the facility. The O&M Plan shall include requirements for work zone safety, compliance with permits, traffic management, Storm Water Management and procedures for Allowable Lane Closures.

The ETCS, ITS, and Tolling O&M Plan shall include maintenance staffing and administration, dispatch procedures, communication requirements, support from outside maintenance services (for example, computer manufacturers), final maintenance equipment list, and other details as may be appropriate. Include specific maintenance processes and procedures to be used to successfully manage, staff, and conduct ETCS, ITS, and tolling maintenance in order to achieve or exceed the performance standards.

The O&M Plan shall comply with all requirements of the Section P3 Agreement, and include the following:

- a staff organization chart for the O&M Plan including a description of the staffing Plan, including all positions, work locations and work hours required to operate and maintain the Section facilities for the term of the Section P3 Agreement;
- a description of the minimum staff qualifications for each staff position;
- the qualifications of maintenance staff for structures maintenance and procedures for performing structural maintenance work;
- a contact list of the various entities and agencies with whom the Section Developer's O&M staff will require coordination, including their contact information (contact Person, address, telephone numbers, email address and website address);
- an identification of major documents that are the basis of the O&M Plan;
- a description of the Section Developer's self-monitoring processes, including a list of the procedures to be used to monitor compliance with minimum performance criteria;
- a description of the maintenance reporting system;
- a description of the Renewal Work reporting system;
- a description of the process for calculating and preparing the invoices for payments (in the case of shared costs) in accordance with the Section P3 Agreement;
- a description of the method of tracking and reporting Defects, Noncompliance Events, and Noncompliance Points accumulated throughout the term of the Section P3 Agreement;
- a description of the methods of monitoring and verifying compliance with all O&M procedures, including those specified in the SMP, the O&M Plan, and Good Industry Practice;

- copies of all maintenance forms, checklists, fault detection logs, etc.;
- a description of the Section Developer's Plan for regulated substances management and response;
- a description of the Section Developer's Plan for tracking the use and performance of proprietary materials;
- a description of the Section Developer's general approach and assumptions for O&M;
- a description of the Section Developer's approach and assumptions for the Renewal Work items and equipment replacement, including life cycles;
- communication protocols in the event that MDOT required access to the PMLs for maintenance activities and when Developer requires access to the GPLs for maintenance activities;
- a description of the Section Developer's Plan for landscape planting maintenance;
- a description of the Section Developer's general approach and assumptions for Routine Maintenance;
- a description of the Section Developers approach, assumptions and protocols for communications and Stakeholder outreach;
- the Preliminary Maintenance Schedule and Renewal Work Schedule;
- an accounting of budgeted annual expenditures for Maintenance Work and Renewal Work;
- O&M dispatching procedures;
- Emergency communications procedures protocols;
- a list of vehicles, tools and major equipment furnished by the Section Developer to support the Section O&M Work;
- a list of real estate, facilities, computers, software, and other major Assets/items to support the O&M Plan;
- a description and schedule of the Inspections;
- copies of drawings that indicate the Elements that are included in the Section Developer's Section O&M Work and the physical extent, limits or boundaries of the Section O&M Work for Elements;
- a description and form of the O&M Report;
- the procedures for completing Emergency-related repair Work in accordance with the Section Documents;
- quality assurance procedures for the proper selection, preparation, and installation of approved materials, along with material test certifications, manufacturer's recommendations, etc.;
- material safety data sheets postings for all materials, along with disposal Plans for unused, or removed materials;
- the responsibilities and procedures for security and Incident Management;
- the responsibilities and procedures for cooperation with public law enforcement and first responders in accordance with the Section P3 Agreement;
- a description and form of the Operations Reporting System;
- copies of all operations forms, checklists and fault detection logs;

- copies of all Asset O&M Responsibility Matrices and Shared Responsibility Protocols;
- a description of approach and procedures for obtaining and complying with permits and overall environmental compliance;
- a description of approach and procedures for MOT and Allowable Lane Closures; and
- a description of the approach and procedures for ETCS.

Submit the proposed format and proposed media of the O&M Report with the initial O&M Plan Submittal.

25.3.3 Staffing

25.3.3.1 O&M Manager

Provide an O&M Manager to oversee all Section O&M Work, including Routine Maintenance, Operations, Renewal Work and capital replacement activities. The O&M Manager's responsibilities shall also include environmental compliance, O&M management reporting, customer service activities, and achieving performance requirements in accordance with the Section P3 Agreement and the Section Developer's O&M Plan. The O&M Manager shall have the following qualifications:

- a minimum of 15 years' experience in maintenance and asset management including relevant and progressive experience in the daily O&M activities on congested urban highways;
- a minimum of 10 years' experience with ITS and tolling systems operations;
- demonstrated past experience with all electronic open road tolling; and
- be a licensed Professional Engineer in the State of Maryland.

The O&M Manager position must be filled for the term of the Section P3 Agreement; the Person holding such position is expected to be on-site in the Section Office and be committed full time. Qualifications shall be submitted and is subject to review and acceptance by MDOT. If a replacement is needed to fill the position, the qualifications for the replacement shall be submitted and are subject to review and acceptance by MDOT.

25.3.3.2 Tolling Manager

Provide a Tolling Manager to be responsible for operations necessary for tolling, tolling system and Toll Transactions. The Tolling Manager shall have the following qualifications:

- a minimum of 10 years' experience with tolling systems operations;
- demonstrated past experience with all electronic open road tolling operations; and
- preferably experience with MDTA and MDOT CHART.

The Tolling Manager position must be filled for the duration of the term of the Section P3 Agreement; the Person holding such position is expected to be on-site in the Section Office and be committed full time starting at least one year prior to the commencement of the Section O&M Work.

25.3.4 Meetings

Hold monthly meetings with the appropriate MDOT representatives during the term of the Section P3 Agreement to discuss Section O&M Work, including the following:

- planned lane closures;
- maintenance activities performed the previous month;
- planned maintenance for the next month;
- Incidents/accidents;
- an assessment of Noncompliance Points; and
- the status of operations and the ETCS;

MDOT may request a meeting at any time to discuss Section O&M Work-related issues.

25.3.5 Safety

Conduct all Section O&M Work during the term of the Section P3 Agreement in accordance with all Applicable Laws, including those pertaining to safety and safety standards. Perform all Section O&M Work during the term of the Section P3 Agreement with the goal of maximizing the safety of the public, MDOT's employees, and the Section Developer's employees. Develop an O&M SaMP that includes staff training, safety procedures, and protocols to address the hazardous conditions associated with the Section Developer's Section O&M Work.

The O&M Safety Management Plan ("O&M SaMP") shall be an integral part of the O&M Plan and shall be incorporated into the SaMP and shall be in accordance with the SaMP. Remove and replace any personnel or subcontractors who are jeopardizing safety, disregarding safety rules and procedures, or acting in a negligent or irresponsible manner.

The O&M Plan shall address the approach to meeting all the safety requirements as set forth in the Section P3 Agreement and shall include the following requirements:

- ensure the safety of all personnel. Provide safety equipment and procedures for the protection of employees and the public;
- operate and maintain all equipment used in a safe and efficient manner in accordance with all Applicable Laws, safety organizations, regulations and guidelines pertaining to providing the required services; and
- follow all safety requirements outlined in the National Electric Safety Code, OSHA and any standards or practices for safe installation or maintenance of required equipment per the Section P3 Agreement.

Submit the O&M SaMP to MDOT for review and acceptance.

25.3.6 O&M Quality Management Plan

The Section Developer shall be responsible for all aspects of quality control related to the Section O&M Work including tolling maintenance and operations. The Section Developer may choose to retain an IQF or perform quality assurance reviews by other means subject to review and acceptance by MDOT. If the Section Developer does not retain the IQF, the Section Developer shall provide quality assurance reviewers who are independent from the O&M Work being reviewed. Quality assurance reviewers shall meet the same requirements as those for

IQF staff who would perform the same function. The O&M QMP shall describe how quality assurance reviews are to be conducted; the qualifications for quality assurance reviewers; and who will perform such reviews for all aspects of the Section O&M Work.

Within this Exhibit 6 Article 25 (Operations and Maintenance), references to the IQF are to mean either the IQF or the Section Developer's quality assurance reviewers, depending on the choice of quality assurance staff made by the Section Developer.

The Section Developer shall prepare an O&M QMP as a component of the O&M Plan and SMP and submit for review by the IQF. The O&M QMP is subject to review and acceptance by MDOT. Fully comply with the requirements of the Section P3 Agreement and include O&M log forms, procedures, and other means as necessary to create a system that assembles the necessary information and data. Include an O&M quality management system to monitor the performance of the Section O&M Work conducted by the Section Developer's staff and a quality assurance system. The primary function of the O&M quality management system is to monitor the performance of the Section O&M Work including ETCS, ITS, and tolling. The O&M quality management system shall provide the means to evaluate the Section Developer's level of performance with respect to the minimum O&M Performance Requirements during the term of the Section P3 Agreement.

The O&M QMP shall also assemble the O&M information and data necessary and compare it to the Routine Maintenance Work Plan and Renewal Work Schedule and, ultimately shall document the O&M Noncompliance Points during the term of the Section P3 Agreement. The O&M QMP shall identify the means for monitoring and evaluating all aspects of the performance indicators specified in the Section P3 Agreement. Submit an O&M Report to MDOT that includes all supporting data and calculations used in the O&M QMP. Consider O&M Performance Requirements during design development, equipment selections, and construction quality since they impact the requirements and performance of the O&M QMP.

Develop a detailed quality assurance system as part of the O&M QMP that is consistent with its QMP for the Section. The quality assurance system shall validate the information, accuracy, and results of the O&M QMP. Include procedures to validate the data, times, dates, O&M logs, other information, and calculations that are the basis of Noncompliance Points.

Include in the O&M Report a section that identifies the results of the O&M quality management and quality assurance system.

To verify the accuracy of tolling data, the O&M Quality Management manual shall discuss approaches to quality control and quality assurance for this data, so the performance requirements are met or exceeded. After checking for accuracy, tolling data shall be subjected to statistic random sampling of Toll Transactions checked daily by reviewing the VMS video, images, Trip building, and Toll Transaction details for accuracy prior to submission to MDTA.

Quality assurance measures shall also include daily tracking of statistical performance across all lanes and activities and comparing that performance to previous and historical performance to identify anomalies. If anomalies are identified, The Section Developer shall undertake such activities as may be necessary to identify the cause of the anomalies and adjust or repair the system; checking procedures; or take other actions as necessary to restore proper performance.

At a minimum, the Section Developer shall track the following statistics:

- traffic volume;
- volume by lane;

- average operating speed during peak travel hours;
- Transponder Transactions vs Image-Based Transactions by lane;
- ineligible vehicles as defined in Section 25.6.1.9 (ETCS Performance Requirements);
- class vs volume;
- image rejects by lane;
- automated optical character recognition confidence by lane;
- automated optical character recognition accuracy by lane by time of day; and
- image rejects by lane by time of day.

If anomalies are found that may have resulted in inaccurate Toll Transactions, the volume and impact shall be disclosed to MDTA.

Yearly, processes used to verify the accuracy of tolling data shall undergo system and organization controls audit such as a SOC Type 2 Audit or other similar audit that achieves the same objectives following the guidance of the American Institute of Certified Public Accountants. Any audit issues shall be resolved within 60 days of issuance of the report.

Provide training to all staff that emphasizes the importance of the O&M quality management system. Do not alter any O&M logs, procedures, Inspection forms, or any other information that is used to monitor performance. Acceptance of the O&M QMP by MDOT and MDTA is a required condition prior to commencement of any Section O&M Work.

25.3.7 Reporting and Records

Deliver the Operations and Maintenance Report (“O&M Report”) to MDOT for its records, all in accordance with the Section P3 Agreement and quality management system. Submit the proposed format and proposed media of the O&M Report with the draft D&C O&M Plan Submittal. The O&M Report includes a section on D&C O&M which shall be submitted during the D&C Period. In accordance with Exhibit 6 Article 27 (Data Management for MDOT Systems), input data directly into the owner’s databases for:

- Bridge maintenance;
- pavement; and
- SWM.

25.3.8 O&M Reports

The O&M Report shall identify Defects, O&M logs, service requests, and security issues and Incidents that occur. Include a system for referencing each activity/event and the time and date of commencement and date of resolution. During the D&C Period, submit the D&C Period O&M Report to MDOT on a monthly basis no later than seven days after the first day of each month. Upon O&M Commencement Service Date, submit the Monthly O&M Report on a monthly basis no more than seven days after the first day of each month and the Quarterly O&M Report to MDOT on a quarterly basis no later than 14 days after the start of each quarter of each Fiscal Year (July 1, October 1, January 1, and April 1). For additional O&M Report requirements, see Exhibit 6 Article 25 (Operations and Maintenance) Section 25.9 (O&M Reporting).

Draft and final D&C Period O&M Reports and Operating Period O&M Reports shall include, at a minimum, the following data and information:

- a summary of the status of all Elements identifying all O&M activities and operating issues;
- a summary of Allowable Lane Closure timeframes, compliance hours, and planned maintenance hours for the coming month. Include details describing the location, duration, and reason of each;
- Non-Conformance Reports for each material Defect in the Elements identifying the location, the nature and cause of the material Defect and the steps that will be, or have been, taken to address the material Defect;
- a summary of Incidents, response times, repair Plans and repairs completed;
- a quality assurance review of O&M activities and lessons learned where appropriate; and
- information and requirements listed in Exhibit 6 Article 25 (Operations and Maintenance) Section 25.9 (O&M Reporting).

Include a high-level summary of Noncompliance Events, and Noncompliance Point assessments in an organized and readable format. Include all the supporting information and detailed data necessary to confirm the occurrence of any Noncompliance Events, and any Defects or other occurrences that result in Noncompliance Point assessments.

Reporting requirements for ETCS and operating data is described in Exhibit 6 Article 24 (Electronic Toll Collection Infrastructure).

25.3.9 Customer Service Logs

Maintain a log of customer comments, the MDOT CCMS, and Section Developer responses throughout the term of the Section P3 Agreement. MDOT will inform the Section Developer of customer inquiries, comments, and complaints relating to the PMLs. The Section Developer shall analyze the inquiries, comments, and complaints and provide suggested resolution to MDOT in the time frames identified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance).

25.3.10 O&M Personnel

Provide and maintain properly trained O&M personnel of sufficient quantities to perform the Section O&M Work. Provide sufficient O&M staff on-call 24 hours per day, seven days per week, and every day of the year. O&M personnel shall be available to respond to urgent O&M issues to support the requirements of the Section.

Provide O&M training of MDOT personnel upon O&M Commencement Service Date and again 60 days prior to the end of the term of the Section P3 Agreement, such that MDOT personnel have a complete understanding of the O&M program, Plans, tasks, reports, and activities for the Section O&M Work.

25.3.11 MDOT Audits

MDOT has the right to perform periodic audits of Section Developer's Section O&M Work at any time and for any reason to verify that the O&M Plan meets the requirements specified within the Section P3 Agreement.

Provide MDOT access to all files, records, logs, data, databases, and any other information related to the O&M Plan such that MDOT can verify that the O&M requirements are performed appropriately. Maintain accurate, updated files that are accessible for this purpose.

Provide access to tracking data for Noncompliance Events, and any Defects or other occurrences that would result in Noncompliance Point assessments in electronic format at any time upon MDOT's request.

25.3.12 Roadway Closure Criteria

See Exhibit 6 Article 22 (Maintenance of Traffic) for work hour restrictions for any lane closures for Section O&M Work and Renewal Work.

The Section Developer shall not undertake the closure without MDOT prior acceptance. Coordinate with MDOT prior to closing any travel lanes for unplanned lane closures when the circumstances arise.

In Emergencies, the Section Developer may be required to close the Relevant Infrastructure within the O&M Limits to the general public should circumstances either compromise the safety of the public or as is necessary to protect the facility's Assets. Coordinate with MDOT and agencies that may be impacted by closures.

Maintain a log of the closure periods and identify the closure periods in the O&M Report. Include the time log of the events, the cause of the nonconformance, and the measures taken to achieve conformance.

25.3.13 Oversize and Overweight Load Permits

MDOT may issue permits for oversize and overweight loads to use the Section through an automated permitting system for most oversize/overweight permits. All oversize Permitted Vehicles shall be allowed to use the Section subject to the restriction of Applicable Law.

Provide MDOT all Bridge model information for the Section, including Bridge load ratings performed and required for issuance of such permits. Provide MDOT bridge structure data in file types as agreed to by the Parties. Promptly report to MDOT any changes in a bridge's structural condition and supply updated models to reflect the changes to the structure's condition.

When a permit request warrants further review, MDOT will forward such requests to the Section Developer for additional analysis. Analyze the permit request using load rating guidelines and return the analysis to MDOT within three Business Days together with the Section Developer's determination regarding the request and, when applicable, recommended permit speed or lane restrictions.

25.3.14 Shared O&M Protocols

As part of the O&M Plan, the Section Developer shall prepare a Transition and Coordination Plan and submit it subject to review and acceptance by MDOT. The Transition and Coordination Plan shall detail how the Section Developer shall work with MDOT to ensure a seamless transfer of O&M responsibilities and how Phase Developer will coordinate with MDOT for all Section O&M Work performed by the Section Developer throughout the Operating Period. The Transition and Coordination Plan shall also detail how the Section Developer shall coordinate with MDOT for

all Section O&M Work that is the responsibility of MDOT and Section O&M Work that is shared between the Section Developer and MDOT.

At least 180 days prior to the scheduled O&M Commencement Date, coordinate with MDOT to prepare Asset O&M Responsibility Matrices that include all Elements identifying who is responsible for the Section O&M Work during the Operating Period. O&M Responsibilities are either the Section Developer's, MDOT's or shared. For all Elements with Shared O&M Responsibilities, coordinate with MDOT to prepare draft Shared O&M Protocols and submit to MDOT for review 180 days prior to the scheduled O&M Commencement date. At least 60 days prior to the scheduled O&M Commencement Service Date, prepare final Shared O&M Protocols and submit them subject to review and acceptance by MDOT. The Transition and Coordination Plan shall detail protocols the Section Developer must establish with MDOT regarding shared use of the PMLs and GPLs. The Plan shall detail communication and coordination protocols when the Developer needs to use the GPLs for Section O&M activities and when MDOT needs to use the PMLs and associated infrastructure for their Work. Protocols will include but are not limited to proper notice for start and finish of Work, description of Work, and any additional requirements of either MDOT or the Section Developer while the work is being performed.

25.4 O&M Requirements During Design and Construction

Prepare a D&C O&M Plan that describes the Section Developer's responsibilities during the D&C Period. Prepare the Plan in accordance with the overall requirements of the O&M Plan, including Plans for O&M safety and quality during the D&C Period. Prepare a draft D&C O&M Plan and submit to MDOT as a condition to Financial Close. Submit a final D&C O&M Plan subject to review and acceptance by MDOT prior to NTP.

Perform reviews of the design as it is prepared to ensure maintainability is provided. Conduct the Section O&M Work at all times during the D&C Period. When the Section Developer's design requires the performance of Construction Work on existing roadways outside of the O&M Limits, conduct the D&C Period Section O&M Work on such roadways beginning upon commencement of Construction Work on such roadways and continue until Substantial Completion or the Section Developer is notified otherwise.

When MDOT determines that such Construction Work has been completed satisfactorily, MDOT will notify the Section Developer in writing of acceptance of such Construction Work and the Section Developer will not be responsible for further O&M of such roadway that is outside of the O&M Limits.

25.4.1 Property Acquired for Construction

Section O&M Work on any properties acquired for construction of the Work is required upon acquisition. This includes winter maintenance (snow and ice), mowing and landscaping, litter removal, neatness, and Routine Maintenance for all acquired properties.

The property acquisition process shall be coordinated with MDOT in accordance with [Exhibit 6 Article 8 \(Right-of-Way\)](#).

25.5 Maintenance Performance Requirements

Maintenance requirements included in the O&M Performance Requirements are set out as minimum standards. At all times, demonstrate Good Industry Practice. Specific O&M

Performance Requirements are presented in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance) for Section O&M Work. The responsible party for Section O&M Work for individual Elements is shown in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-5 (Asset O&M Responsibility Matrix).

For any Mitigation, Temporary Repair, or Permanent Repair as shown in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) or Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance) exceeding 1 month, provide a repair plan within 3 days of notification of Noncompliance Event, and include a discussion of the status in the Monthly O&M Report.

25.5.1 Roadway Condition – Rigid and Flexible Pavement

Pavement (roadway ramps, access roads and other paved areas) shall adhere to the O&M Performance Requirements as specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance) ID #1.

Enter as-constructed information into MDOT's Pavement Management Database. MDOT will continue to collect surface condition video, rutting measurements, ride quality measurements, and faulting measurements as appropriate for the pavement type. These collections, including ride quality, typically happen every year. This does not relieve the Section Developer from collecting data and reporting on O&M Performance Requirements. The pavement shall provide the minimum O&M Performance Requirements for any pavement as specified in Table 25-6.

Roadway smoothness shall be measured for the entire continuous roadway surface within the O&M Limits, but the data from 50 feet prior to and 50 feet after any bridge approach shall be excluded from the Performance Requirement.

25.5.2 Stormwater Drainage System Condition

The drainage system shall adhere to the O&M Performance Requirements as specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance) ID #2 and responsibilities specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-5 (Asset O&M Responsibility Matrix).

The Maryland Department of Environment ("MDE") issued a NPDES MS4 Stormwater Permit No. 11-DP-3313 to MDOT. Activities conducted by the Section Developer under the Section P3 Agreement on MDOT owned property must meet the requirements of the current and future MS4 Permits. Under the MS4 Permit, MDOT retains operational authority to perform the following with respect to SWM:

- identify special needs for the Section;
- mandate special details to be included in the design Plans or special provisions;
- conduct on-site Plan reviews for compliance and require design and operational changes to accommodate field changes, new environmental regulations, and NPDES permit requirements;
- inspect all construction sites including waste and borrow pits and haul roads and industrial sites;

- issue violation notifications or cease and desist orders; and
- rescind authorization for performing Work under this program due to negligence in NPDES Permit implementation or compliance.

SWM associated with MDOT's NPDES MS4 Permit pertains to both the D&C Period and the Operating Period. If the need for pump stations becomes apparent, the design standards, construction requirements, and O&M Performance Requirements will be determined at that time.

Prior to the start of any construction, the Section Developer shall identify a point of contact to manage and provide oversight of NPDES Stormwater Permit requirements and submit a Stormwater Management Program Plan subject to review and acceptance by MDOT. The Stormwater Management Program Report ("SMPPr") identifies how the Section Developer intends to comply with the NPDES permit requirements of the prevailing permit at the time.

The SMPPr shall identify the content of the compliance report, which shall be submitted annually with the O&M Report. The SMPPr shall be submitted subject to review and acceptance by MDOT. An accepted SMPPr is required prior to the O&M Commencement Service Date.

25.5.3 Environmental Features

Environmental features shall adhere to the O&M Performance Requirements as specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance) ID #3 and responsibilities specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-5 (Asset O&M Responsibility Matrix).

In addition to MS4 Permit compliance activities, the Section Developer shall adhere to all environmental regulations including but not limited to the following:

- Spill Prevention, Control, and Countermeasure Plan: Per US EPA regulations, the Section Developer shall prepare and implement a Spill Prevention, Control, and Countermeasure Plan for activities that store greater than 1,320 gallons of oil and have a reasonable potential to discharge into or upon navigable Waters of the US or adjoining shorelines; and
- Concrete and Asphalt Production Facilities: Concrete and asphalt production plants are not permitted through MDOT's NPDES permit. The Section Developer shall obtain applicable permits for establishing or operating any of these facilities within the ROW.

The Section Developer shall fully comply with the Reforestation Law; maintain the sites during the specified warranty period or otherwise as determined or required by the property owner.

25.5.4 Structures

Structures shall adhere to the O&M Performance Requirements as specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance) ID #4 and responsibilities specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-5 (Asset O&M Responsibility Matrix).

Routine Maintenance, minor repair and major repairs on Bridges, including collision damage repairs, shall include the following:

- Routine Maintenance: The Section Developer shall preserve and maintain structures and all their appurtenances, including all sloped areas under the structures' end supports, including slope protection and rip rap, in their original condition or as subsequently improved. Routine Maintenance includes any activity intended to maintain an existing condition or to prevent deterioration. Examples include but are not limited to cleaning, lubrication, spot painting, dirt and debris removal, and application of protective systems;
- Repair of Minor Damage: The Section Developer shall undertake minor repairs, including any activity intended to correct the effects of minor material deterioration by restoring the damaged Bridge Elements. Minor repairs are generally defined as repairs to Bridge Elements that are structurally sound (i.e., no loss of strength), but may have minor section loss, cracking, spalling, or scour. Minor repairs are typically unanticipated maintenance Work as identified by Bridge Inspections. Minor damage repair Work also includes but is not limited to, repairing:
 - damaged or misplaced clearance markers;
 - damaged or missing advisory and warning signs;
 - damaged or deteriorated railings and curbs;
 - uneven or cracked approach and deck surfacing;
 - accumulated drift adjacent to bents and piers;
 - minor erosions;
 - accumulated dirt or debris on decks, near stringer ends at supports, adjacent to bearings;
 - plugged drains;
 - settlement or roughness of approach;
 - fire hazards; and
 - faulty electrical contact.
- Repair of Major Damage: The Section Developer shall repair damages that affect structural integrity of an entire span, thus requiring underpinning of the span or supplementing of a member, pier, or bent before repair in place or removal and replacement. The Section Developer shall perform engineering evaluation (such as structural, geotechnical, hydraulic, or other) when necessary to determine the extent of the lost strength and identify the Work to be performed to remedy the damage. Conditions requiring major repairs include loss of section, deterioration, spalling, or scour that affect the strength of a load-bearing Bridge Element. Major damage repair Work includes, but is not limited to, repairing:
 - bent or damaged steel beams, girders, or truss members;
 - cracked or spalled concrete members, other than curb and railing;
 - defective bearings on substructure or in deck at expansion joints;
 - settled bents or piers;
 - major erosion or scour;
 - extensive fire damage; and
 - loose bolts.

- Rehabilitation: The repair or rehabilitation of a Structure, including all its appurtenances, to a condition meeting or exceeding the design standards at the time the Work is performed, insofar as practical shall be considered Renewal Work; and
- Bridge painting: The Section Developer shall maintain all paint systems on structures to the original condition as intended in the design. Spot painting is only acceptable for active corrosion areas as a preventative measure. For aesthetic reasons, the paint system shall always be of uniform color and appearance.

25.5.5 Pavement Marking

Pavement markings, object markers, barrier markers, delineators and related features shall adhere to the O&M Performance Requirements as specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance) ID #5 and responsibilities specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-5 (Asset O&M Responsibility Matrix).

25.5.6 Sign Structures, Foundations and Supports

Sign structures, foundations and supports shall adhere to the O&M Performance Requirements as specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance) ID #6 and responsibilities specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-5 (Asset O&M Responsibility Matrix).

25.5.7 Permanent Signs

Permanent signs shall adhere to the requirements of Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) ID #7 and responsibilities specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-5 (Asset O&M Responsibility Matrix).

25.5.8 Fences and Sound Abatement

Fences and sound abatement shall adhere to the O&M Performance Requirements as specified in Exhibit 6 Article 25 Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance) ID #8 and responsibilities specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-5 (Asset O&M Responsibility Matrix).

25.5.9 Landscaping

Landscaping shall adhere to the O&M Performance Requirements as specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance) ID #9 and responsibilities specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-5 (Asset O&M Responsibility Matrix).

Plant establishment and warranty shall be addressed in the Landscape Maintenance Plan. The plant establishment period shall:

- coincide with a minimum length of forest conservation and maintenance periods for two years from the date of installation for all plants and as defined by the agency owning or maintaining the property during and following the establishment period; and
- be the minimum period for a meadow to be established and self-sustaining except for yearly mowing for three years from the date of installation for all meadow establishment areas.

Additionally, plant warranties shall be provided for:

- all trees, shrubs, and perennials for a period of two years; and
- all trees and shrubs installed for reforestation mitigation for a period of five years.

Long-term plant maintenance shall include mulching, watering, and pruning of deadwood, removal of hazardous trees, replacements for trees and shrubs.

The schedule for planting seasons and limitations on digging hazards may be required for local jurisdictions. The Phase Developer is advised to address these constraints in the Section Schedule.

25.5.10 Earthworks, Embankments and Cut Slopes

Earthwork, embankments, and cut slopes shall adhere to the O&M Performance Requirements as specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance) ID #10 and responsibilities specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-5 (Asset O&M Responsibility Matrix).

25.5.11 Litter and Obstructions/Debris Removal

Litter and obstructions/debris removal shall adhere to the O&M Performance Requirements as specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance) ID #11 and responsibilities specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-5 (Asset O&M Responsibility Matrix).

25.5.12 Lighting

Lighting shall adhere to the O&M Performance Requirements as specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance) ID #12 and responsibilities specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-5 (Asset O&M Responsibility Matrix).

25.5.13 Guardrails and Safety Barriers

Guardrails and Safety Barriers shall adhere to the O&M Performance Requirements as specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance)

and Table 25-7 (D&C Period Performance) ID #13 and responsibilities specified in (Operations and Maintenance) Exhibit 6 Article 25 Table 25-5 (Asset O&M Responsibility Matrix).

25.5.14 ETTM System and Electrical

The scope of ITS systems maintenance shall include any activities necessary to keep the systems fully operational and functional and to comply with the minimum O&M Performance ITS and electrical systems shall adhere to the O&M Performance Requirements as specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance) ID #15 and responsibilities specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-5 (Asset O&M Responsibility Matrix). For the ETCS, maintenance activities to keep systems fully operational and functional shall comply with the O&M Performance Requirements and the TSA.

All equipment and component parts that are furnished shall meet all requirements of the Section P3 Agreement. Maintain and have readily available an up-to-date inventory of all ITS equipment and parts. The inventory shall contain, at a minimum:

- manufacturer;
- model number;
- descriptive name;
- manufacturer serial number;
- spare or newly ordered part;
- location where installed including stationing, if possible;
- date of purchase;
- date of repair;
- date when scrapped;
- calibration status and date;
- manufacturer's Routine Maintenance schedule; and
- warranty status if applicable.

Upon the observation or a notification of a malfunction or problem with the ITS system, dispatch qualified personnel to provide diagnostic and troubleshooting services as required, to identify the problem and, if possible, perform minor repairs to fix the problem while at the site.

Conduct the minor repairs that are needed during diagnostic Work. Minor repairs include, but are not limited to, replacement of any spare parts in the current spare parts inventory, reset of electric, electronic or electromechanical devices, reset of the device or PC/PLC controllers, reset programs, replace missing screws or clamps, loose connection of any wires, cables, or harnesses, replacement of fuses or circuit breakers.

Conduct Routine Maintenance and repair or replace damaged, missing, or malfunctioning equipment in order to maintain the system operation and functionality in order to meet the minimum O&M Performance Requirements.

Provide replacement parts as needed for the maintenance of the ITS system. The replacement part shall be the latest compatible technology, equal to or better in function and quality to meet

or exceed the original equipment manufacturer's standards for the existing system component or equipment, and by its use, does not cause a system upgrade. Maintain inventory control of all replacement equipment.

Protect any existing communication links within the ROW. If any communication link is damaged, it is the responsibility of the Section Developer to repair or replace the damaged communications equipment (fiber-optic cable, conduit, pull boxes, splice cabinets, hubs, etc.). Damaged fiber-optic cable may be temporarily spliced to restore communications; however, any damaged fiber-optic cable will be replaced from termination point to termination point with the same type of cable.

Provide ITS Emergency maintenance, non-scheduled maintenance, and Routine Maintenance services as part of the overall infrastructure maintenance program.

25.5.14.1 ITS Emergency Maintenance Repair

ITS Emergency maintenance response will be required when a device or component of the device, results in the complete failure to critical operational Elements of the ITS system; or any ITS system infrastructure item that is in a condition that is unsafe or may present a life-threatening condition. Typical ITS emergency maintenance response will be required for, but not be limited to:

- system-wide communication outage;
- structural failure or potential Structure failure due to Incident or weather damage;
- message being stuck on an electronic message sign;
- fiber/cable cuts, electrical risks, or potential fire risks; and
- Incident detection system failure

Maintenance staff shall arrive at the site of the ITS Emergency within 30 minutes during the period of 5:00 a.m. to 9:00 p.m., Monday through Friday, and within one hour at all other times, upon detection or notification of the ITS Emergency maintenance-related system failure.

Upon arrival at the site, update MDOT of the status of the ITS Emergency maintenance. Then analyze the situation and develop an estimate of the time required for repairs and analyze if a Lane Closure or road closure is necessary. Determine if the repair should be initiated immediately or if the situation should be monitored through the period of 5:00 a.m. to 9:00 p.m., Monday through Friday, and repaired outside of such period. If the repair time will exceed two hours, notify MDOT immediately and begin the preparation of a contingency Plan. A workaround should be considered if it would not negatively impact any part of the Section operations. Notify MDOT when the maintenance actions have been completed and describe any resulting operational restrictions.

25.5.14.2 Non-Scheduled ITS Maintenance Work

Non-scheduled maintenance will be required when a device or component of the device, has failed and must be repaired in order for the ITS system to function as required. Maintenance staff shall arrive at the worksite within 24 hours upon detection or notification of the non-scheduled maintenance-related system failure.

Upon arrival at the site, update MDOT of the status and estimated time required for repairs. If the repair time will exceed 24 hours, notify MDOT immediately and begin the preparation of a

contingency Plan. A workaround should be considered if it would not negatively impact any part of the Section operations. Notify MDOT when the maintenance actions have been completed and describe any resulting operational restrictions.

25.5.14.3 Routine ITS Maintenance Work

Perform all Routine ITS Maintenance within the periodic intervals as recommended and specified by the equipment manufacturer and based on the equipment's operating condition over the duration of the Operating Period. Routine ITS Maintenance shall consist of performing necessary Inspections, electrical and mechanical tests, and repairs of the device sites to maintain the ITS system.

Provide a standard Routine ITS Maintenance schedule/checklist of the items to be checked or changed on the ITS system. Such Plans shall be updated periodically to reflect any future system renewals during the Operating Period. Submit a sample Routine ITS Maintenance schedule/checklist as part of the O&M Plan.

Power and communications service runs shall be kept clear for easy recognition of the pull boxes and easy access to the service run. Dirt, plants, weeds, etc. shall be removed from pull box covers. Maintain areas surrounding the controller cabinet's utility service poles, camera/device poles, and sign structures to allow safe and convenient access to the Elements. The interior of all ITS controller and system cabinets shall be free of excess dust, dirt, debris, cobwebs, nests, etc. The exterior of the ITS system devices shall be cleaned as needed and shall be performed in conjunction with the Routine ITS Maintenance.

Ensure that the cable plant markers are in place and that they are in good condition. This service shall be provided each year as part of the Routine ITS Maintenance, for each marker in the entire ITS system. If a need arises for replacement cable plant markers to be purchased, such markers shall be similar to the existing markers; ensure that the same markings are used to identify the cable route.

25.5.15 Graffiti

Addressing graffiti shall adhere to the O&M Performance Requirements as specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance) ID #16 and responsibilities specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-5 (Asset O&M Responsibility Matrix).

25.5.16 Stakeholder Communication

Stakeholder communication shall adhere to the O&M Performance Requirements as specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) ID #17 and responsibilities specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-5 (Asset O&M Responsibility Matrix).

25.5.17 General

Additional general conditions shall adhere to the O&M Performance Requirements as specified in Exhibit 6 Article 25 Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25

(Operations and Maintenance) Table 25-7 (D&C Period Performance) ID #18 and responsibilities specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-5 (Asset O&M Responsibility Matrix).

25.5.18 Winter Maintenance

25.5.18.1 General

Provide winter maintenance during the D&C Period and Operating Period within relevant O&M Limits at a consistently superior LOS across the entire Section. Maintain the roadway in as safe as possible a condition during winter events. Use the full complement of available resources to keep the roadway safe throughout the winter and to reach the prescribed LOS as soon as possible after winter events have abated or ceased. Have available staff and equipment in a state of readiness one month prior to and one month after the median date for the first and last snowfall of 0.5 inches or more based upon past meteorological data and monitoring weather patterns. The Section Developer shall be prepared to maintain the roadway at all times and under all weather conditions to the best of its ability and to prevent and to address any adverse conditions, regardless of the time of the year, using all available resources. Winter maintenance shall adhere to the O&M Performance Requirements as specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance) ID #19 and responsibilities specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-5 (Asset O&M Responsibility Matrix). Monitor long-term forecasts to aid in deciding when equipment should be readied for unusually early and late storms, including those outside of the normal snowfall period.

25.5.18.2 Snow and Ice Control Plan

Develop, implement, operate, and, as required, update a Snow and Ice Control Plan ("SICP"). The SICP shall contain detailed operational procedures for performing the snow and ice control Work outlined herein. The SICP shall comply with Applicable Law, codes, and regulations governing the operation of snow removal equipment on public highways, best highway management practices, and MDOT requirements.

The SICP shall address the following:

- advance preparation procedures;
- call-out procedures;
- response protocol;
- operational requirements;
- training;
- recordkeeping/reporting;
- environmental management;
- anti-icing and de-icing chemical storage; and
- equipment.

Prepare and submit the SICP subject to review and acceptance by MDOT prior to Substantial Completion. Annually update and submit the SICP subject to review and acceptance by MDOT

as part of the annual O&M Plan update on July 1 of each year. Incorporate any changes in strategy, equipment levels, etc., designed to rectify faults identified by the Section Developer, and MDOT in the Section Developer's snow and ice removal operations during the preceding winter season.

25.5.18.3 Bare Pavement Event

During the winter season, keep the roadway clear of ice and safe. The Performance Requirement used to determine clear and safe is Bare Pavement. Bare Pavement is defined as a condition under which the entire driving surface and shoulders have been cleared of loose snow and ice. The driving surface and shoulders may have isolated patches of ice, snow, or slush that, when treated with chemicals or abrasives or a combination of these, may be negotiated safely by the average driver at a reduced speed.

The storm event beginning date and time is the date and time that snow and, as applicable, freezing rain falling is first observed. The storm ending is the date and time that snow and, as applicable, freezing rain is observed to have stopped.

Bare Pavement is considered lost on a roadway when snow or ice is covering the road surface and winter operations (plowing and, as applicable, spreading) are required. Record this date and time as the bare pavement lost date and time. If winter maintenance equipment is called in advance of the roadway being covered (with ice and, as applicable, snow) and operations are then required, Bare Pavement is considered lost when the first unit arrives at the area to be serviced. Record the date and time the unit arrived at the area as the date and time bare pavement was lost.

Bare Pavement is considered regained when more than 95 percent of the portion of the roadway affected by the storm is bare.

Drifting is not considered a storm, and therefore is not recorded as such. When drifting delays, the time to regain Bare Pavement, this shall be noted as part of the data collection. Each storm shall be recorded as it happens, even if Bare Pavement is not regained before the start of the next storm. If precipitation begins again within three hours of the previous storm ending, it shall be considered to be the same storm.

Time shall be recorded using the 24-hour clock and rounded to the nearest half-hour for the local time zone.

25.5.18.4 Reporting Requirements

Complete the Winter Patrol Diary, date, and sign daily during the winter season and submit to MDOT within 24 hours upon request. Maintain a sufficient quantity of hardbound diaries for documenting the requirements. Document daily information in the diary, which, at a minimum, includes the following:

- weather condition;
- date;
- printed name and signature;
- Work completed during the day and equipment and material used (to include, but not limited to, salt, slurry, agricultural by-product, brine and magnesium chloride);

- when patrols are completed, areas patrolled, deficiencies noted;
- discussions with the public (name the individual);
- discussions with MDOT (name the individual);
- equipment that cannot be operated at full capacity and why;
- calls from the police services and action taken;
- accident information; and
- page number (e.g., page 1 of 2).

Complete the Winter Operations Record or a report of a similar nature that shall record the following information for each winter vehicle:

- date and time each winter vehicle is called for work;
- time operator arrived at the yard;
- time the winter vehicle is left at the yard;
- quantity of salt/liquid used;
- lane miles serviced;
- rate of application;
- total hours worked;
- unit number;
- page number (e.g., page 1 of 2);
- comments; and
- time drivers dismissed or relieved.

Each daily entry is to be signed by the operator of the winter vehicle at the start of performing winter operations and at the end, when relieved. Clearly identify a printed name identifying the operator of the vehicle.

Collect Bare Pavement data and report its achievement of meeting the performance target on an annual basis. Provide data in electronic format and to MDOT by July 1 of each year.

The information collected and recorded for each storm event is as follows:

- date and time event started;
- date and time event ended;
- date and time Bare Pavement was lost;
- date and time Bare Pavement was regained;
- type of event (snow(s), freezing rain (fr), which includes hail, and both (b));
- bare pavement regained time is n/a (if applicable); and
- comments.

25.6 Operations Performance Requirements

25.6.1 ETCS Operations

The following ETCS functional requirements shall be followed for each and every vehicle using the PML, whether equipped with a Transponder or not, the ETCS shall at a minimum:

- provide all electronic tolling service to vehicles on the PML;
- detect vehicles;
- read Transponders (if equipped);
- capture an image of the front and rear of each vehicle showing the license plate image, readable to determine plate number, state of origin, and plate type;
- handle multiple Transponder reads within a vehicle by defaulting to a single Transponder as determined in accordance with the TSA and (if applicable) the Business Rules;
- receive Transponder status files from the MDTA Customer Service Center (“CSC”) including full status files daily and incremental updates throughout the day and complete distribution from the files(s) to the lane level system in 15 minutes or less;
- maintain Transponder-reader equipment utilizing Multi-Protocol Reader technology sufficient for a minimum of three protocols with protocol reading priority capabilities to be set during Final Design under the direction of MDTA;
- provide real-time Transponder passage notifications to the CSC via the intermediate notification ICD (to support short message service (“SMS”)/text and push notifications to Users);
- inform corridor motorists in real-time of the applicable Toll Rates, including the suspension of tolls, using Toll Rate Signs before they use the PML;
- classify vehicles per the vehicle classification;
- identify occupancy declaration;
- tolerate old Transponder data files during periods of lost communication;
- detect and prevent duplicate Toll Transactions from being sent to MDTA;
- transmit completed Trips and all associated data to MDTA within the time limits established;
- construct an accurate Trip with Toll Rate, location, lane, date and time information, vehicle class, Transponder or plate information as applicable;
- create a proof of passage by Tolling Point in accordance with applicable requirements;
- generate accurate Toll Transactions, for both Tolling Point and Trip, and maintain proper records of such Toll Transactions and supporting information resulting in the creation of each Toll Transactions;
- allow a configurable time window between each consecutive Tolling Point to associate individual Toll Transactions into a single Trip;
- transmit accurate and certified Trip data to MDTA host server;
- create buffered Toll Transactions and ability to hold locally for an extended period of time in the event of a transmission disruption;
- communicate and interface to ITS/traffic management systems as needed along the PMLs and GPL corridors;

- maintain a database of all the displayed Toll Rates by Tolling Point, direction, date and time of day to provide historical toll value in the case of component failure, system audit, or dispute resolution accessible by CSC staff as needed;
- accurately calculate the toll for the use of the PML and assigned as applicable pursuant to the TSA;
- display the Toll Rate for the PML in accordance with Exhibit 6 Article 19 (Intelligent Transportation Systems);
- publish Toll Rates to MDOT CHART using current ICD and modify only if required for functionality and as accepted by MDOT;
- collect audit data by means of a Digital Video Auditing System with data and event logger attached to monitoring cameras and indexed to the Toll Transactions;
- provide access to view and download Digital Video Auditing System video clips as necessary for customer service;
- exchange audit and reconciliation files per the applicable file specification;
- provide traffic counts sufficient to verify and audit the performance of the ETCS;
- provide accurate accounting in US dollars and according to State rules and regulations, and US GAAP;
- manage and store all data transfers among the ETCS functions and between ETCS and MDTA;
- measure key performance indicators, metrics and monitor ETCS performance;
- provide preventative and curative maintenance management systems;
- implement a monitoring tool to monitor and manage equipment and systems that are compatible with MDTA's existing monitoring tool protocols;
- monitor, track, and control quality of ETCS maintenance performed; and
- produce and provide to MDOT and MDTA in an acceptable format, all reports in accordance with Exhibit 6 Article 25 (Operations and Maintenance) Section 25.3.8 (O&M Reports).

ETCS performance and functional requirements are further defined in this [Exhibit 6 Article 25 \(Operations and Maintenance\)](#) and in [Exhibit 6 Article 24 \(Electronic Toll Collection Infrastructure\)](#).

25.6.1.1 Vehicle detection, identification, and classification

The ETCS shall detect and classify according to the vehicle classification in the TSA, all vehicles traveling in the PML; identify in which lane the vehicle traveled through each Tolling Point, including those within the shoulders or straddling a lane and shoulder, without degradation or interference; and produce the data necessary to accurately calculate the Trip Toll. Vehicles meeting the definition of Exempt Vehicles shall be filtered out by the Section Developer and not forwarded to MDTA for processing.

25.6.1.2 Toll Transactions

Provide the necessary Toll Transactions data as required to correctly process each Trip sent to MDTA for posting. Valid Trip elements can be found in the TSA. The Section Developer shall work with MDTA to adopt detailed ICD requirements to correctly process each Toll Transaction

to be sent to MDTA. Detailed ICD requirements to be developed by the Toll Systems Integrator using the high-level ICD provided in the TSA as a basis.

The Section Developer shall record the time for each Toll Transaction within a millisecond and agree with the MDOT wide area network master clock.

The ETCS shall have the capability to calculate Toll Rates dynamically in real-time in the PML to meet the requirements set out in the TSA and (if applicable) the Business Rules.

The ETCS shall assign the toll due based in accordance with the term of the TSA and (if applicable) the Business Rules.

The system shall support human audit and manual amendments to Toll Transactions.

The assigned toll to the vehicle using the PML shall be according to the requirements set out in the TSA and (if applicable) the Business Rules.

The ETCS shall not create Toll Transactions for vehicles traveling in the GP Lanes, whether equipped with a Transponder or not.

For all Toll Transactions, the ETCS shall include the license plate data as part of the Toll Transaction message.

The ETCS shall include machine-read images and license plate identification information in the Toll Transaction message, including license plate type, alphanumeric characters, optical character recognition confidence level value, and jurisdiction of origin.

The ETCS shall maintain a record of all applicable Toll Rates (to the millisecond), to serve as evidence of applicable rate at time of passage for vehicles. The ETCS shall maintain a record of all Toll Transactions and Trips for a minimum of 90 days. This information shall be available to MDTA within 24 hours.

The ETCS shall have the capacity to buffer transactions for 90 days and the ability to resend transactions to MDTA if requested.

The ETCS shall digitally store VMS video clips associated with Toll Transactions, and video of each toll price displayed on the toll pricing signs for a period of 90 days. The archived video shall be accessible to MDTA for investigation, auditing, and customer service purposes.

The ETCS shall create a Trip from the collected Toll Transactions of each vehicle traveling along the PMLs in the Phase in accordance with the TSA and (if applicable) the Business Rules.

ETCS shall host a web-accessible tool that allows MDTA CSC staff to research Toll Rates, detailed Toll Transaction data, and other applicable data to aid in User dispute/inquiry resolution.

25.6.1.3 Image Capture

For every vehicle passing through a Tolling Point, the system shall capture license plate images and correctly associate them with the corresponding Toll Transaction data.

The tolling system shall imbed audit data on every image, including, at a minimum: Tolling Point, lane, data, time, Toll Rate, and image number.

Audit data is imbedded on every image not only for Image-Based Transaction purposes but also for human reviews to detect an issue with a specific camera in the tolling system.

The system shall create an area of interest image from the image used to determine the license plate data showing an enlarged view of the license plate with license plate data clearly readable to the unaided eye.

For all Toll Transactions, the system shall capture, at a minimum, images of the vehicle's front and rear license plate and rear of the vehicle along with an image containing the complete vehicle profile. The captured images shall display clearly (as required to meet statutory requirements) without the need for image enhancements, the information needed to process the Toll Transaction as required to meet performance specifications as outlined in the ICD, the TSA and the Technical Requirements.

The following components, at a minimum, shall be included with the image capture practices to comply with MDTA processing of Trips and violations:

- at each Tolling Point, a front and rear image shall be captured of the vehicle;
- the Toll Transaction time of the first Tolling Point in the Trip shall be the entrance time and used for the entry timestamp;
- the Toll Transactions time of the last Tolling Point in the Trip shall be the exit time and used for the exit timestamp;
- after Trip building, the best image from the last Tolling Point (front or rear) in the Trip is used as the image identified for notice of toll due ("NOTD") and region of interest ("ROI"), unless it is corrupted;
- if the last Tolling Point images are corrupted, the next to last Tolling Point in the Trip images shall be used. If that is corrupted, the usable image from the Tolling Point closest to the end of the Trip shall be used;
- time stamps cannot be changed/edited after being embedded on the images;
- all images from all Tolling Points related to the Trip shall be sent to MDTA and associated to the Toll Transaction pursuant to the ICD and the TSA;
- image file names must follow the ICD requirements;
- the ROI (license plate) from the image identified for NOTD is cropped and provided as a separate image;
- all images, except the ROI, shall have the image timestamp applied at the respective Tolling Point in lane camera along the top of the image. The timestamp identifies the date, time of day to the millisecond, the Tolling Point identification, and lane identification;
- all images, except the ROI, shall have the entry timestamp, and exit timestamp applied to them along the bottom of the image after Trip building;
- if any image adjustments are performed to make an image easier to read, the adjusted image shall be sent to MDTA;
- images shall be human readable to validate license plate number, license plate type, and state as per compliance with the performance requirements listed in this [Exhibit 6 Article 25 \(Operations and Maintenance\)](#);
- timestamps shall not interfere with reading the license plate information;

- the date, time and location embedded on the images for entry/exit data shall be consistent with the dates, times and locations as reported within the Trip data;
- for single-Tolling Point Trips, the entry and exit times shall be the same;
- for multi-Tolling Point Trips all available images from all Tolling Points of the Trip shall be transferred to MDTA, including both front/rear images and their respective ROIs; and
- evidence package shall contain all images, including those which are sent with the uniform transaction message, as well as the remaining images which are sent via a batch process.

25.6.1.4 Video Monitoring System

The ETCS shall include a Video Monitoring System (“VMS”) that records color video at a minimum rate of 10 frames per second of every toll lane and Tolling Point allowing for the visual identification of vehicle size and number of axles at all times of the day and under all environmental conditions. Authorized MDTA users shall be able to:

- view real-time and recorded VMS video and video clips from up to 50 workstations concurrently; and
- search quickly by various query criteria, including:
 - lane number;
 - specific time and time range;
 - location;
 - Tolling Point;
 - class mismatch; and
 - any combination of these parameters.

The ETCS shall associate a segment of VMS video with every Toll Transaction. The segment of VMS video associated with the Toll Transaction shall start 5 seconds before the Toll Transaction occurs and end 5 seconds after the Toll Transaction occurs. During viewing of any VMS video include the associated Tolling Point/lane controller Toll Transaction/event messages in a viewable format, synchronized to the video clip. Allow authorized users to record and store video clips and embed the date, time (to 1/100 of a second), Tolling Point, and lane at the bottom of the images so that it is visible when images are played back.

The VMS subsystem and ETCS host shall be synchronized within 1/100 of a second.

25.6.1.5 Interoperability

The ETCS shall meet MDTA Interoperability and compatibility standards, requirements, and protocols as outlined in the TSA.

25.6.1.6 High Occupancy Vehicle Enforcement

Enforcement of HOV status shall be carried out only by authorized law enforcement authorities.

Provide to such law enforcement authority all declaration data sufficient and necessary for legal enforcement, including vehicle classification, date and time of entry, location of entry, and vehicle identification and occupancy data (per vehicle classification), and any other information as may be required by such law enforcement authority.

To the extent the Section Developer provides enforcement zones, such enforcement zones shall consist of an area for occupancy enforcement technology and a parking area for at least one law enforcement vehicle. The enforcement zone shall be designed in accordance with the AASHTO Guidance for High Occupancy Vehicle Facilities.

The ETCS shall communicate vehicle occupancy declaration data to law enforcement personnel. The data shall be adequate and sufficient to enable law enforcement personnel to distinguish between vehicles declared as HOV and non-HOV.

The ETCS may use a variety of methods to communicate vehicle occupancy declaration data to law enforcement personnel. Such methods should be commercially reasonable and Good Industry Practice, such as:

- the use of beacon lights located at the enforcement zone, to indicate previous User declaration actions;
- the use of personal digital devices or similar technology by enforcement personnel to receive User declaration data from the ETCS;
- the use of an automated occupancy detection system; and
- manual, visual enforcement at the declaration zones.

25.6.1.7 Security, Protection, and Monitoring

Exercise caution, due diligence, and utilize best industry practices to protect the ETCS against natural disasters, data and equipment tampering, and sabotage. Develop and implement a DRP and procedures for maintaining service continuity in the event of a catastrophe or disaster impacting the ETCS, in order to prevent or minimize any service interruption. Comply with and adhere to the State Information Technology Security Policy and standards where applicable. These policies may be revised from time to time and the Section Developer shall comply with all such revisions.

The ETCS must log all database, file, and software application access and attempted access. Ensure duplicate data and image storage at a physically and geographically separate site is in accordance with applicable data security standards. Provide protection of data containing personally identifiable information which may contain elements such as an individual's driver's license number, social security number, license plate number, location, financial, tax or health records in accordance with state and federal policies. Any such personally identifiable information shall not be transmitted outside of the US. Supply means of auditing all ETCS data and records, directly produced by the ETCS. Although it is not initially anticipated that data covered by Payment Card Industry Data Security Standard ("PCIDSS") would be handled within the Section Developer's tolling systems, if at any time during the term of the Section P3 Agreement such PCIDSS impacted data is handled, the Section Developer shall follow, apply, and implement the relevant PCIDSS requirements.

The ETCS shall, at a minimum:

- track Incidents affecting tolling from occurrence to resolution;
- monitor the tolling Work from request to completion;

- track system performance; and
- provide integrated data/anti-virus protection for all the Section Developer roadside ETCS host, plaza, and facility computers.

25.6.1.8 Customer Service

The primary customer service shall be carried out by parties other than the Section Developer, primarily MDTA. Providing superior customer service is a priority for the MDTA and shall likewise be a priority of the Section Developer. The Section Developer shall arrange for and provide all Toll Transaction data sufficient and necessary for MDTA to proceed with financial clearing of all certified Trips, to respond to general User inquiries, and at a minimum, the information described as part of a properly formatted Trip in accordance with Exhibit 6 Article 24 (Electronic Toll Collection Infrastructure).

25.6.1.9 ETCS Performance Requirements

The ETCS performance requirements set forth in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) ID #15 shall apply at all times and throughout a vehicle speed range from stop-and-go traffic to highway free-flow speeds. ETCS performance requirements shall apply to all vehicles whether they are traveling closely together or far apart at all speeds.

For the purpose of assessing the license plate image readability and reliability success rate as presented in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) ID #15, ineligible vehicles shall be those for which an obtained license plate image cannot be reliably read by the human eye due to one or more of the following conditions:

- the vehicle either has no license plate, or it is not mounted in the legally required position;
- the license plate is covered by dirt or snow rendering it unreadable;
- the license plate is willfully obstructed by Users by a film or other means;
- the license plate is damaged, bent or broken rendering it unreadable;
- the license plate is blocked by an object carried by the vehicle (such as a plate frame, overhanging cargo, bicycle rack or a trailer towing ball); or
- the license plate is blocked by something in the lane, such as a Person or another vehicle.

Ineligible vehicles shall not be calculated in the success rate. ETCS and any Trip building systems shall be fully auditable allowing authorized users to audit all system actions.

25.6.1.10 ETCS Performance Monitoring, Auditing, and Reporting

General requirements for ETCS performance monitoring, auditing, and reporting include:

- deploying technical means to record, monitor, track, and audit the ETCS performance;
- producing database extracts, analyses, and syntheses for verifying ETCS performance upon MDTA's request; and

- supplying MDTA with secure access via VPN or similar technology, to facilitate system monitoring and perform Toll Transaction research.

Additional reporting requirements are included in Exhibit 6 Article 24 (Electronic Toll Collection Infrastructure) Section 24.10 (ETCS Reporting Requirements).

The Section Developer shall be responsible for Trip accuracy and completeness, and the ETCS must have the capability to flag lane transactions for possible audit where there is a discrepancy between the classification data from the vehicle classification system and the Transponder.

Business continuity activities may include, but not be limited to:

- resending upon request or holding Toll Transactions and Trips at no cost to MDOT due to MDTA CSC issues, maintenance activities or testing activities;
- making backups of all software and configuration of the ETCS;
- maintaining a daily backup of all new and changed data held on the ETCS;
- providing media used for the daily backup to a secure, off-site location within 24 hours (or other mutually agreed to timeframe);
- maintaining storage of a minimum 90 days of the data backups in a secure off-site location;
- verifying that the daily backups and stored data are retrievable and usable; and
- ensuring backups do not affect any ETCS functional requirements.

25.6.1.11 Independent Development/Test Environment

The ETCS shall include an independent development/testing environment that is mirrored to the Toll production database that includes all of the functionality of the ETCS and is able to mirror all or a definable portion of the production database.

25.6.2 Traffic Operations

MDOT's traffic engineering and operations personnel will evaluate and review safety and operations issues within the PMLs. Such reviews do not relieve the Section Developer from its responsibilities with respect to traffic operations and safety. When such safety reviews are conducted, the Section Developer shall cooperate with MDOT's requests for data and provide relevant staff support as necessary. When corrections or mitigations are required based on the safety review, the Section Developer shall comply with such corrective or mitigation measures for such safety review. Corrective measures include the development of traffic/safety studies, providing access to data, access to the Section resources, and implementation of safety-related mitigation recommendations.

The Section Developer shall work with MDOT to resolve any issues related to revisions or modifications, including but not limited to:

- advising speed limit changes on the Mainline;
- speed limit changes to the ramps within the Section;
- signing and pavement marking improvements;
- regulatory, overhead and ground-mounted signs;

- safety lighting;
- request to experiment with new products;
- special event coordination;
- safety studies; and
- fatal crash reporting.

25.6.3 Traffic Incident Management

25.6.3.1 Incident Management

Traffic Incident Management shall adhere to the requirements of Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance) ID #14 and responsibilities specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-5 (Asset O&M Responsibility Matrix).

When made aware of an Incident within the PMLs during the term of the Section P3 Agreement respond to such Incidents and provide assistance to the police and other first responders and appropriate Governmental Entities to protect the safety of motorists and highway users. This includes responding on short notice for Incidents such as accidents, highway spills, and other miscellaneous Incidents, and to remove and dispose of debris from the PMLs and PML shoulders.

When made aware of an Incident, notify MDOT and proceed to the Incident site to secure the site and, as applicable, provide wrecker services and other assistance as required.

Take all action required to keep the traveling public and staff safe.

Provide continuous wrecker service to assist any disabled vehicle that could disrupt traffic flow in the PMLs and make adequate wrecker equipment available to respond to all PML Incidents during the term of the Section P3 Agreement.

The Work also includes removing, temporarily relocating, and resetting temporary barriers for ingress and egress to remove a disabled vehicle(s) or provide access for first responders. Wrecker response time is included in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance) ID #14.

Provide sufficient employees at all times who can respond to an Incident within 30 minutes. The time period commences at the time when knowledge of the occurrence of the Incident and stops when the Section Developer has initiated the appropriate response steps for the Incident, as detailed by the Incident response procedures. These steps include all required notifications, traffic, and facility control systems activations and the arrival on the scene of the Incident of appropriate equipment and personnel from the Section Developer's field response team. In all cases, lanes must be cleared and opened to traffic within two hours.

For instances where the assistance of Maryland State Police is requested, Maryland State Police have the right to provide the level of response, including the amount of resources needed as they deem appropriate.

In instances where Incidents occur in both the PMLs and GP Lanes, MDOT will have control of the Incident and may delegate responsibilities to the Section Developer based on protocols detailed in the Operating Period Traffic Incident Management Plan.

Log and record the sequence of all actions taken in response to the Incident. Prepare a draft Incident Report of each Incident and submit within three days and provide a final Incident Report to MDOT for review within 10 days. The report shall analyze damages, including performing damage to structures and develop temporary and permanent repair Plans. Meet with MDOT every two weeks to review Incidents, report on repairs, capture lessons learned from Incidents, and report on follow-up actions.

Incident Management also includes providing a Courtesy Patrol for the PMLs. Courtesy Patrols provide roadway services and aid to travelers and vehicles for minor Incidents such as flat tires, cars that run out of gas, etc. Collect Incident information and share with traveler information systems, traffic management, maintenance, and construction. Provide Courtesy Patrol during the D&C Period and Operating Period that meet or exceed the performance requirements in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance).

Establish a customer satisfaction survey for Courtesy Patrol services. Provide a survey to be completed by the User following Courtesy Patrol service to collect feedback from their experience. Submit the form of customer satisfaction survey subject to review and acceptance by MDOT prior to beginning Section O&M Work during the D&C Period.

25.6.3.2 Traffic Incident Management Plan

Develop a Traffic Incident Management Plan in accordance with Exhibit 6 Article 22 (Maintenance of Traffic) for the D&C Period. Twelve months before Substantial Completion, update the Traffic Incident Management Plan as an Operating Period Traffic Incident Management Plan. The updated Plan shall provide all information necessary for responding to and managing Incidents occurring within the Operating Limits. Coordinate with MDOT and other Stakeholders involved in the response and management of Incidents during the development of the Operating Period Traffic Incident Management Plan. The Operating Period Traffic Incident Management Plan shall include the following at a minimum:

- Incident and crash prevention strategies;
- Incident mitigation strategies;
- Emergency response procedures, including:
 - response agencies/entities with roles and responsibilities identified;
 - notification procedures, including a Section Developer, established Emergency response telephone tree with all appropriate Emergency response agencies/personnel identified for immediate response in the event of an Emergency;
 - an Emergency response telephone tree organized into areas of expertise, so the proper people are contacted for specific Emergency situations;
 - response Plans for various types and levels of Incidents;
 - response equipment;
 - response staging areas and locations;

- protocols for Incidents affecting both PMLs and GP Lanes where MDOT and the Section Developer have shared responsibilities and MDOT is in control of the Incident; and
- other information as required for the Section.
- Section Developer reporting procedures and requirements, which at a minimum, shall provide documentation to MDOT on the following:
 - cause of disruption (i.e., whether it is construction-oriented or not);
 - actions being taken to alleviate the problem;
 - responsible parties for the actions; and
 - anticipated duration of the disruption.

25.6.4 Emergency Management

Emergency management can be classified into two categories:

- Governor Declared Emergencies; and
- all other Emergencies

For a Governor Declared State of Emergency, perform pre-event preparation, and provide initial response post-event to protect the traveling public from hazards created by the event. For all other Emergencies, perform all aspects of responding to the Incident/event, including pre-event preparation, post-event initial response, and post-event cleanup and repair. For both classifications of Emergency management, perform the following activities before every foreseeable Emergency management Incident/event:

- contact vendors and subcontractors to verify quantity, availability, and priority of appropriate equipment and personnel (e.g., variable message boards, chainsaws, and sand spreaders);
- develop a complete, up-to-date list of equipment resources and staging locations and of all stockpiled materials and their locations;
- in case of possible area evacuations, prepare for implementation of contraflow, including the pre-staging of necessary contraflow resources;
- if directed by MDOT, implement contraflow and remove contraflow devices when complete; and
- in preparation for high winds, rains, and other impending Elements, secure all areas within the ROW associated with the Section Developer's Section O&M Work.

For all Emergency management activities, MDOT reserves the right to take control of the Incident or perform recovery Work with its own forces or other contracted forces when MDOT determines at its sole discretion it is in MDOT's best interest to do so. For provisions of the Traffic Incident Management Plan, see other pertinent portions of this [Exhibit 6 Article 25 \(Operations and Maintenance\)](#).

25.6.4.1 Emergency Response Plan

Be fully conversant with MDOT's applicable comprehensive Emergency management Plan as well as the FHWA and FEMA guidelines for federal reimbursement, ensure compliance with all state and federal Emergency management requirements, and administer all response and recovery efforts in accordance with the Section P3 Agreement.

As part of the O&M Plan, develop an Emergency Response Plan for Highway Assets and ITS systems that sufficiently replicate the intent of MDOT's comprehensive Emergency management Plan. The Emergency Response Plan shall include, but not be limited to:

- Emergency communications Plan with call lists;
- procedures for Incident/event management;
- agency and public notifications;
- measures to assure motorist safety;
- handling of Hazardous Materials;
- coordination with public law enforcement and other appropriate agencies;
- assurance of compliance with NFPA requirements for roads, bridges, and other Limited Access Highways;
- traffic control;
- coordination with MDOT and other agencies to establish or implement pre-established detour routes;
- identification of detour routes;
- procedures for making Emergency repairs;
- debris removal;
- evacuation/contraflow response;
- coordination with traffic Incident Management;
- submission of Incident/event reports; and
- detailed organizational structure with the functions, qualifications, experience level, and contact information of staff assigned to respond to Incidents/events.

Comply with all MDOT's Plans and Applicable Law concerning evacuation routes and the handling and disposal of Hazardous Materials.

Update the Emergency Response Plan annually with the O&M Plan by engaging in an iterative, collaborative process of discussion with MDOT whereby lessons learned from past experience can be implemented for future use.

25.6.4.2 Responsibilities for Governor Declared State of Emergency

Perform the following post-event activities following a Governor Declared State of Emergency:

- search all roadways within the O&M Limits for grievous hazards (roadway washouts/cave-ins, downed electrical lines, non-traversable Bridges, etc.). This may include clearing some debris from the roadway and shoulders in order to access such areas;
- immediately respond to perform traffic control, set up safety devices, and layout established or improvised detour routes in order to protect the traveling public from grievous hazards created by the Incident/event. When detour routes are required due to an Incident/event occurring within the O&M Limits, manage and maintain the entire detour route within the vicinity, even if the route extends onto roadways not covered by the Section P3 Agreement. For portions of a detour route extending outside the ROW, coordinate detour setup and maintenance with MDOT and appropriate AHJ;

- notify MDOT immediately upon occurrence of all major Incidents/events and immediately upon road closure for all road closures exceeding one hour;
- notify MDOT again upon road reopening;
- inspect and perform any repairs as directed by MDOT that are not eligible for federal reimbursement; and
- assist MDOT in performing damage assessment reviews.

Do not initiate or perform debris removal, cleanup, or federally reimbursable repair Work necessitated by a Governor Declared State of Emergency, with the exception of minimal clearing as required when searching for grievous hazards, until authorized to do so by MDOT. The Section Developer shall provide an initial damage assessment and repair Plan as soon as possible after assessing the scene.

25.6.4.3 Section Developer Responsibilities for Other Emergencies

Other Emergencies are all Incidents/events that are not a Governor Declared Emergency in response to the Incident/event. Emergencies associated with traffic crashes or breakdowns are covered under traffic incident management elsewhere in this Exhibit 6 Article 25 (Operations and Maintenance). Other Emergencies may most commonly consist of, but are not limited to, guardrail hits, severe potholes or pavement damage, debris within roadways, attenuator hits, roadway/shoulder washouts, roadway cave-ins, and downed light poles but can also include natural disasters/events/storms, acts of God, and Incidents/events resulting from human interactions.

Arrive on-site, be prepared to take necessary action with necessary manpower and Emergency response equipment and be available to relieve law enforcement personnel of traffic control functions.

Manage all aspects of traffic control related to an Incident, including coordination with Governmental Entities when Incidents impact other roads outside the O&M Limits. When detour routes are required due to an Incident within the O&M Limits, upon notification by MDOT or other Governmental Entities, manage and maintain the portions of the detour route within the O&M Limits.

Notify MDOT immediately upon occurrence of any major Incident or event resulting in a road closure. Provide an initial damage assessment and repair Plan as soon as possible after assessing the scene in accordance with Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance). Subsequently, notify MDOT again upon road reopening.

When an Incident or event causes damage to any Element, the Section Developer may pursue Claims against any responsible party for reimbursement of expenses incurred.

25.7 Routine and Unplanned Section O&M Work

The O&M Plan shall include information and schedules that define the approach to Routine Section O&M Work, including preventative maintenance, routine planned maintenance, and unplanned maintenance Work.

25.7.1 Routine Section O&M Work

Undertake all Routine Section O&M Work in accordance with the O&M Plan and meet the O&M Performance Requirements set out in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance). The O&M Plan shall provide an overview description of all Elements within the O&M Limits, including facilities, systems, and equipment to be operated and maintained by the Section Developer. The O&M Plan shall also include:

- logical system breakdown of the Elements within the O&M Limits, including facilities equipment and systems and the levels of O&M to be provided by the Section Developer's staff;
- description of the staffing Plan and related workshop, maintenance garages, major equipment, vehicles, storage facilities, etc., as necessary to support the Section O&M Work;
- list of major systems and equipment manufacturers/ vendors, including their contact information (contact Person, address, telephone numbers, website address);
- list of subcontractors used to perform any maintenance activities and the identification of the services expected to be provided;
- list of preventative maintenance procedures;
- planned maintenance schedule indicating the tasks and the required frequency;
- detailed preventative maintenance procedures;
- detailed reactive maintenance procedures;
- spare parts inventory procedures;
- list of spare parts inventory (on-site and off-site);
- repair procedures for repairs that are anticipated;
- software manuals;
- wiring diagrams, schematic drawings, logic block diagrams, etc.;
- assembly and disassembly drawings clearly identifying the components;
- copies of all Inspection forms, checklists, etc.;
- procedures and frequencies for routine Section O&M Work for such activities as mowing, landscaping, winter maintenance, and litter and debris pick-up;
- procedures and frequencies for ETCS, ITS, and tolling systems;
- Lane Closure Plans for Routine Maintenance; and
- a summary listing of all maintenance tasks categorized by system/discipline and the related maintenance classifications,

Standard service manuals for commercially available equipment and products shall be acceptable only if the equipment provided is standard off-the-shelf equipment without any custom features or functions.

Custom equipment and systems shall have custom O&M manuals that include detailed information that addresses the custom features of the equipment provided and shall include drawings. The non-applicable portions of standard manuals shall be neatly encircled and cross-hatched to clearly indicate that these portions are not applicable.

Prepare an annual Routine Maintenance Work Plan as part of the annual O&M Plan Submittal. Submit the Routine Maintenance Work Plan for the next Fiscal Year to MDOT for review by July 1 of each year. Describe all the Routine Maintenance Work activities planned and the dates and expected durations of each, as well as the total quantity of planned lane closures, Routine Maintenance Work hours, and estimated costs for the Routine Maintenance Work.

25.7.2 Unplanned Maintenance

All unplanned maintenance and repairs to Elements shall meet the minimum O&M Performance Requirements specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance).

Maintain a time log indicating the time at which Element has a fault or Defect that requires attention, maintenance, or repair. Identify the time when the response was initiated and the time at which the Element was put back into service. Prepare monthly draft and quarterly final reports for inclusion in the O&M Report that indicate all instances of unplanned maintenance.

Include a summary of unplanned maintenance or repair activities and clearly indicate the instances in which the repairs or maintenance were performed to return the Element to service within the specified time criteria, as well as the instances in which the maintenance or repairs were performed, and the Element was returned to service beyond the specified time criteria.

25.8 Renewal Work

25.8.1 Renewal Work Plan

Prepare and submit a draft RWP to MDOT for review within 90 days after NTP. Submit a final RWP subject to review and acceptance by MDOT 180 days prior to the scheduled O&M Commencement Service Date. Conform the draft and final RWP to the O&M and rehabilitation related aspects of the O&M Plan requirements. The Annual and Monthly Renewal Work Schedule shall describe all the scheduled maintenance and renewal tasks or activities and the dates, times, and duration of each and the total quantity of planned maintenance hours and lane hours. The Renewal Work Schedule shall be included in the RWP. Prepare an RWP that is consistent with the general O&M obligations and defines the process and procedures for the maintenance and renewal of the Work for the term of the Section P3 Agreement. The RWP shall include:

- performance requirements, measurement procedures, and threshold values, at which heavy maintenance and renewal is required for each Element;
- Inspection procedures and frequencies, and subsequent maintenance and renewal to address noted deficiencies of the physical Elements; and
- response times to mitigate hazards, permanent remedy, and permanent repair of Defects, which shall, at a minimum, be in accordance with Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance).

Differentiate response times for Defects that require prompt attention due to immediate or imminent damage or deterioration, excluding those items, which have no impact on any parties other than the Section Developer and response times for other Defects.

Update the RWP at least annually or more frequently, as necessary, to indicate the O&M requirements for the equipment and systems as they are revised, upgraded, rehabilitated, and,

as applicable, replaced. The RWP shall cover Relevant Infrastructure within the O&M Limits during the Operating Period. Submit the RWP update as part of the overall annual O&M Plan update.

The RWP shall be a complete document that includes a brief description of the Elements within the O&M Limits. In addition to the items listed above, include the following minimum requirements in the RWP:

- overview description of all Elements within the O&M Limits, including facilities, systems, ITS, ETCS, and tolling systems and equipment to be operated and maintained by the Section Developer;
- list of unplanned but anticipated O&M Renewal Work activities;
- diagnostic procedures for equipment and systems;
- lane closure Plans for Renewal Work; and
- summary listing of all renewal tasks categorized by system/discipline and the related maintenance classifications.

Update the RWP, including preparing renewal Plans and schedules annually. During each year of the Operating Period, incorporate into the RWP Renewal Work for that year.

Submit the RWP for the next Fiscal Year to MDOT for review by July 1 of each year. Along with and consistent with the Routine Maintenance Work Plan described in these Technical Provisions. Describe all the Renewal Work activities planned and the dates and expected duration of each, as well as the total quantity of planned lane closures, Renewal Work hours, and estimated costs for the Renewal Work.

The RWP shall include a Renewal Work Schedule that provides the Renewal Work activities planned over the next five fiscal years with explicit detail provided for the first fiscal year in the five year period. The Section Developer shall use the results of the Inspections described in its RWP and other relevant information to determine, on an annual basis, the Residual Life of each Element within the O&M Limits. From this, the Section Developer shall determine the scope of the Renewal Work Schedule.

Perform Renewal Work at the point in time necessary to establish a Residual Life for each Element that will avoid deterioration of any Element to the extent that such deterioration would result in the failure to comply with a Performance Requirement.

25.8.2 Renewal Work Schedule (Planned and Unplanned)

Prepare a Renewal Work Schedule on an annual and monthly basis. Submit to MDOT the Annual Renewal Work Schedule for the next five MDOT fiscal years subject to review and acceptance by MDOT by July 1 of each year. Submit the Monthly Renewal Work Schedule, except for the first month of the year scheduled, subject to review and acceptance by MDOT at least 30 days prior to the commencement of the monthly scheduled Renewal Work.

25.8.3 Renewal of Elements

Unless otherwise stated elsewhere, renew Elements when any of the following conditions are evident:

- targets for individual Elements fall below 75% average compliance with the relevant targets for each Element;
- individual Elements are in fair condition, but suggesting a need for early replacement, rehabilitation or repair of an individual Element or maintenance actions to meet Performance Requirement;
- reliability is less than 99.9% for any Element that, should it fail, the safe operation of the Section would be in jeopardy or an immediate or imminent safety hazard would result (a safety-critical Element);
- reliability is less than 90% for Element other than a safety-critical Element;
- the Element ceases to function, or dies (as in the case of certain landscaping); and
- frequency of repair is higher than that recommended in the manufacturer's preventative maintenance schedule.

For the avoidance of doubt, reliability is calculated as the in-service time over a prescribed time. For example, if an Element is out of service for 20 days of 365 days, its reliability is 94.5% (i.e. $(365 - 20)/365 \times 100\%$). The reliability measurement is made over a moving 365 days.

25.9 O&M Reporting

O&M Reporting requirements are identified in Exhibit 6 Article 25 (Operations and Maintenance) Section 25.3.8 (O&M Reports). Additional detail for the O&M Reporting is summarized in this Exhibit 6 Article 25 (Operations and Maintenance).

25.9.1 Monthly and Quarterly O&M Reports

After the O&M Commencement Service Date, submit a Monthly O&M Report to MDOT. Each Monthly O&M Report shall be considered a draft report and be submitted to MDOT for review. The Monthly O&M Report shall identify all Routine O&M and Renewal Work for the period, the actual Work performed for the period, and confirmation that all Work was performed in compliance with the O&M policies and procedures and the O&M Plan. Prepare a Quarterly O&M Report, which shall be broken down for each month of the quarter. Submit the Quarterly O&M Report which shall be considered a final report.

The draft Monthly and final Quarterly O&M Reports shall include the following data and information, at a minimum:

- summary of the Routine Maintenance (planned and unplanned) and Renewal Work for each month of the quarter;
- summary of the Routine Maintenance and Renewal Work performed and completed each month;
- summary of the unplanned maintenance and repairs performed and completed during the quarter;
- summary of the Routine Maintenance and Renewal Work that was not completed as planned. Include reasons for the incompleteness of the Planned Maintenance and a summary of deferred days for each deferred item;
- summary of the maintenance activities performed for the month beyond the Planned Maintenance and Renewal Work;

- detailed results of all Routine Maintenance and Renewal Work and other maintenance Work that was performed during the month;
- reconciliation with the RWP and Renewal Work schedule to identify the Renewal Work completed, the major Work remaining, as well as any changes to the RWP or Renewal Work Schedule;
- revised Renewal Work Schedule looking ahead one year reflecting actual Maintenance and Renewal Work performed;
- summary of lane and road closures, Allowable Lane Closures, and Routine Maintenance and Renewal Work hours for the coming month, including details describing the location, duration, and reason of each;
- detailed results of all Inspections, assessments, and testing activities, including the procedures, forms, etc.;
- equipment out-of-service report that lists all mechanical, and electrical equipment that was not functional at some time during the month and includes data such as durations, reasons, and cross-references to any events that may be related to the out-of-service equipment;
- quality assurance review of all O&M personnel actions, lessons learned, etc.;
- summary of staff and hours worked for the month;
- listing of all Elements by system in the O&M Work, including individual equipment, with a summary of all the maintenance activities performed during the month and the complete history of maintenance for the Element as reported by the computerized maintenance management information system (“MMIS”);
- details of traffic Incidents and summary of individual reports;
- Winter Operations Report and Winter Patrol Diary; and
- summary of Performance Measures Reports and Noncompliance Events.

25.9.2 Annual O&M Report

On an annual basis, create a consolidated annual O&M Annual Report that summarizes all the activities associated with Section O&M Work and Renewal Work for the year, the actual O&M performed for the year and confirmation that the Section Developer performed its Section O&M Work and Renewal Work in compliance with the Section P3 Agreement. Organize the Annual O&M Report with the following information:

- a summary of all quarterly O&M reports and Renewal Work reports from the preceding year;
- statement of all adjustments to the quarterly O&M Report from the preceding year (if any);
- the results and recommendations of the most recently completed MDOT condition assessment; and
- budgeted annual expenditures for the upcoming year for Section O&M Work and Renewal Work.

After O&M Commencement Service Date, deliver the Annual O&M Report subject to review and acceptance by MDOT no later than July 31 of each year.

25.10 Maintenance Management Information System

Use a computerized GIS based MMIS database for all maintenance activities based on Released for construction documents and Renewal Work and in accordance with Exhibit 6 Article 27 (Data Management for MDOT Systems). The MMIS database shall include all Elements to be maintained including ETCS, ITS and tolling systems and shall include for each Asset a description of the item/equipment, location, tag number, equipment nameplate data (model number, serial number, size, etc.).

The MMIS database shall include the planned preventative maintenance activities required, those performed, dates, and repair history. The database shall include the day and time that an Element is taken out of service and the day and time that it is returned to service and shall include detailed information regarding the type of repairs or failures and identification of the Maintenance Work performed. The MMIS software shall have a minimum of the following functional capabilities: scheduling, database of equipment, database of planned/preventative maintenance tasks, descriptions and work codes, work order generation, technician identification, spare parts inventory, purchasing requisitions, and repair history. The MMIS shall also include performance tracking and reporting, and the results of Performance Inspections (see Exhibit 6 Article 25 (Operations and Maintenance) Section 25.12.5 (Performance Inspections)).

As part of the MMIS, the Section Developer shall keep up-to-date and available on-site in an easily accessible location, a complete set of technical documentation (including but not limited to design, technical specifications, wiring diagram, as-built drawings) and procedures and manuals for executing the Section O&M Work.

The MMIS shall, at a minimum:

- monitor and collect data on System and equipment statuses continually 24 hours a day seven days a week;
- maintenance management system data shall not be able to be deleted or modified, only appended or corrected with identification of who did the appending or correcting, when it was done, what was done, and why it was done;
- automatically generate and track work orders for preventative maintenance, corrective maintenance, and Emergency maintenance. Work orders are to be completed and closed out by the Toll Systems Operator;
- support the generation of ad-hoc work orders by authorized users. Work orders are to be completed and closed out by the Toll Systems Operator;
- automatically alert maintenance staff once a work order has been generated;
- provide monthly reporting on the overall status of maintenance activities of all Elements including the ETCS in sufficient detail to compare performance requirements with actual performance over the reporting period;
- track mean time between failures for all Elements; and
- track spares and inventory levels, including serial numbers and associated warranty information for installed equipment and inventoried equipment.

Provide training for MDOT personnel on the MMIS, such that MDOT personnel have a complete understanding of the MMIS, the MMIS's capabilities, functions, and how the Section Developer shall apply the MMIS to the Work. MDOT shall have read-only access to the MMIS.

25.11 Mandatory Spares

Determine the spare parts required to meet its O&M obligations under the Section P3 Agreement. However, due to their nature and associated long lead time, at a minimum, store spare parts including, but not limited to, attenuator parts, guardrail panels, guard rail and roadside systems, and ITS spare parts.

25.12 Inspections

Plan and implement a program of Inspections with trained and competent personnel which:

- verifies the continuing safety for the public;
- prioritizes Defects requiring immediate and urgent attention because they are likely to create a danger or serious inconvenience to the public;
- identifies Defects to be included for repair either within the Section Developer's annually recurring highway O&M and repair program or as Renewal Work;
- is responsive to reports or complaints received from MDOT and the public; and
- collates data to monitor performance and to establish priorities for future O&M and Renewal Work.

Ensure that personnel performing Inspections of road pavements and structures are certified as inspectors or raters, or otherwise appropriately qualified to perform the Inspections in accordance with the Section P3 Agreement and MDOT requirements.

The IQF shall conduct quality assurance reviews of Inspections, procedures and results.

25.12.1 Inspections Frequencies

Establish Inspection procedures and carry out Inspections, in accordance with the Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance), O&M Performance Requirements, at a minimum quarterly and immediately after major rain events, so that Defects are identified and repaired in accordance with the Section P3 Agreement.

The period for repairs shall be deemed to start upon the time the Section Developer first knew or should have knowledge of the Defect. For this purpose, the Section Developer shall be deemed to have knowledge of not meeting the performance requirements upon receipt of notice of the Defect, regardless of actual knowledge. Investigate reports and complaints on the condition of the Section received from all sources. Record these in the O&M Reports and the MMIS together with details of all relevant Inspections and actions taken in respect of Defects, including temporary protective measures and repairs.

25.12.2 Inspection Standards

In performing Inspections to identify Defects, for any Element defined in the column entitled "Element" on Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance), conform at a minimum to the Inspection standards set forth for that Element in the column entitled "Inspection and Measurement Method" in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance).

25.12.3 General Inspections

Perform general Inspections in accordance with the O&M Plan so that the repairs of identified Defects are included in planned programs of Work. Records of General Inspections shall include details of the manner of Inspection (e.g. road closure if any, equipment utilized, time and duration), the weather conditions and any other unusual features of the Inspection.

General Inspections shall be performed such that Defects are identified and repaired within the period shown in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) or, if the Defect is not specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance), within six months of the Defect occurring unless otherwise specified in the Section P3 Agreement; if Defects require special equipment to identify or are listed in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-2 (Specialist Inspections), they may have different identification periods.

25.12.4 Specialist Inspections

Undertake Specialist Inspections for Elements listed in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-2 (Specialist Inspections) and include the Inspection results as Maintenance Records. Specialist Inspections are needed for the portions of the Section identified in the O&M Limits. Provide inspectors who are qualified in the specific areas of Inspection.

Table 25-2 Specialist Inspections

ELEMENT	FREQUENCY
Roadway	Annual survey of pavement condition including main lanes and ramps undertaken using condition survey equipment to measure all necessary criteria such as: ruts, skid resistance and ride quality per the Inspection and measurement methods set forth in <u>Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance)</u> and <u>Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance)</u> .
Bridges/Structures	Inspections and load-rating calculations at the frequency specified in these Technical Provisions. In addition, National Bridge Inspection Standards (“NBI S”) Inspections as per FHWA regulations and at the frequency specified in FHWA regulations and MDOT frequency, and Inspection type guidance.

ELEMENT	FREQUENCY
Landscaping and Vegetation	<p>Annual Inspection of landscape to assess growth and health of nonwoody and woody vegetation. Inspection to identify and document site conditions, disease, damage, and or pest infestations, which are detrimental to the health and normal growth and vitality of the landscape and vegetation. Pesticide applicators must possess a proper Maryland pesticide applicator license. Both company and individual must possess the license.</p> <p>Fertilizer applicators must possess a proper Maryland fertilizer applicator license. Both company and individual must possess the license.</p> <p>Arboricultural work must be performed and inspected by a certified arborist registered in the state. Any landscaping requirements outside of the ROW shall be in accordance with the AHJ, as described in the Section P3 Agreement.</p>
Storm Water Management Facilities	Inspections for compliance with MDOT's MS4 Permit. Typically, Inspections are completed once every 3 years.
ITS	Annual calibration of vehicle detection equipment, including traffic detectors.

25.12.5 Performance Inspections

The IQF shall undertake detailed Inspections of randomly selected Performance measures for audit purposes (the "Performance Inspections") annually. Submit proposed Performance Measures Report to MDOT for review 90 days prior to the scheduled O&M Commencement Service Date. On each occasion that a Performance Inspection is undertaken, it shall include at least five percent of the total available Performance Measures as described in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance).

Assess the condition of each Element, as set forth in the column entitled "Element" presented on Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance) using the Inspection and measurement method set forth in the column entitled "Inspection and Measurement Method". Include physical Inspection of those Elements that are safely accessible without traffic control. Where the measurement method would require specialized equipment or would require traffic lane closures to implement, assess the condition of the relevant Element by reference to the current Maintenance Records held in the Section Developer's database.

Using the MMIS, create a new Maintenance Record for each Element physically inspected in accordance with the column entitled "Measurement Record" on the Performance and Measurement Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance). Undertake Performance Inspections on a schedule agreed with MDOT on Performance Measures randomly selected by MDOT.

Provide seven-day notice to MDOT of a scheduled Performance Inspection to provide MDOT an opportunity to accompany the physical Inspections when undertaking Inspections associated with the Performance Inspection.

25.13 Plans and Reports and Records

In general, O&M reports and records shall be maintained for the PML. The O&M reports and records shall adhere to the Quality Management System and shall, at a minimum, meet the following minimum requirements.

25.13.1 Reports during the Term of the Section P3 Agreement

O&M reporting requirements are summarized in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-3 (Report Frequency). For the avoidance of doubt, any O&M reporting requirements referenced throughout the text of the Section Documents that are not included in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-3 (Report Frequency) are still required.

Table 25-3 Report Frequency

PLAN	FREQUENCY
SMP Components and Sub-Plans	
ECP	Update as Necessary for Section O&M Work
TMP	Update as Necessary for Section O&M Work
Operations and Maintenance Plan Components	
O&M Shared Responsibility Protocols	Annually on July 1
Regulated Substances Management Plan	
O&M SaMP	
O&M QMP	
Environmental Protection Training Plan	
Traffic Incident Management Plan	
Vegetative Maintenance Plan	
Stormwater Management Program Plan	
ETCS and ITS O&M Plan	
Maintenance of Traffic Plan	
SICP	

PLAN	FREQUENCY
Emergency Response Plan	
Communications and Outreach Plan	
Operations Plan	
Renewal Work Schedule	5-year look ahead Annually on July 1; Monthly on first of the month One year look ahead Quarterly, 14 days prior to the start of each Quarter
RWP	Annually on July 1
Draft Monthly O&M Report	Monthly (draft); 7 days after the beginning of each month
Final Quarterly O&M Report	Quarterly (final); 14 days after the start of each Quarter
Annual O&M Report	Annually on July 31

25.13.2 O&M Records

Maintain the following Maintenance Records and all other records as required under the Section P3 Agreement:

- complete records of Incidents that affect the maintenance of the O&M Limits;
- complete records of all Inspections, executed tests and assessments, as well as results of all Inspections, tests, and assessments;
- details of all Renewal Work performed;
- all data in relation to all original tests, graphics and other records in relation to measurement equipment, certifications, and calibration records;
- complete series of quarterly reports; and
- monthly records of all lane closures.

25.14 Deliverables

Table 25-4 – O&M Submittals

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
Operations and Maintenance Limits Drawings	Within 90 days after NTP
O&M Responsibility Matrices	Within 90 days after NTP
Updated Conceptual PML Limits	Within 90 days prior to NTP

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
Updated Conceptual O&M Responsibility Matrix	Within 90 days prior to NTP
Final O&M Limits Drawings	2 years prior to Substantial Completion
Final O&M Responsibility Matrix	2 years prior to Substantial Completion
Final Shared O&M Protocol Agreements	90 days prior to Substantial Completion
Draft D&C O&M Plan	A condition of Financial Close
Final D&C O&M Plan	A condition of NTP
Draft Operations and Maintenance Plan	Within 45 days after NTP
Final Operations and Maintenance Plan	Within 90 days after NTP
Updated Operations and Maintenance Plan	July 1 of each Fiscal Year after Operations and Maintenance Commencement Date
ETCS, ITS, and Tolling O&M Plan	Included with O&M Plan
O&M Manager qualifications	With the Committed Section Proposal
O&M SaMP	Included with O&M Plan
O&M QMP	Included with O&M Plan
Draft Operations and Maintenance Report	Monthly no more than 7 days after the first day of each month
Final Operations and Maintenance Report	Quarterly no later than 14 days after the start of each Quarter of each Fiscal Year (July 1, October 1, January 1, and April 1)
Draft Shared O&M Protocols	180 days prior to O&M Commencement Date
Transition and Coordination Plan	Included in O&M Plan
Final Shared O&M Protocols	At least 60 days prior to the scheduled Operations and Maintenance Commencement Date
SMPr	Annually with O&M Report

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
SICP	Prior to Substantial Completion; Update annually with O&M Plan
Winter Patrol Diary	Within 24 hours of request
Customer Satisfaction Survey for Courtesy Patrol Services	Prior to start of construction
Draft Incident Report	3 days following Incident
Final Incident Report	10 days following Incident
Emergency Response Plan	Part of O&M Plan
Draft RWP	Within 90 days after NTP
Final RWP	180 days prior to the scheduled Operations Maintenance Commencement Date; and updated as needed annually at least
RWP for the next fiscal year	July 1 of each year
Routine Maintenance Work Plan	Part of Annual O&M Plan July 1 of each year
Annual Renewal Work Schedule	July 1 of each year
Monthly Renewal Work Schedule (except for the first month of the year scheduled)	At least 30 days prior to the commencement of the monthly scheduled Renewal Work
Draft Renewal Work Report	Monthly
Final Renewal Work Report	Quarterly; as part of the draft and final Operations and Maintenance Reports
Annual O&M Report	July 31 of each year
Proposed Performance Measures Report	90 Days prior to the scheduled Maintenance Commencement Date

TABLE 25-5 ASSET O&M RESPONSIBILITY MATRIX		
MAINTENANCE ACTIVITY DURING OPERATING PERIOD	MDOT/AHJ O&M RESPONSIBILITY	SECTION DEVELOPER O&M RESPONSIBILITY
O&M of PMLs		X
O&M of GPLs	X	
Tolling Back-Office Systems	X	
TRAFFIC ASSETS		
Traffic Signals		
Ramp termini /side street	X	
Overhead Sign Structures		
Spanning GPLs (only GPL signing)	X	
Spanning GPLs (only PML signing)		X
Spanning GPLs (GPL & PML signing)	X	
Spanning PMLs		X
Spanning GPLs & PMLs (only GPL signing)	X	
Spanning GPLs & PMLs (only PML signing)		X
Spanning GPLs & PMLs (GPL & PML signing)	X	
Spanning ramp to/from GPLs	X	
Spanning ramp to/from PMLs		X
Spanning side street (only GPL signing)	X	
Spanning side street (only PML signing)		X
Spanning side street (GPL & PML signing)	X	
Ground Mount Signs Supports		
GPLs (only GPL sign message)	X	
GPLs (only PML sign message)		X
GPLs (GPL and PML sign message)	X	
GPLs (non-GPL and Non-PML sign message)	X	
PML (all signs)		X
Side street (only GPL sign message)	X	

TABLE 25-5 ASSET O&M RESPONSIBILITY MATRIX		
MAINTENANCE ACTIVITY DURING OPERATING PERIOD	MDOT/AHJ O&M RESPONSIBILITY	SECTION DEVELOPER O&M RESPONSIBILITY
TRAFFIC ASSETS (CONT.)		
Side street (only PML sign message)		X
Side street (GPL & PML sign message)	X	
Side Street (Non-GPL and Non-PML sign message)	X	
Sign Panels		
GPL sign messages only	X	
PML sign message only		X
GPL and PML sign messages	X	
Non-GPL, Non-PML sign messages	X	
Roadway Lighting		
All equipment (devices, poles, cabinets, conduit, cables, manholes, power feeds, etc.) for PMLs regardless of location		X
All equipment (devices, poles, cabinets, conduit, cables, manholes, power feeds, etc.) for GPLs regardless of location	X	
Poles within GPL shoulders	X	
Poles within Bridges belonging to MDOT	X	
Electrical supply (including roadside systems)		
Individual, separate supply for PMLs electrical responsibilities		X
Individual, separate supply for GPL electrical responsibilities	X	
Data communications		
Communications network established solely for PMLs		X
Dynamic message signs		
DMS associated with PMLs		X
Intelligent transportation systems		
All equipment (devices, poles, cabinets, conduit, cables, manholes, power feeds, etc.) for GPLs regardless of location	X	
ITS equipment unique to PMLs under separate metering		X

TABLE 25-5 ASSET O&M RESPONSIBILITY MATRIX		
MAINTENANCE ACTIVITY DURING OPERATING PERIOD	MDOT/AHJ O&M RESPONSIBILITY	SECTION DEVELOPER O&M RESPONSIBILITY
TRAFFIC ASSETS (CONT.)		
Tolling		
All equipment (devices, poles, cabinets, cables, manholes, power feeds, etc.) for GPLs regardless of location	X	
Tolling equipment unique to PMLs under separate metering		X
Pavement Marking Striping		
Mainline striping for GPLs	X	
Mainline striping for PMLs including buffer striping		X
Ramp striping to/from GPLs	X	
Ramp striping to/from PMLs		X
Mainline striping for at-grade slip ramps from PMLs to GPLs and from GPLs to PMLs		X
Striping for side streets	X	
*Sign lighting, if needed will follow the O&M requirements of the overhead sign structures categories		
INCIDENT MANAGEMENT		
Incident Management within PMLs		X
Incident Management within GPLs	X	
COURTESY PATROL		
Courtesy Patrol in PMLs		X
Courtesy Patrol in GPLs	X	
ENFORCEMENT		
Responsible for contracting Maryland State Police in PMLs		X
Responsible for contracting Maryland State Police in GPLs	X	
ROADSIDE ASSISTANCE		
Roadside assistance in PMLs		X
Roadside assistance in GPLs	X	
ROADSIDE SYSTEMS		

TABLE 25-5 ASSET O&M RESPONSIBILITY MATRIX		
MAINTENANCE ACTIVITY DURING OPERATING PERIOD	MDOT/AHJ O&M RESPONSIBILITY	SECTION DEVELOPER O&M RESPONSIBILITY
Roadside systems in PMLs and used to monitor PMLs (design, installation, integration, testing, and maintenance)		X
GRAFFITI		
Graffiti remediation within PMLs Limits		X
Graffiti remediation within GPLs	X	
FACILITIES AND MAINTENANCE YARDS		
O&M of offsite facilities exclusive to PMLs operations		X
O&M of offsite facilities exclusive to GPLs operations	X	
LANDSCAPING		
Landscaping between PMLs and to include median		X
Landscaping outside GPLs to extent of ROW	X	
PAVEMENT		
New GPLs (New Pavement/Reconstruction)		
Mainline pavement, ramps, and associated shoulders	X	
Side street reconstruction	X	
New PMLs (New Pavement/Reconstruction)		
Mainline, ramps and associated shoulders		X
Managed lane ramps		X
Existing Mainline used as GPLs (Rehabilitation)		
Mainline and associated shoulders	X	
Side street rehabilitation	X	
Existing Mainline used as PMLs (Rehabilitation)		
Mainline and associated shoulders		X
Roadway Condition		
Ride surface for PMLs and PML ramps		X
Ride surface for GPLs and ramps	X	
Major renewal decking of shared decks on all structures	X	
STORMWATER MANAGEMENT FACILITIES (CONT.)		

TABLE 25-5 ASSET O&M RESPONSIBILITY MATRIX		
MAINTENANCE ACTIVITY DURING OPERATING PERIOD	MDOT/AHJ O&M RESPONSIBILITY	SECTION DEVELOPER O&M RESPONSIBILITY
Major renewals of asphalt (pavement) on PMLs and associated ramps		X
Major renewals of asphalt (pavement) on GPLs and associated ramps	X	
Shared-use pathways	X	
Onsite Facilities		
Aboveground/surface	X	
Proprietary devices		X
Underground structural facilities including incoming and outgoing pipe sections		X
Facilities that include mechanical infrastructure such as pumps, etc.		X
Dams		X
Offsite Facilities (any facility not within the I-270, I-70 or I-495 ROW)		
All offsite facilities, including any associated stormwater conveyance systems		X
Proprietary devices		X
STORMWATER CONVEYANCE SYSTEMS		
Inlets, structures, ditches, and pipes accessible from PMLs		X
Inlets, structures, ditches, and pipes not accessible from PMLs	X	
ENVIRONMENTAL		
Wetland & Stream Mitigation		
Standard warranty work following construction (i.e., plant survivability/replacement)		X
Following warranty period, 10-year maintenance/monitoring of wetland/stream mitigation sites (on public sites only)	X	
Long-term maintenance (following 10-year monitoring or upon agency acceptance of site)	X	
Reforestation		
Monitor/report for warranty period (2 years) prior to transfer to MDOT.		X
Long-term maintenance		X
STRUCTURE		
Maintenance of structures used for PMLs only such as direct access ramps		X
Shared responsibility of structures based on Shared Structures (see figures 1 & 2 following this table)	X	X
STRUCTURE (CONT.)		

TABLE 25-5 ASSET O&M RESPONSIBILITY MATRIX		
MAINTENANCE ACTIVITY DURING OPERATING PERIOD	MDOT/AHJ O&M RESPONSIBILITY	SECTION DEVELOPER O&M RESPONSIBILITY
MDOT/Section Developer share Inspections responsibilities (see figures 1 & 2 following this table)	X	X
Renewal Work of structures used for PMLs only such as direct access ramps		X
FENCES, WALLS, AND SOUND ABATEMENT		
Fences/sound walls within ROW that are not mounted directly on Section Developer's structure	X	
Fences/sound walls within ROW mounted directly on Section Developer's structure		X
MSE/RETAINING WALLS		
MSE walls reconstructed or remaining in the median or between PMLs		X
All walls in ROW in outside shoulders regardless of who constructed the element	X	
Earthwork and Embankments		
Earthwork and embankments within PMLs limits		X
Earthwork and embankments within GPLs and areas outside of shoulders	X	
Guardrail and Safety Barriers		
Guardrail and safety barriers within PMLs Limits		X
Guardrail and safety barriers within GPLs and areas outside of shoulders	X	
Litter and Debris Disposal, Sweeping		
Litter, debris disposal, and sweeping between the PMLs		X
Litter, debris disposal, and sweeping for GPLs and outside the shoulders	X	
Winter Maintenance		
Snow and ice removal for GPLs	X	
Snow and ice removal for PMLs		X

TABLE 25-5 ASSET O&M RESPONSIBILITY MATRIX		
MAINTENANCE ACTIVITY DURING D&C PERIOD	MDOT/AHJ O&M RESPONSIBILITY	SECTION DEVELOPER O&M RESPONSIBILITY
Roadway (Flexible, Composite, and Ridged)		
Mainline and Bridge approach slabs		X
Ramps and service drives		X
Sidewalks		X
Skid resistance (asphalt only)		X
Spilled liquids/materials		X
Potholes/fatigue cracking		X
Pavement drainage		X
Ride quality	X	
Cracks	X	
Rutting	X	
Spalling (on new roadway only)		X
Stormwater/Drainage		
Pipes and channels		X
SWM treatment devices (BMPs)		X
Discharge systems		X
Roadway underdrains		X
Manholes, headwalls, and other drainage structures		X
Catch basins		X
Standing water on travel lanes		X
Stream relocations		X
Stormwater facilities behind sound barriers		X
Earthworks, Embankments, and Cuttings		
Embankment and cut slopes		X
Permanent erosion and sedimentation control maintenance		X
Temporary erosion and sedimentation control maintenance		X

TABLE 25-5 ASSET O&M RESPONSIBILITY MATRIX		
MAINTENANCE ACTIVITY DURING D&C PERIOD	MDOT/AHJ O&M RESPONSIBILITY	SECTION DEVELOPER O&M RESPONSIBILITY
Fences, Walls and Sound Abatement		
Sound barriers, Retaining Walls, and other walls		X
Fencing		X
Graffiti		X
Guardrails and Safety Barriers		
Guardrails and safety barriers		X
Impact attenuators		X
ITS Equipment		
ITS Equipment		X
Incident Management		
Incident Response		X
Lane closure time		X
Incident duration		X
Courtesy Patrol		X
Landscaping (New and Existing)		
Turf		X
Meadows		X
Trees, shrubs, and perennials		X
Bulbs and annuals		X
Lighting		
Roadway lighting		X
Sign lighting		X
Electrical Supply and Fiber-optics		
Separate electrical supply		X
Litter and Obstructions/Debris Removal		
Litter within or originated in construction zone		X
Pavement Markings		
Pavement markings and delineators		X

TABLE 25-5 ASSET O&M RESPONSIBILITY MATRIX		
MAINTENANCE ACTIVITY DURING D&C PERIOD	MDOT/AHJ O&M RESPONSIBILITY	SECTION DEVELOPER O&M RESPONSIBILITY
Signs and Supports		
Temporary construction signs and supports		X
Temporary directional signs and supports		X
Winter Operations		
Snow and ice removal for entire roadway		X
Structures		
Bridge deck and slabs		X
Approach slabs		X
Bridge railing		X
Superstructure		X
Bearings		X
Substructure		X
Culvert		X
Scour protection		X
Appurtenances		X
Structures (cont.)		
Load ratings		X
Graffiti		X
Biennial Bridge Inspections	X	
Enforcement and Job Site Security		
Maryland State Police enforcement		X
Phase Developer or Section Developer Facilities/Section Developer Maintenance Yards		
Onsite laydown and office space		X
Offsite laydown and office space		X
Utilities		
Protect utilities		X
Maintain access to utilities		X

TABLE 25-5 ASSET O&M RESPONSIBILITY MATRIX		
MAINTENANCE ACTIVITY DURING D&C PERIOD	MDOT/AHJ O&M RESPONSIBILITY	SECTION DEVELOPER O&M RESPONSIBILITY
ENVIRONMENTAL		
Wetland & Stream Mitigation		
Protection and maintenance of sites during storms		X
Reforestation		
Monitor and report for the warranty period prior to transfer to MDOT or otherwise as determined or required by the property owner.		X

Figure 1 to Accompany Table 25-5

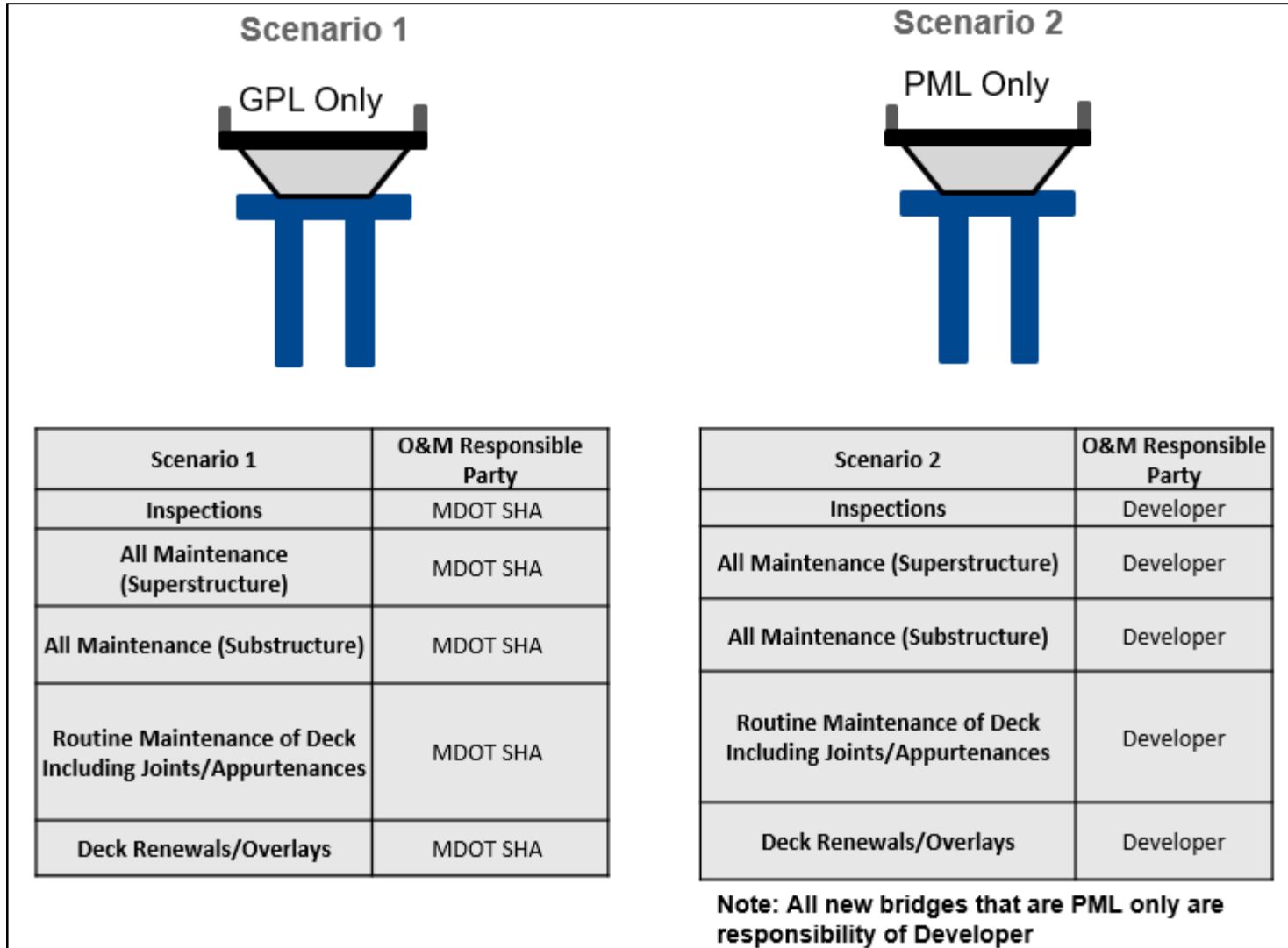


Figure 2 to Accompany Table 25-5

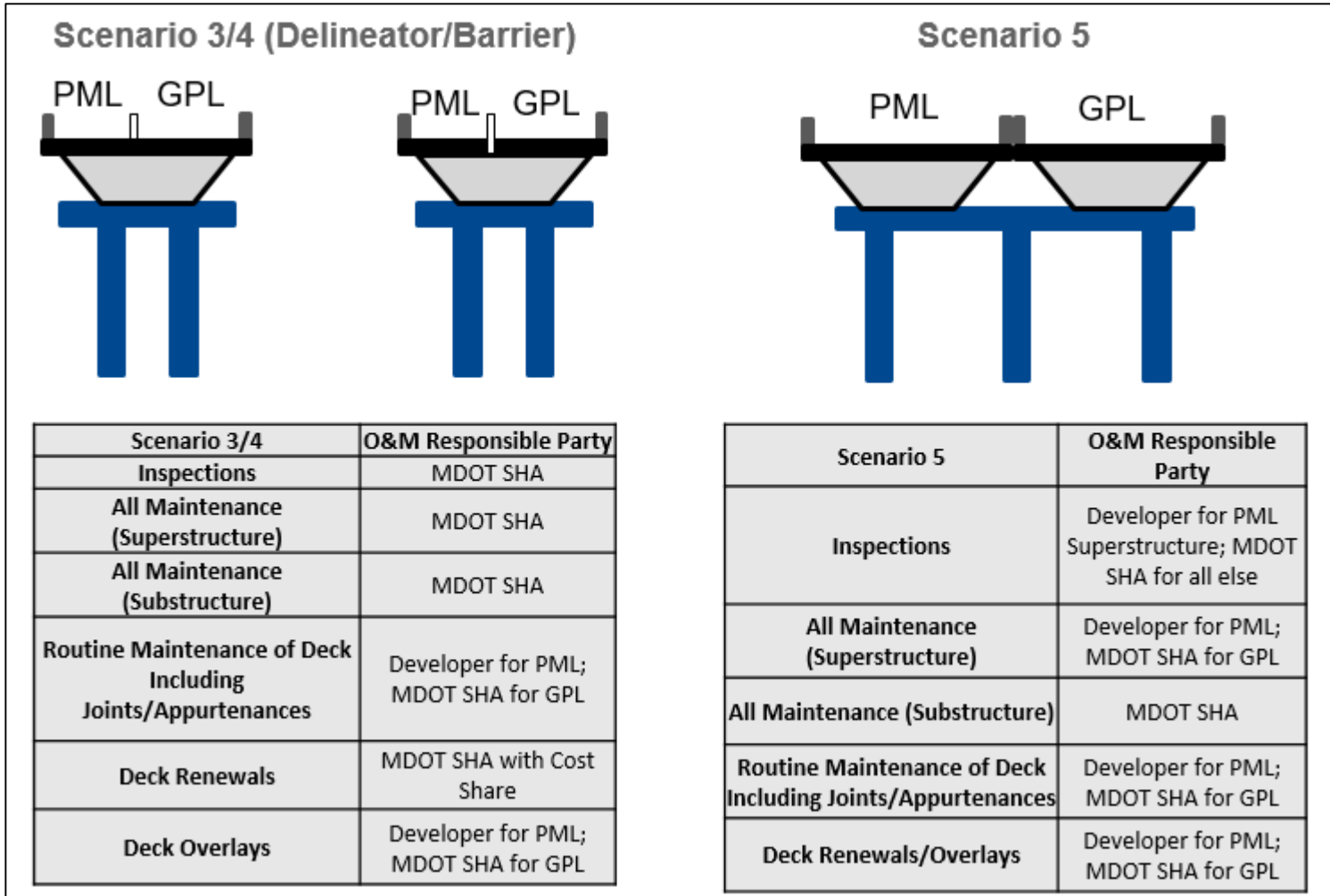


Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
1.) Pavement (Roadway Ramps, Access Roads and Other Paved Areas)													
1.1	Pavement condition	All travel lanes, including ramps, have a smooth ride quality	Ride Quality: 0.1 mile x one lane; MDOT to measure per International Roughness Index ("IRI") calculated according to ASTM E 1926 "Standard Practice for Computing International Roughness Index of Roads from Longitudinal Profile Measurements" using equipment meeting AASHTO M 328 "Standard Specification for Inertial Profiler" and ASTM E 950 "Standard Test Method for Measuring the Longitudinal Profile of Traveled Surfaces with an Accelerometer-Established Inertial Profiling Reference" operated in accordance AASHTO R 57 "Standard Practice for Operating Inertial Profiling Systems" using equipment verified and operators certified according to AASHTO R 56 "Standard Practice for Certification of Inertial Profiling Systems" and accepted according to AASHTO R 54 "Standard Practice for Accepting Pavement Ride Quality When Measured Using Inertial Profiling Systems"; data processed by MDOT	Yearly	100% of segments < 170 in/mi	Less than 100% of segments < 170 in/mi	N/A	N/A	One month (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	N/A	N/A	4 months (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	5
1.2	Pavement condition	All travel lanes, including ramps, have a smooth ride quality	Ride Quality: 0.1 mile x one lane; MDOT to measure per IRI calculated according to ASTM E 1926 using equipment meeting AASHTO M328 and ASTM E 950, operated in accordance AASHTO R 57 using equipment verified and operators certified according to AASHTO R 56, and accepted	Yearly	90% of segments < 140 in/mi	Less than 90% of segments <140 in/mi	N/A	N/A	One month (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	N/A	N/A	4 months (unless temperature restrictions for paving are still in force, then within one month once temperature	3

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
			according to AASHTO R 54; data processed by MDOT									restrictions are lifted)	
1.3	Pavement condition	All travel lanes, including ramps, have a smooth ride quality	Ride Quality: 25 feet x one lane; MDOT will measure per IRI using an IRI Inertial Profiler that conforms to ASTM E 950 and Maryland Standard Method of Tests ("MSMT") 563 "Operation of the Inertial Profiler." Data collected in accordance with quality assurance testing procedures outlined in MDOT SHA's Standard Specifications for Construction and Materials Section 535. Only one test run will be performed on each lane. Data processed by MDOT in accordance with Section 535 and MSMT 736 "Procedures for Determining the Ride Specification Pay Limits".	Yearly	100% of segments < 200 in/mi	Less than 100% of segments < 200 in/mi	N/A	N/A	One month (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	N/A	N/A	4 months (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	5
1.4	Pavement condition	All travel lanes have an adequate skid resistance	Skid Resistance: 0.5 mile x one lane; MDOT will measure per ASTM E 274 "Standard Test Method for Skid Resistance of Paved Surfaces Using a Full-Scale Tire" using a tire meeting the requirements of ASTM E 501 "Standard Specification for Standard Rib Tire for Pavement Skid-Resistance Tests."	Yearly	100% of segments > 35	Less than 100% of segments > 35	N/A	5 days to place warning sign	One month (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	N/A	5 days	4 months (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	5
1.5	Pavement condition	All ramps have an adequate skid resistance	Skid Resistance: 0.5 mile x one lane, or Ramp length, whichever is greater; MDOT will measure per ASTM E 274 using a tire meeting the requirements of ASTM E 501	Yearly	100% of segments > 40	Less than 100% of segments > 40	N/A	5 days to place warning sign	One month (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	N/A	5 days	4 months (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	5

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
1.6	Pavement condition	All travel lanes, including ramps, have an adequate skid resistance	Skid Resistance: 0.5 mile x one lane, or Ramp length, whichever is greater; MDOT will measure per ASTM E 274 using a tire meeting the requirements of ASTM E 501.	Yearly	90% of segments > 45	Less than 90% of segments > 45	N/A	5 days to place warning sign	One month (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	N/A	5 days	4 months (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	5
1.7	Pavement condition	All pavement is free from defects. deleterious material such as oil, antifreeze, gasoline or other liquids spilled from vehicles onto traffic lanes, and repair of damaged pavement shall be removed from pavement	Visual Inspection of all pavement by the Section Developer, MDOT or both	12 months or as notified of occurrence	No deleterious material greater than 30 square feet in area	Deleterious material greater than or equal to 30 square feet in area	N/A	24 hours	One month (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	N/A	24 hours	4 months (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	3
1.8	Pavement condition	All travel lanes, including ramps, are free from structural and functional cracking, rutting, potholes/fatigue cracking, edge cracking, faulting, durability, longitudinal and transverse cracks, corner breaks or spalling.	Structural crack density (flexible surface) - 0.1 mile x one lane; MDOT will measure per AASHTO PP 67 "Practice For Quantifying Cracks In Asphalt Pavement Surfaces From Collected Pavement Images Utilizing Automated Methods" and based on structural cracks (as defined in the MDOT Pavement and Geotechnical Design Guide) using images collected following AASHTO PP 68 "Standard Practice for Collecting Images of Pavement Surfaces for Distress Detection"; data processed by MDOT.	Yearly	100% of segments < 15	Less than 100% of segments < 15	N/A	N/A	One month (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	N/A	N/A	4 months (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	4
1.9	Pavement condition	All travel lanes, including ramps, are free from structural and functional cracking,	Functional crack density (flexible surface) - 0.1 mile x one lane; MDOT will measure per AASHTO PP 67 and based on functional cracks (as	Yearly	100% of segments < 25	Less than 100% of segments < 25	N/A	N/A	One month (unless temperature restrictions for paving are still in	N/A	N/A	4 months (unless temperature restrictions for paving	3

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
		rutting, potholes/fatigue cracking, edge cracking, faulting, durability, longitudinal and transverse cracks, corner breaks or spalling.	defined in the MDOT Pavement and Geotechnical Design Guide) using images collected following AASHTO PP 68; data processed by MDOT.						force, then within one month once temperature restrictions are lifted)			are still in force, then within one month once temperature restrictions are lifted)	
1.10	Pavement condition	All travel lanes, including ramps, are free from structural and functional cracking, rutting, potholes/fatigue cracking, edge cracking, faulting, durability, longitudinal and transverse cracks, corner breaks or spalling.	Functional crack density (flexible surface) - 0.1 mile x one lane; MDOT will measure per AASHTO PP 67 and based on functional cracks (as defined in the MDOT Pavement and Geotechnical Design Guide) using images collected following AASHTO PP 68; data processed by MDOT.	Yearly	90% of segments < 16	Less than 90% of segments < 16	N/A	N/A	One month (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	N/A	N/A	4 months (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	3
1.11	Pavement condition	All travel lanes, including ramps, are free from structural and functional cracking, rutting, potholes/fatigue cracking, edge cracking, faulting, durability, longitudinal and transverse cracks, corner breaks or spalling.	Rutting (flexible surfaces) - 0.1 mile x one lane; MDOT will measure per AASHTO R 48 "Standard Practice for Determining Rut Depth in Pavements" and AASHTO PP 70 "Standard Practice for Collecting the Transverse Pavement Profile" using data collected according to AASHTO PP 69 "Standard Practice for Determining Pavement Deformation Parameters and Cross Slope from Collected Transverse Profiles"; data processed by MDOT	Yearly	100% of segments < 0.30"	Less than 100% of segments < 0.30"	N/A	N/A	One month (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	N/A	N/A	4 months (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	5
1.12	Pavement condition	All pavement is free from structural and functional cracking, rutting, potholes/fatigue cracking, edge cracking, faulting, durability, longitudinal and	Potholes/fatigue cracking (flexible surface); measure per the Strategic Highway Research Program's Long-Term Pavement Performance ("LTPP") Program "Distress Identification Manual"	12 months or as notified of occurrence	No medium or high severity potholes or high severity fatigue cracking greater than 1 square foot in area	Medium or high severity potholes or high severity fatigue cracking greater than 1 square foot in area	N/A	24 hours	One month (unless temperature restrictions for paving are still in force, then within one month once temperature	N/A	24 hours	4 months (unless temperature restrictions for paving are still in force, then within one month once	5

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
		transverse cracks, corner breaks or spalling.							restrictions are lifted)			temperature restrictions are lifted)	
1.13	Pavement condition	All shoulders are free from structural and functional cracking, rutting, potholes/fatigue cracking, edge cracking, faulting, durability, longitudinal and transverse cracks, corner breaks or spalling.	Edge cracking (flexible surface); measure per LTPP "Distress Identification Manual"	12 months or as notified of occurrence	No medium or high severity edge cracking	Medium or high severity edge cracking exists	N/A	N/A	One month (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	N/A	N/A	4 months (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	3
1.14	Pavement condition	All travel lanes, including ramps, is free from structural and functional cracking, rutting, potholes/fatigue cracking, edge cracking, faulting, durability, longitudinal and transverse cracks, corner breaks or spalling.	Faulting (rigid surface) - 0.1 mile x one lane; MDOT will measure per AASHTO R 36 "Standard Practice for Evaluating Faulting of Concrete Pavements" using equipment meeting the requirements of ASTM E 950 "Standard Test Method for Measuring the Longitudinal Profile of Traveled Surfaces with an Accelerometer-Established Inertial Profiling Reference: and data processed by MDOT.	Yearly	100% of segments < 0.15"	Less than 100% of segments < 0.15"	N/A	N/A	One month (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	N/A	N/A	4 months (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	4
1.15	Pavement condition	All pavement is free from structural and functional cracking, rutting, potholes/fatigue cracking, edge cracking, faulting, durability, longitudinal and transverse cracks, corner breaks or spalling	Longitudinal and transverse cracks (rigid surfaces) - 0.1 mile x one lane; measure per LTPP "Distress Identification Manual"	12 Months or as notified of occurrence	< 25' Longitudinal Cracks <4 Transverse Cracks	> 25' Longitudinal Cracks exist > 4 Transverse Cracks exist	N/A	N/A	One month (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	N/A	N/A	4 months (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	1
1.16	Pavement condition	All pavement is free from structural and functional cracking, rutting, potholes/fatigue cracking, edge cracking, faulting,	Corner breaks or spalling (rigid surfaces); measure per LTPP "Distress Identification Manual"	12 months or as notified of occurrence	No medium or high severity corner breaks or spalls	Medium or high severity corner breaks or spalls exist	N/A	24 hours for high severity	One month (unless temperature restrictions for paving are still in force, then within one	N/A	24 hours for high severity	4 months (unless temperature restrictions for paving are still in force, then	4

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
		durability, longitudinal and transverse cracks, corner breaks or spalling							month once temperature restrictions are lifted)			within one month once temperature restrictions are lifted)	
1.17	Pavement condition	All pavement is free from structural and functional cracking, rutting, potholes/fatigue cracking, edge cracking, faulting, durability, longitudinal and transverse cracks, corner breaks or spalling	Durability, longitudinal and transverse cracks (rigid surfaces); measure per LTPP "Distress Identification Manual"	12 months or as notified of occurrence	No medium or high severity cracks No slabs broken into 3 or more pieces	Medium or high severity cracks exist. Slabs broken into 3 or more pieces	N/A	N/A	One month (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	N/A	N/A	4 months (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	3
1.18	Pavement condition	All pavement must be free from localized deficiencies such as pop outs or scaling (ridged surfaces)	Localized deficiencies such as pop outs or scaling (rigid surfaces); measure per LTPP "Distress Identification Manual"	12 months or as notified of occurrence	No localized deficiencies greater than 2 inches wide, or to a depth of 0.50 inch, or greater than 6 inches long	Localized deficiencies exist greater than 2 inches wide, or to a depth of 0.50 inch, or greater than 6 inches long	N/A	N/A	One month (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	N/A	N/A	4 months (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	1
1.19	Pavement drainage (underdrain, trench drains, catch basins, inlets, outlets)	Each Element of the drainage system is maintained and functions correctly (travel way is free from standing water following a rain event)	Visual Inspection or - measurement of standing water within traveled lanes or paved shoulder	12 months or as notified of occurrence	No instances of standing water in any traveled lane and no greater than 1" in depth elsewhere	Instances of standing water in any traveled lane and greater than 1" in depth elsewhere	N/A	4 hours	One month (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	N/A	4 hours	4 months (unless temperature restrictions for paving are still in force, then within one month once temperature restrictions are lifted)	5

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
1.20	Sidewalks and Americans with Disabilities Act ("ADA") access points	Maintain sidewalks and ADA access points in a manner that provides well-drained and compliant surfaces. Perform Inspections at minimum once per year.	Visual Inspections and physical measurements	12 months or as notified of occurrence	ADA access points meet or exceed ADA compliance	ADA access points do not meet ADA compliance	2 hours	2 weeks	1 month	1 hour	2 weeks	1 month	3
2.) Drainage (See Notes 1 and 2 following this table)													
2.1	Stormwater discharge locations	Stormwater discharges in a stable manner to groundwater and waterways and complies with Applicable Law and Governmental Approvals	Visual Inspection and records following drainage and MDOT SHA OHD Highway Hydraulics Division SWM Assets Program Standard Operating Procedures and use of the most current ArcCollector/Survey123 applications (as developed by the ESRI Corporation) and coordinated with MDOT NPDES database uploads	2 years	Non-compliances with Applicable Law and Governmental Approvals	Discharge point within ROW does not comply with Applicable Law or Governmental Approvals;	24 hours	5 days	45 days	24 hours	5 days	24 hours	5
2.2 Drainage Systems													
2.2.1	Standing water on travel lanes	Respond to instances of standing water on any travel lane and implementation of mitigation measures or corrective action.	Visual Inspection and reports of standing water on travel ways. Reports of same from others.	As needed	Instances and extent of standing water in on any travel lane: Response times in excess of 2 hours	Failure to respond to any instances of standing water covering greater than 25% of the width of any travel lane on travel way	2 hours	1 day	7 days	1 hour	1 day	1 day	5
2.2.2	Roadway underdrains	Underdrain pipes and outlets in a fully functioning condition to maintain the design drainage flow	Visual CCTV Inspection	4 years	All devices functioning correctly	Blocked, collapsed or deteriorated underlain piping	3 days	7 days	120 days	1 day	1 day	7 days	2
2.2.3	Storm drain pipes, channels and ditches (conveyance)	Each storm drain conveyance Element is maintained in its proper function by	Visual Inspection and regular inventory following drainage and MDOT SHA OHD Highway Hydraulics Division SWM Assets Program Standard	2 years	a) Length of pipes or channels with less than 90% of original cross section clear	Any length of drainage pipe or channel with less than 90% of cross section clear	1 day	7 days	365 days	1 day	1 day	30 days	2

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
		cleaning, clearing or emptying as appropriate from the point at which water drains from inlet point to outlet point	Operating Procedures and use of the most current ArcCollector/Survey123 applications and coordinated with MDOT NPDES database uploads. Visual Inspection supplemented by CCTV where required to inspect buried pipe work. CCTV Inspections should be at intervals of no less than 5 years.		b) Channels are free flowing and clear of standing water and obstacles. c) Pipe joints are sound in terms of their water and soil tightness. Joints should be connected, not separated and not leaking.	Channels are not free flowing and clear of standing water and obstacles. Pipe joints are not sound in terms of their water and soil tightness. Joints should be connected, not separated and not leaking.	1 day 1 day	7 days 7 days	365 days 365 days	1 day 1 day	1 day 1 day	30 days 30 days	2 2
2.2.4	Storm drain structures incl. inlets, manholes, headwalls, end sections, junction boxes, pipe connections, and others. (drainage structure)	All drainage structures are in a fully functioning, undamaged condition to meet intended design.	Visual Inspection and regular inventory following Drainage and MDOT SHA OHD Highway Hydraulics Division SWM Assets Program Standard Operating Procedures and use of the most current ArcCollector/Survey123 applications and coordinated with MDOT NPDES database uploads	2 years	Structures, frames, covers and appurtenances are functioning correctly and free of debris.	Any structure not in a fully functioning condition to meet the intended design or any cover not in place and functioning correctly	8 hours	1 day	7 days	4 hours	1 day	2 days	3
2.3 Stormwater Management Facilities													
2.3.1	SWMFACs	Stormwater treatment systems, incl. flow and spillage control devices function in accordance with the Section Developer's specific design requirements as approved by the AHJ; location and means of operation are recorded adequately to permit correct operation.	Visual Inspection. All devices functioning.	Every 3 years after acceptance of As-Built Drawings	Devices functioning in accordance with the Section Developer's specific design requirements with means of operation and as determined by MDOT; with an Action Rating of I (no action) in compliances with the MS4 permit.	Per MS4 permit requirements. Failure to complete Routine Maintenance Required per MDOT SWM Facility Routine Maintenance Manuals based on facility type (e.g., facility mowing and litter control)	7 days	30 days	60 days	1 day	7 days	7 days	1
2.3.2	SWMFACs	See ID #2.3.1	See ID #2.3.1	See ID #2.3.1	Devices functioning in accordance with the Section Developer's specific design	Per MS4 permit requirements. Failure to complete minor maintenance required per MDOT SWM Facility Routine	7 days	30 days	60 days	1 day	7 days	7 days	1

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
					requirements with means of operation and as determined by MDOT with an Action Rating of II (Minor Maintenance) in compliances with the MS4 permit.	Maintenance Manuals based on facility type. Could include mowing, brush clearing, minor sediment removal, seeding bare spots, litter control and more.							
2.3.3	SWMFACs	See ID #2.3.1	See ID #2.3.1	See ID #2.3.1	Devices functioning in accordance with the Section Developer's specific design requirements with means of operation and as determined by MDOT with an Action Rating of III indicates non-compliance issues with the MS4 permit.	Per MS4 permit requirements. Failure to complete work order which may result in additional development of design; reconstruction; change in maintenance approach and additional permitting activities.	7 days	90 days	Within 3 years of Inspection revealing major issues.	1 day	30 days	7 days	3
2.3.4	SWMFACs	See ID #2.3.1	See ID #2.3.1	See ID #2.3.1	Devices functioning in accordance with the Section Developer's specific design requirements with means of operation and as determined by MDOT with an Action Rating of IV indicates non-compliance issues with the MS4 permit.	Per MS4 permit requirements. Failure to complete retrofit design required, facility no longer functioning as designed and cannot be restored to original condition within original footprint or as original facility type. Full redesign, reconstruction and additional permitting activities may be required.	7 days	90 days	Within 3 years of Inspection revealing major issues.	1 day	30 days	7 days	5
2.3.5	SWMFACs	See ID #2.3.1	See ID #2.3.1	See ID #2.3.1	Devices functioning in accordance with the Section Developer's specific design	Per MS4 Permit Requirements. Failure to complete Emergency design and repair followed by review and issuance	3 days	30 days	Within 3 years of Inspection revealing major issues.	1 day	1 day	7 days	5

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
					requirements with means of operation and as determined by MDOT with an Action Rating of V to have catastrophically failed and pose an immediate threat to public safety.	of new permit. Emergency repairs may only bring facility to an Action Rating of IV condition and follow-up required.							
2.3.6	SWM As-built conditions	As-built Drawings are accepted by MDOT SHA OHD PRD and provided to MDOT SHA HHD for NPDES Database	Accepted As-built Drawings	As needed for facilities constructed or re-constructed	Accepted As-built Drawings	Failure to complete and submit as-built drawing within 60 days of construction completion. Failure to obtain acceptance of As-Built Drawings with 6 months of construction	5 days	N/A	N/A	5 days	N/A	N/A	5
2.3.7	SWM Inspections	Inspections per MS4 permit conditions	Per drainage and MDOT SHA OHD Highway Hydraulics Division SWM Assets Program Standard Operating Procedures and use of most current ArcCollector/Survey123 applications and coordinated into MDOT NPDES database.	Every 3 years after acceptance of As-Built Drawings	Records to be posted to NPDES database prior to Submittal of NPDES Annual Report to MDE.	MS4 permit violation for failure to inspect facilities.	7 days	30 days	30 days	1 day	1 day	1 day	5
2.4 Dams/Embankments													
2.4.1	Significant and high hazard dams/embankments	All dams in MDE dam safety inventory should be inspected and maintained in good condition in accordance with MDE dam inspection checklist requirements	Per MDE dam inspection checklists and standard procedures.	Annually and after each significant rain event (significant as determined by MDE DSD)	Dams must be in excellent or good condition. Any lower condition must be remediated immediately.	Dam Inspection below good or breach event after a major storm. significant (B) and high(C) hazard dams must include an EAP in case there is a large scale storm and the dam fails. These plans are updated annually and will be provided to MDOT.	8 hours	3 days	30 days	4 hours	1 day	1 day	5

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
2.4.2	Low Hazard Dams/Embankments	All dams in MDE dam safety inventory should be inspected and maintained in good condition in accordance with MDE dam inspection checklist requirements	Per MDE dam inspection checklists and standard procedures.	Every 3 years after acceptance of As-Built Drawings	Dams must be in excellent or good condition. Any lower condition must be remediated immediately.	Dam Inspection below good or breach event after a major storm.	8 hours	7 days	60 days	4 hours	1 day	1 day	4
2.5 Erosion and Sediment Control													
2.5.1	ESC Plan Holder line for quality assurance program ratings	See MDOT SHA Standard Specifications for Construction and Materials Section 308.03.06	See MDOT SHA Standard Specifications for Construction and Materials Section 308.03.06	See MDOT SHA Standard Specifications for Construction and Materials Section 308.03.06	See MDOT SHA Standard Specifications for Construction and Materials Section 308.03.06	Rating of C	8 hours	24 hours	72 hours	72 hours	72 hours	72 hours	3
						Rating of D	8 hours	24 hours	72 hours	72 hours	72 hours	72 hours	4
						Rating of F	8 hours	24 hours	72 hours	72 hours	72 hours	72 hours	5
2.5.2	Maintain LOD/ temporary orange construction fence ("TOCF")	Demarcate and maintain LOD with TOCF to avoid excursions outside approved LOD	Visual Inspection	Daily	Maintain TOCF so that there are no gaps, segments pushed down, etc.	Failure to make repairs to TOCF within 72 hours of initial Inspection	N/A	1 day	3 days	N/A	1 day	3 days	2
2.5.3	Maintenance of stream flow	Maintain stream flow during construction	Visual Inspection	Daily	Maintain stream flow through use of pump around practices, partial or full stream diversions, and relocations	Failure to maintain stream flow. Failure to maintain dry work area. Failure to correct 72 hours after Inspection.	N/A	1 day	3 days	N/A	1 day	3 days	2
2.5.4	Maintenance of all ESC controls	Maintain all approved ESC per the MDOT ESC Manual	Visual Inspection by IQF and IEM	Daily by IQF; IEM Inspection bi-weekly	Maintain all approved ESC controls per the MDOT ESC manual	Failure to maintain controls per the MDOT ESC manual. Failure to correct 72 hours after Inspection.	N/A	1 day	3 days	N/A	1 day	3 days	2
2.5.5	Maintenance of haul roads, timber mats,	Maintain haul roads, timber matting, and Site access	Visual Inspection by IQF and IEM	Daily by IQF; IEM Inspection bi-weekly	Maintain haul roads to meet specifications	Failure to maintain controls per the MDOT ESC manual. Failure to correct 72	N/A	1 day	3 days	N/A	1 day	3 days	2

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
	and Site access				/MDOT ESC Manual	hours after Inspection.							
2.5.6	Maintenance of concrete wash outs	Maintain concrete washouts so that materials are contained with no spillage.	Visual Inspection by IQF and IEM	Daily by IQF; IEM Inspection bi-weekly	Maintain all approved ESC controls per the MDOT ESC manual	Failure to maintain controls per the MDOT ESC manual. Failure to correct 72 hours after Inspection.	N/A	1 day	3 days	N/A	1 day	3 days	2
2.5.7	Maintenance of public roadways	Maintain SCEs and prevent trucks and other vehicles from tracking sediment and other construction debris on roads.	Visual Inspection by IQF and IEM	Daily by IQF; IEM Inspection bi-weekly	Maintain all approved ESC controls per the MDOT ESC manual	Failure to maintain controls per the MDOT ESC manual. Sediment/debris tracking evident on roadways. Failure to correct 72 hours after Inspection.	N/A	1 day	3 days	N/A	1 day	3 days	2
2.5.8	Maintenance of stockpile areas	Maintain stockpiles and stockpile areas to prevent materials from leaving approved areas. Maintain proper heights and stabilize properly.	Visual Inspection by IQF and IEM	Daily by IQF; IEM Inspection bi-weekly	Maintain all approved ESC controls per the MDOT ESC manual	Failure to maintain controls per the MDOT ESC manual. Sediment/debris tracking evident on roadways. Failure to correct 72 hours after Inspection.	N/A	1 day	3 days	N/A	1 day	3 days	2
2.5.9	Maintenance of fish blockage nets (if fish relocation required)	Maintain fish blockage nets. Keep free of excessive debris, re-install after disturbance/high flows, reset as required.	Visual Inspection by IQF and IEM	Daily by IQF; IEM Inspection bi-weekly	Maintain fish blockage and work area free of fish according to permit conditions.	Failure to maintain fish blockage as per permit conditions. Failure to correct 72 hours after Inspection.	N/A	1 day	3 days	N/A	1 day	3 days	2
2.5.10	Maintenance of equipment	Maintain equipment so that there is no leakage of hydraulic fluids, oils, and other harmful substances	Visual Inspection by IQF and IEM	Daily by IQF; IEM Inspection bi-weekly	Maintain equipment according to BMPs and permit conditions	Evidence of fluids leaking from equipment. Failure to correct/make repairs.	N/A	1 day	3 days	N/A	1 day	3 days	2
2.5.11	Maintenance of water quality	Maintain water quality through the use of approved ESC controls. Do not exceed approved turbidity levels	Visual Inspection or use of turbidity meter by IQF and IEM	Daily by IQF; IEM Inspection bi-weekly	Maintain according to the permit requirements.	Failure to correct 72 hours after Inspection.	N/A	1 day	3 days	N/A	1 day	3 days	2

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
2.5.12	Maintenance of vegetation associated with SWMFACs and drainage	Maintain native vegetation, tree protection, etc.	Visual Inspection by IQF and IEM	Daily by IQF; IEM Inspection bi-weekly	Maintain native vegetation coverage according to permit conditions.	Native vegetation coverage not met. Invasive species coverage exceeds threshold.	N/A	1 day	30 days	N/A	1 day	3 days	2
3.) Environmental													
3.1	Maintenance of stream flow	Maintain stream flow during construction	Visual Inspection by IQF and IEM	Daily by IQF; IEM Inspection bi-weekly	Maintain stream flow through the use of pump around practices, partial or full stream diversions, and relocations	Failure to maintain streamflow. Failure to maintain a dry work area. Failure to correct 72 hours after Inspection.	N/A	1 day	3 days	N/A	1 day	3 days	3
3.2	Maintenance of fish blockage nets (if fish relocation required)	Maintain fish blockage nets. Keep free of excessive debris, re-install after disturbance/high flows, reset as required.	Visual Inspection by IQF and IEM	Daily by IQF; IEM Inspection bi-weekly	Maintain fish blockage and work area free of fish according to permit conditions.	Failure to maintain fish blockage as per permit conditions. Failure to correct 72 hours after Inspection.	N/A	1 day	3 days	N/A	1 day	3 days	3
3.3	Maintenance of water quality	Maintain water quality through the use of approved ESC controls. Do not exceed approved turbidity levels	Visual Inspection or use of turbidity meter by IQF and IEM	Daily by IQF; IEM Inspection bi-weekly	Maintain according to the permit requirements.	Failure to correct 72 hours after Inspection.	N/A	1 day	3 days	N/A	1 day	3 days	3
3.4	Stream relocations	As stipulated in the Section 404 and Waterway Construction Permits – [TBD pending receipt of permits]	As stipulated in the Section 404 and Waterway Construction Permits – [TBD pending receipt of permits]	As stipulated in the Section 404 and Waterway Construction Permits – [TBD but most likely annually]	Maintain according to the permit requirements.	Non-compliance with permit conditions	In accordance with permits	In accordance with permits	In accordance with permits	Same timeframe as Response Time	Same timeframe as Response Time	Same timeframe as Response Time	3

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
3.5	Stream and wetland mitigation sites on public lands	Monitor and performance requirements as outlined in the Section 404 and MDE Nontidal Wetlands permits	As stipulated in the Section 404 and MDE non tidal wetlands permits	As stipulated in the Section 404 and MDE non tidal wetlands permits	Maintain according the permit requirements.	Non-compliance with permit conditions	In accordance with permits	In accordance with permits	In accordance with permits	Same timeframe as Response Time	Same timeframe as Response Time	Same timeframe as Response Time	3
4.) Structures													
4.1	All reinforced concrete Elements listed in Table 3.3 of AASHTO Manual for Bridge Element Inspection (See Note 3 following this table)	All portions of Element shall be coded no greater than Condition State 2 for all types of Defects	Element level Inspection using AASHTO Manual for Bridge Element Inspection	24 months	Quantity in square feet ("ft ² ") of Element in Condition State 3	Portion of Element No. 12 reinforced concrete deck or Element No. 38 reinforced concrete slab coded in Condition State 3	24 hours	7 days	21 days	24 hours	24 hours	3 days	4
						Portion of remaining Elements (not mentioned above) coded in Condition State 3	3 days	14 days	60 days	24 hours	24 hours	14 days	3
				24 months	Quantity (ft ²) of Element in Condition State 4	Portion of Element No. 12 reinforced concrete deck or Element No. 38 reinforced concrete slab coded in Condition State 4	24 hours	3 days	14 days	24 hours	24 hours	3 days	5
						Portion of remaining Elements (not mentioned above) coded in Condition State 4	24 hours	7 days	30 days	24 hours	3 days	7 days	4
4.2	All prestressed concrete	All portions of Element shall be coded Condition	Element level Inspection using AASHTO Manual for Bridge Element Inspection	24 Months	Quantity (ft ²) of Element in Condition State 2	Portion of Element coded in Condition State 2	3 days	14 days	60 days	24 hours	24 hours	14 days	3

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
	Elements listed in Table 3.4 of AASHTO Manual for Bridge Element Inspection	State 1 with respect to exposed prestressing and cracking			Quantity (ft ²) of Element in Condition State 3	Portion of Element coded in Condition State 3	24 hours	7 days	21 days	24 hours	24 hours	7 days	4
					Quantity (ft ²) of Element in Condition State 4	Portion of Element coded in Condition State 4	24 hours	3 days	7 days	24 hours	24 hours	3 days	5
		Element Level Inspection using AASHTO Manual for Bridge Element Inspection	Element level Inspection using AASHTO Manual for Bridge Element Inspection	24 Months	Quantity (ft ²) of Element in Condition State 3	Portion of Element coded in Condition State 3	3 days	14 days	60 days	24 hours	24 hours	14 days	3
					Quantity (ft ²) of Element in Condition State 4	Portion of Element coded in Condition State 4	24 hours	7 days	21 days	24 hours	24 hours	7 days	4
4.3	All steel Elements listed in Table 3.5 of AASHTO Manual for Bridge Element Inspection	All portions of Element shall be coded no greater than Condition State 2 for all types of Defects	Element level Inspection using AASHTO Manual for Bridge Element Inspection	24 Months	Quantity (ft ²) of Element in Condition State 3	Portion of Element coded in Condition State 3	3 days	14 days	60 days	24 hours	24 hours	14 days	5
				24 Months	Quantity (ft ²) of Element in Condition State 4	Portion of Element coded in Condition State 4	24 hours	7 days	21 days	24 hours	3 days	7 days	10
4.4	All masonry Elements listed in Table 3.7 of AASHTO Manual for Bridge Element Inspection	All portions of Element shall be coded no greater than Condition State 2 for all types of Defects	Element level Inspection using AASHTO Manual for Bridge Element Inspection	24 months	Quantity (ft ²) of Element in Condition State 3	Portion of Element coded in Condition State 3	3 days	14 days	60 days	24 hours	24 hours	14 days	3
			Element level Inspection using AASHTO Manual for Bridge Element Inspection	24 months	Quantity (ft ²) of Element in Condition State 4	Portion of Element coded in Condition State 4	24 hours	7 days	30 days	24 hours	3 days	7 days	5
4.5	All other material Elements listed in Table 3.8 of AASHTO Manual for Bridge Element Inspection (See Note 4 following this table)	All portions of Element shall be coded no greater than Condition State 2 for all types of Defects	Element level Inspection using AASHTO Manual for Bridge Element Inspection	24 months	Quantity (ft ²) of Element in Condition State 3	Portion of Element coded in Condition State 3	3 days	14 days	60 days	24 hours	24 hours	14 days	3
			Element level Inspection using AASHTO Manual for Bridge Element Inspection	24 months	Quantity (ft ²) of Element in Condition State 4	Portion of Element coded in Condition State 4	24 hours	7 days	30 days	24 hours	3 days	7 days	5
4.6	All bearings Elements listed in Table	All portions of Element shall be coded no greater	Element level Inspection using AASHTO Manual for Bridge Element Inspection	24 months	Quantity (ft ²) of Element in Condition State 3	Portion of Element coded in Condition State 3	3 days	14 days	60 days	24 hours	24 hours	14 days	3

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points	
										Mitigation	Temporary Repair	Permanent Repair		
	3.9 of AASHTO Manual for Bridge Element Inspection	than Condition State 2 for all types of Defects	Element level Inspection using AASHTO Manual for Bridge Element Inspection	24 months	Quantity (ft ²) of Element in Condition State 4	Portion of Element coded in Condition State 4	24 hours	7 days	30 days	24 hours	3 days	7 days	5	
4.7	All joints Elements listed in Table 3.10 of AASHTO Manual for Bridge Element Inspection	Joint armoring associated with all types of joints	Element level Inspection using AASHTO Manual for Bridge Element Inspection	24 months	Quantity of joint with armoring showing some minor signs of anchorage looseness	Any location with Armoring showing some minor signs of anchorage looseness	24 hours	3 days	7 days	24 hours	24 hours	3 days	3	
				24 months	Quantity of joint with armoring showing signs of anchorage looseness or movement is noticed	Any location with Armoring showing signs of anchorage looseness or movement is noticed	24 hours	2 days	5 days	24 hours	24 hours	3 days	5	
				24 months	Quantity of joint armoring or armoring anchorage has failed	Any location where Joint Armoring or Armoring anchorage has failed	24 hours	24 hours	3 days	24 hours	24 hours	3 days	10	
			All portions of Element shall be coded no greater than Condition State 2 for all types of Defects	Element level Inspection using AASHTO Manual for Bridge Element Inspection	24 months	Quantity (ft ²) of Element in Condition State 3	Portion of Element coded in Condition State 3	3 days	14 days	60 days	24 hours	24 hours	14 days	3
		Element level Inspection using AASHTO Manual for Bridge Element Inspection		24 months	Quantity (ft ²) of Element in Condition State 4	Portion of Element coded in Condition State 4	24 hours	7 days	30 days	24 hours	3 days	7 days	5	
		4.8	All wearing surfaces Elements listed in Table 3.11 of AASHTO Manual for Bridge Element Inspection	All portions of Element shall be coded no greater than Condition State 2 for all types of Defects	Element level Inspection using AASHTO Manual for Bridge Element Inspection	24 months	Quantity (ft ²) of Element in Condition State 3	Portion of Element coded in Condition State 3	24 hours	3 days	7 days	24 hours	24 hours	3 days
Element level Inspection using AASHTO Manual for Bridge Element Inspection	24 months				Quantity (ft ²) of Element in Condition State 4	Portion of Element coded in Condition State 4	24 hours	2 days	5 days	24 hours	24 hours	24 hours	5	
4.9	Steel protective coating	All portions of Element shall be coded no greater than Condition State 2 for all types of Defects	Element level Inspection using AASHTO Manual for Bridge Element Inspection	24 months	Quantity (ft ²) of Element in Condition State 3	Portion of Element coded in Condition State 3	3 days	14 days	60 days	24 hours	24 hours	14 days	3	

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
	Element listed in Table 3.11 of AASHTO Manual for Bridge Element Inspection	than Condition State 2 for all types of Defects	Element level Inspection using AASHTO Manual for Bridge Element Inspection	24 months	Quantity (ft ²) of Element in Condition State 4	Portion of Element coded in Condition State 4	24 hours	7 days	30 days	24 hours	3 days	7 days	5
4.10	Concrete protective coating Element listed in Table 3.11 of AASHTO Manual for Bridge Element Inspection	All portions of Element shall be coded no greater than Condition State 2 for all types of Defects	Element level inspection using AASHTO Manual for Bridge Element Inspection	24 months	Quantity (ft ²) of Element in Condition State 3	Portion of Element coded in Condition State 3	3 days	14 days	60 days	24 hours	24 hours	14 days	3
			Element level Inspection using AASHTO Manual for Bridge Element Inspection	24 months	Quantity (ft ²) of Element in Condition State 4	Portion of Element coded in Condition State 4	24 hours	7 days	30 days	24 hours	3 days	7 days	5
4.11	Concrete reinforcing steel protective coating Element listed in Table 3.11 of AASHTO Manual for Bridge Element Inspection	All portions of Element shall be coded no greater than Condition State 2 for all types of Defects	Element Level Inspection using AASHTO Manual for Bridge Element Inspection	24 months	Quantity (ft ²) of Element in Condition State 3	Portion of Element coded in Condition State 3	3 days	14 days	60 days	24 hours	24 hours	14 days	3
			Element Level Inspection using AASHTO Manual for Bridge Element Inspection	24 months	Quantity (ft ²) of Element in Condition State 4	Portion of Element coded in Condition State 4	24 hours	7 days	30 days	24 hours	3 days	7 days	5
4.12	Non-National Bridge Inventory bridge class culverts and SWM structures	Non- National Bridge Inventory bridge class culverts are free of: a) any combination of vegetation, debris, or silt causing > 10% loss in cross-section of the structure	Visual Inspection and physical measurement	24 months	a) Number and locations with vegetation, silt or debris > 10% of design opening not including the sump where applicable	Any location with vegetation, silt or debris > 10 % of design opening not including the sump where applicable	24 hours	7 days	90 days	2 hours	5 day	10 days	4
		b) Defects in sealants to movement joints			b) Number and locations with Defects in sealants and movement joints	Any location with Defects in sealants and movement joints	24 hours	7 days	90 days	2 hours	5 day	10 days	4

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
		c) Scour damage			c) Number and locations with scour damage	Any locations with scour damage							
		d) Bituminous Coating missing with sediment present			d) Any areas of invert with no bituminous coating and sediment present.	Areas of no bituminous coating and sediment present	7 days	14 days	90 days	24 hours	3 days	7 days	4
		e) Spalls, cracks, exposed reinforcing steel			e) Quantity (square feet) of Element in Condition State 3 or 4 as if rated as a National Bridge Inventory bridge element	Portion of Element coded in Condition State 3 or 4	24 hours	7 days	21 days	24 hours	3 days	7 days	3
4.13	Load ratings	All Bridges maintain a 1.0 inventory rating factor for all AASHTO design vehicle and Maryland and Virginia legal loads	Inspection and assessment in accordance with the requirements of AASHTO's Manual for Bridge Evaluation, MDOT SHA "Guidelines and Procedures Memorandum D-97-47(4)" or VDOT "Instructional and Informational Memorandum on Load Rating and Posting of Structures (Bridges and Culverts)"	As Needed	Number and locations of load restrictions for loads lower than design capacity or locations where bridges cannot handle all legal loads.	Any Bridge that does not maintain the existing design load, in accordance with the requirements of AASHTO's Manual for Bridge Evaluation, MDOT SHA "Guidelines and Procedures Memorandum D-97-47(4)" or VDOT "Instructional and Informational Memorandum on Load Rating and Posting of Structures (Bridges and Culverts)"	24 hours	3 days	7 days	24 hours	2 days	5 days	5

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
4.14	Structural assessment	As part of Incident Management, evaluate structural damage to structures and liaise and coordinate with first responders and MDOT and VDOT including reporting critical findings per NBIS	Inspections, surveys and evaluations as required as part of Incident Management in accordance with response times in <u>Exhibit 6 Article 25 (Operations and Maintenance)</u>	As Needed	Incident Reports, structural analyses, repair Plans, and follow-up reports	Failure, after the occurrence of an Incident, to evaluate structural damage to structures and to liaise and cooperate with first responders and MDOT and VDOT personnel	24 hours	3 days	7 days	1 hour	4 hours	1 day	5
4.15	Bridge Inspection	Perform Routine Bridge Inspections and provide data to the AHJ within required time frames	Inspect bridges in accordance with NBIS, AASHTO Manual for Bridge Evaluation, AASHTO Manual for Bridge Element Inspection and the FHWA Bridge Inspector's Reference Manual	24 months	a) Inspection data in accordance with MDOT, VDOT and NBIS requirements b) Inspections carried out in accordance with required Submittal dates	Failure to perform routine Bridge Inspection in accordance with requires standards and provide data to the AHJ within the required time frames.	N/A	N/A	14 days	N/A	N/A	1 day	5
		Perform special or interim Bridge Inspections and provide data to the AHJ within required time frames. Required for structures that are posted, have Fracture-Critical Members, or have a poor condition rating (condition rating value of 4).	Inspect bridges in accordance with NBIS, AASHTO Manual for Bridge Evaluation, AASHTO Manual for Bridge Element Inspection and the FHWA Bridge Inspector's Reference Manual	6 months or 12 months	a) Inspection data in accordance with MDOT, VDOT and NBIS requirements b) Inspections carried out in accordance with required Submittal dates	Failure to perform special or interim Bridge Inspection in accordance with requires standards and provide data to the AHJ within the required time frames.	N/A	N/A	7 days	N/A	N/A	1 day	5
5.) Pavement Markings, Object Markers, Barrier Markers, and Delineators (See Note 5 following this table)													
5.1	Pavement markings	Pavement markings in compliance with MD MUTCD and are: clean and visible; whole and	As specified in Part 3 of the MD MUTCD measured retroreflectivity using retroreflectometer	Annually	Length with more than 5% loss of area at any point, Length with spread more than	More than 5% loss of area of material at any point or length with spread more than 10% of specified	N/A	30 days	90 days	N/A	30 days	30 days	3

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
		complete; and of the correct color, type, width, length; and in compliance with retroreflectivity requirements			10% of specified dimensions, length not performing its intended function and not in compliance with applicable standards, pavement symbols with less than 90% of each symbol functioning as intended, length with more than 5% not meeting minimum retroreflectivity per MD MUTCD	dimensions. Less than 90% of each symbol functioning as intended. More than 5% not meeting minimum retroreflectivity levels per MD MUTCD.							
5.2	Delineators and markers	Markers and delineators are: clean and visible; of the correct color and type; legible and reflective in accordance with MD MUTCD; and straight and vertical	Visual Inspection	Monthly	Number of object markers or delineators defective, damaged or missing.	More than 1 in every 10 object markers or delineators defective or missing. Damage such that the color may be misconstrued or unknown.	N/A	N/A	60 days	N/A	N/A	14 days	3
5.3	SRPM	SRPMs in compliance with MD MUTCD and are: clean and reflective lens visible; of the correct color and type	Visual Inspection	Annually	Number of SRPMs defective or missing	More than 10% of SRPMs defective or missing	N/A	N/A	60 days	N/A	N/A	14 days	1
6.) Sign Structures, Foundations and Supports													
6.1	Low-level lighting and traffic signal support elements including foundation, base plate, anchor rods,	All Elements shall have a rating of 5 or higher on the rating scale used in the MDTA's Facilities Inspection Manual, Section 9.1	Hands-on Inspection in accordance with the MDTA's Facilities Inspection Manual, Section 9.1	4 years	Any Element with a rating below 5 on the rating scale used in the MDTA's Facilities Inspection Manual	Element has a rating below 5 on the rating scale used in the MDTA's Facilities Inspection Manual	24 hours	7 days	30 days	24 hours	2 days	7 days	5

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
	pole, traffic signal, cameras, and luminaires												
6.2	High-Mast Light and Camera Support elements including foundation, base plate, anchor rods, pole, luminaires, cameras, and surface coating	All Elements shall have a rating of 5 or higher on the rating scale used in the MDTA's Facilities Inspection Manual, Section 9.2	Hands-on Inspection in accordance with the MDTA's Facilities Inspection Manual	4 years	Any Element with a rating below 5 on the rating scale used in the MDTA's Facilities Inspection Manual	Element has a rating below 5 on the rating scale used in the MDTA's Facilities Inspection Manual	24 hours	7 days	30 days	24 hours	2 days	7 days	5
6.3	Sign structure (and ground-mounted sign structures) elements including foundation, base plate, anchor rods, post and web members, post to arm/truss connection, arm/truss, sign panels, and vertical attachment members, and surface coating	All Elements shall have a rating of 5 or higher on the rating scale used in the MDTA's Facilities Inspection Manual, Section 9.3	Hands-on Inspection in accordance with the MDTA's Facilities Inspection Manual	4 years	Any Element with a rating below 5 on the rating scale used in the MDTA's Facilities Inspection Manual	Element has a rating below 5 on the rating scale used in the MDTA's Facilities Inspection Manual	24 hours	7 days	30 days	24 hours	2 days	7 days	5

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
7.) Permanent Signs													
7.1	Permanent signs	Signs are clean, correctly located, clearly visible, legible and reflective and meet requirements of MD MUTCD	Visual Inspection and physical measurements Part 2 of MD MUTCD	Monthly	Numbers and locations where: a) Face damage: number of signs with face damage greater than 5% of area. Face damage includes dirt, dents, and wrinkled reflective sheeting) reflective/non-reflective sheeting is peeling; b) Legend size, layout or fonts do not meet requirements	a) Any signs with face damage rendering the sign illegible day or night. Face damage includes dirt, dents and wrinkled or missing reflective sheeting b) Any sign that does not meet MD MUTCD requirements	24 hours	N/A	6 months	24 hours	N/A	30 days	2
7.2	Permanent Signs	Visibility distances meet the stated requirements of Part 2 of MD MUTCD	Visual Inspection and physical Inspection per Part 2 of MD MUTCD	Monthly	Identify signs that: a) do not meet required sign spacing/visibility distances or are otherwise improperly located; b) bottom height of sign doesn't meet minimum requirements c) lateral offsets are under minimum requirements	Any sign that does not meet MD MUTCD requirements;	24 hours	N/A	6 months	24 hours	N/A	30 days	2
7.3	Permanent signs	Obsolete and redundant signs are removed	Visual Inspection per Part 2 of MD MUTCD	Monthly	Identify any signs that are obsolete or redundant	Any sign not removed	24 hours	N/A	30 days	24 hours	N/A	30 days	2
7.4	Permanent signs	Sign information is in the correct; location and type is correct	Visual Inspection and physical Inspection per Part 2 of MD MUTCD	Monthly	Number of signs that have incorrect information or are	Any sign that does not meet MD MUTCD requirements	24 hours	N/A	6 months	24 hours	N/A	30 days	2

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
					incorrect sign type.								
7.5	Permanent signs	Signs are free of graffiti	Visual Inspection	Weekly	Instances of graffiti and timeframes for repair.	Any signs that are not free of graffiti	24 hours	N/A	5 days	4 hours	N/A	1 day	2
7.6	Permanent Signs	Signs meet minimum retroreflectivity requirements	Measured sign retroreflectivity Part 2 of MD MUTCD	Annually	a) Identify signs evaluated and results of retroreflectivity assessment b) Identify mitigation and timeframe for repair	Any signs that do not meet measured sign retroreflectivity requirements	24 hours	N/A	6 months	24 hours	N/A	30 days	3
8.) Fences and Sound Abatement (See Note 6 following this table)													
8.1	Non-Structural portions of sound barriers	All Elements shall have a rating of 5 or higher on the rating scale used in the MDOT's Noise Barrier Inspection Practices and Standard Operating Manual	Hands-on Inspection in accordance with the MDOT's Noise Barrier Inspection Practices and Standard Operating Manual	4 years	Any Element with a rating below 5 on the rating scale used in the MDOT's Noise Barrier Inspection Practices and Standard Operating Manual	Element has a rating below 5 on the rating scale used in the MDOT's Noise Barrier Inspection Practices and Standard Operating Manual	24 hours	7 days	30 days	24 hours	2 days	7 days	5
8.2	Maintain function and integrity of fencing	Fencing is functional, viable, plumb and has no deflections of greater than 6"; ROW fencing is intact and does not allow access to highways	Visual Inspection	Monthly	Inspections records identifying locations where fences are: a) Not plumb or in disrepair b) Deflections are greater than 6" c) Fencing is not intact	Any ROW fencing not intact or continuous, and that allows access to the highway from outside of the ROW	24 hours	N/A	14 days	8 hours	N/A	14 days	3
9.) Landscaping (See Note 7 following this table)													
9.1	Turfgrass/turf grass sod establishment	The height of the turfgrass is maintained between 4 inches and 8 inches	Visual Inspection and physical measurement	Monthly during growing season	Measure turf areas to between 4 inches and 8 inches	Turfgrass not maintained to a height between 4 inches and 8 inches within 10' of roadway edge.	N/A	N/A	14 days	N/A	N/A	14 days	2

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
9.2	Turfgrass/turf grass sod establishment	Damaged, diseased, infested or dead turfgrass exceeding 95% of area	Visual Inspection and reporting	Monthly during growing season	Maintain minimum ground coverage of 95%	Bare patches observed in any 100 SF area exceeding 5% or maintenance operations that strip or leave bare patches	N/A	N/A	30 days	N/A	N/A	30 days	1
				Annually	Pesticide and fertilizer use are reported per Maryland pesticide and fertilizer laws	Pesticide and fertilizer applications are not reported	N/A	N/A	90 days	N/A	N/A	30 days	2
9.3	Turfgrass/turf grass sod establishment	The presence of noxious weeds is less than or equal to 5% of coverage of the total vegetated area after all seeding or sodding operations have been completed, and when the seedlings of turfgrass species have grown at least 4 in. tall, exhibit dark green color, and exhibit at least 95% groundcover.	Visual Inspection	Monthly	Noxious weeds managed per Maryland weed control laws	Presence of noxious weeds are greater than 5% of coverage of the total vegetated area.	N/A	N/A	30 days	N/A	N/A	14 days	2
9.4	Turfgrass/turf grass sod establishment	The presence of invasive weeds is less than or equal to 5% of coverage of the total vegetated area after all seeding or sodding operations have been completed, and when the seedlings of turfgrass species have grown at least 4 in. tall, exhibit dark green color, and exhibit at least 95% groundcover.	Visual Inspection	Monthly	Invasive weeds controlled per the Maryland Invasive Plants Prevention and Control Law	Presence of invasive weeds are greater than 5% of coverage of the total vegetated area.	N/A	N/A	30 days	N/A	N/A	14 days	1

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
9.5	Turfgrass/turf grass sod establishment	Submitted nutrient management Plan	Review of report	Annually	Nutrient management Plans filed	Nutrient management Plans are not filed in accordance with MS4 permits	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	3
9.6	Turfgrass/turf grass sod establishment	Reporting nutrient management	Review of report	Annually	Nutrient management reports filed, IPM Plan filed, and IPM program reports filed	Nutrient management reports are not filed in accordance with MS4 permits, or IPM Plan not filed, or IPM reports not filed in accordance with MS4 permits	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	3
9.7	Meadow establishment	The height of the meadow is maintained between 8 inches and 18 inches in year one	Visual Inspection and physical measurement	Monthly during growing season	Measure meadow areas to between 8 inches and 18 inches	Meadow is not maintained to a height between 8 inches and 18 inches	N/A	N/A	45 days	N/A	N/A	15 days	1
9.8	Meadow establishment	The height of the meadow is maintained between 8 inches and 30 inches in year two and beyond	Visual Inspection and physical measurement	Annually	Measure meadow areas to between 8 inches and 30 inches	Meadow is not maintained annually between 8 inches and 30 inches annually in the late winter or early spring	N/A	N/A	90 days	N/A	N/A	30 days	1
9.9	Meadow establishment	Damaged, diseased, infested or dead meadow exceeding 95% of area	Visual Inspection and reporting	Monthly during growing season	Maintain minimum ground coverage of 95%	Bare patches observed in any 100 SF area exceeding 5% or maintenance operations that strip or leave bare patches	N/A	N/A	30 days	N/A	N/A	30 days	1
				Annually	Pesticide and fertilizer use are reported per Maryland pesticide and fertilizer laws	Pesticide and fertilizer applications are not reported.	N/A	N/A	90 days	N/A	N/A	30 days	2
9.10	Meadow establishment	The presence of noxious weeds is less than or equal to 5% of coverage of the total vegetated area after all seeding operations have been completed, and when the	Visual Inspection	Monthly	Noxious weeds managed per Maryland weed control laws	Presence of noxious weeds are greater than 5% of coverage of the total vegetated area.	N/A	N/A	30 days	N/A	N/A	14 days	2

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
		seedlings have grown at least 4 in. tall, exhibit dark green color, and exhibit at least 95% groundcover.											
9.11	Meadow establishment	The presence of invasive weeds is less than or equal to 5% of coverage of the total vegetated area after all seeding operations have been completed, and when the seedlings have grown at least 4 in. tall, exhibit dark green color, and exhibit at least 95% groundcover.	Visual Inspection	Monthly	Invasive weeds controlled per Maryland weed control laws	Presence of invasive weeds are greater than 5% of coverage of the total vegetated area.	N/A	N/A	90 days	N/A	N/A	30 days	2
9.12	Meadow establishment	Submitted nutrient management Plan	Review of report	Annually	Nutrient management Plans filed	Nutrient management Plans are not filed in accordance with MS4 permits	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	3
9.13	Meadow establishment	Reporting nutrient management	Review of report	Annually	Nutrient management reports filed, IPM Plan filed, and IPM program reports filed	Nutrient management reports are not filed in accordance with MS4 permits, or IPM Plan not filed, or IPM reports not filed in accordance with MS4 permits	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	3
9.14	Shrub seeding establishment	The height of the shrub seeding area is maintained between 8 inches and 18 inches in year one	Visual Inspection and physical measurement	Monthly during growing season	Measure shrub seeding areas to between 8 inches and 18 inches	Shrub seeding area is not maintained to a height between 8 inches and 18 inches	N/A	N/A	90 days	N/A	N/A	30 days	1
9.15	Shrub seeding establishment	The height of the shrub seeding area is maintained between 12 inches and 30 inches in year two	Visual Inspection and physical measurement	Annually	Measure shrub seeding areas to between 12 inches and 30 inches	Shrub seeding area is not maintained annually between 8 inches and 30 inches annually in the late winter or early spring in year two	N/A	N/A	90 days	N/A	N/A	30 days	1

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
9.16	Shrub seeding establishment	The height of the shrub seeding area is maintained between 24 inches and 12 feet in year three and beyond	Visual Inspection and physical measurement	2 years	Measure shrub seeding areas to between 16 inches and 12 feet	Shrub is not maintained annually between 8 inches and 30 inches annually in the late Winter or early Spring in year three	N/A	N/A	90 days	N/A	N/A	30 days	1
9.17	Shrub seeding establishment	Damaged, diseased, infested or dead shrub seeding area exceeding 90%	Visual Inspection and reporting	Monthly during growing season	Maintain minimum ground coverage of 90%	Bare patches observed in any 100 SF area exceeding 10% or maintenance operations that strip or leave bare patches	N/A	N/A	30 days	N/A	N/A	30 days	1
				Annually	Pesticide and fertilizer use are reported per Maryland pesticide and fertilizer laws	Pesticide and fertilizer applications are not reported.	N/A	N/A	90 days	N/A	N/A	30 days	2
9.18	Shrub seeding establishment	The presence of noxious weeds is less than or equal to 5% of coverage of the total vegetated area after all seeding operations have been completed, and when the seedlings have grown at least 12 in. tall, exhibit dark green color, and exhibit at least 95% groundcover.	Visual Inspection	Monthly	Noxious weeds managed per Maryland weed control laws	Presence of noxious weeds are greater than 5% of coverage of the total vegetated area.	N/A	N/A	30 days	N/A	N/A	14 days	2
9.19	Shrub seeding establishment	The presence of invasive weeds is less than or equal to 5% of coverage of the total vegetated area after all seeding operations have been completed, and when the seedlings have grown at least 12 in. tall, exhibit dark	Visual Inspection	Monthly	Invasive weeds controlled per Maryland weed control laws	Presence of invasive weeds are greater than 5% of coverage of the total vegetated area.	N/A	N/A	90 days	N/A	N/A	30 days	1

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
		green color, and exhibit at least 95% groundcover.											
9.20	Shrub seeding establishment	Submitted nutrient management Plan	Review of report	Annually	Nutrient management Plans filed	Nutrient management Plans are not filed in accordance with MS4 permits	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	3
9.21	Shrub seeding establishment	Reporting nutrient management	Review of report	Annually	Nutrient management reports filed, IPM Plan filed, and IPM program reports filed	Nutrient management reports are not filed in accordance with MS4, or IPM Plan not filed, or IPM reports not filed in accordance with MS4 permits	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	3
9.22	Trees, shrubs, and perennials	Damaged, diseased, infested, or dead trees, shrubs, and perennials and planting area exceeding 25%	Visual Inspection and reporting	Annually	Maintain minimum ground coverage of 75% and minimum planting viability in accordance with Maryland Reforestation Law	Bare patches observed in any 100sf area exceeding 25% or maintenance operations that strip or leave bare patches or damage/scar 25% or more of a woody plant canopy or affect 5% or more of the plant trunk	N/A	N/A	30 days	N/A	N/A	30 days	1
					Pesticide and fertilizer use are reported per Maryland pesticide and fertilizer laws	Pesticide and fertilizer applications are not reported.	N/A	N/A	90 days	N/A	N/A	30 days	2
9.23	Trees, shrubs, and perennials	The presence of noxious weeds is less than or equal to 5% of coverage of the total vegetated area after all planting operations have been completed.	Visual Inspection	Monthly	Noxious weeds managed per Maryland weed control laws	Presence of noxious weeds are greater than 5% of coverage of the total vegetated area.	N/A	N/A	30 days	N/A	N/A	14 days	2
9.24	Trees, shrubs, and perennials	The presence of invasive weeds is less than or equal to 5% of coverage of the total vegetated area after all planting	Visual Inspection	Monthly	Invasive weeds controlled per Maryland weed control laws	Presence of invasive weeds are greater than 5% of coverage of the total vegetated area.	N/A	N/A	90 days	N/A	N/A	30 days	1

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
		operations have been completed.											
9.25	Trees, shrubs, and perennials	Submitted nutrient management Plan	Review of report	Annually	Nutrient management Plans filed	Nutrient management Plans are not filed in accordance with MS4 permits	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	3
9.26	Trees, shrubs, and perennials	Reporting nutrient management	Review of report	Annually	Nutrient management reports filed, IPM Plan filed, and IPM program reports filed	Nutrient management reports are not filed in accordance with MS4 permits, or IPM Plan not filed, or IPM reports not filed in accordance with MS4 permits	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	3
9.27	Trees, shrubs, and perennials	Report evidence of quarantined pests.	Review of report	Annually	Invasive pest control in accordance with the Maryland plant disease control regulations	Evidence of disease or pest and no record of reporting to Maryland Department of Agriculture	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	3
9.28	Trees, shrubs, and perennials associated with SWM	The height of the SWM planting is maintained per the MDE permit	Visual Inspection and physical measurement	Per the MDE permit	Per the MDE permit	Per the MDE permit	Per the MDE permit	Per the MDE permit	Per the MDE permit	Per the MDE permit	Per the MDE permit	Per the MDE permit	2
9.29	Trees, shrubs, and perennials associated with SWM	Damaged, diseased, infected or dead trees, shrubs, and perennials and planting area exceeding 25%	Visual Inspection and reporting	Annually	Maintain minimum ground coverage of 75% and minimum planting viability in accordance with Maryland Reforestation Law	Bare patches observed in any 100sf area exceeding 25% or maintenance operations that strip or leave bare patches or damage/scar 25% or more of a woody plant canopy or affect 5% or more of the plant trunk	N/A	N/A	30 days	N/A	N/A	30 days	1
					Pesticide and fertilizer use are reported per Maryland pesticide and fertilizer laws	Pesticide and fertilizer applications are not reported.	N/A	N/A	90 days	N/A	N/A	30 days	2
9.30	Trees, shrubs, turfgrass and perennials	The presence of noxious weeds is less than or equal	Visual Inspection	Monthly	Noxious weeds managed per	Presence of noxious weeds are greater than 5% of coverage	N/A	N/A	30 days	N/A	N/A	14 days	2

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
	associated with SWM	to 5% of coverage of the total vegetated area after all seeding or planting operations have been completed, and when the seedlings have grown at least 4 in. tall, exhibit dark green color, and exhibit at least 95% groundcover.			Maryland weed control laws	of the total vegetated area.							
9.31	Trees, shrubs, turfgrass and perennials associated with SWM	The presence of invasive weeds is less than or equal to 5% of coverage of the total vegetated area after all seeding or planting operations have been completed, and when the seedlings have grown at least 4 in. tall, exhibit dark green color, and exhibit at least 95% groundcover.	Visual Inspection	Monthly	Invasive weeds controlled per the Maryland Invasive Plants Prevention and Control Law	Presence of invasive weeds are greater than 5% of coverage of the total vegetated area.	N/A	N/A	90 days	N/A	N/A	30 days	1
9.32	Trees, shrubs, and perennials associated with SWM	Submitted nutrient management Plan	Review of report	Annually	Nutrient management Plans filed	Nutrient management Plans are not filed in accordance with MS4 permits	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	3
9.33	Trees, shrubs, and perennials associated with SWM	Reporting nutrient management	Review of report	Annually	Nutrient management reports filed, IPM Plan filed, and IPM program reports filed	Nutrient management reports are not filed in accordance with MS4 permits, or IPM Plan not filed, or IPM reports not filed in accordance with MS4 permits	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	3
9.34	Trees, shrubs, and perennials associated with SWM	Report evidence of quarantined pests.	Review of report	Annually	Invasive pest control in accordance with the Maryland plant disease	Evidence of disease or pest and no record of reporting to Maryland Department of Agriculture	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	3

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
					control regulations								
9.35	Annuals and bulbs	The height of the annuals and bulbs area is maintained between 4 inches and 18 inches	Visual Inspection and physical measurement	Monthly during growing season	Measure annual and bulb planting areas to between 4 inches and 18 inches	Annual and bulb planting area is not maintained to a height between 4 inches and 18 inches	N/A	N/A	30 days	N/A	N/A	14 days	1
9.36	Annuals and bulbs	Damaged, diseased, infested or annual and bulb planting area exceeding 25%	Visual Inspection and reporting	Two months	Maintain minimum ground coverage of 75%	Bare patches observed in any 100sf area exceeding 25% or maintenance operations that strip or leave bare patches	N/A	N/A	30 days	N/A	N/A	30 days	1
				Annually	Pesticide and fertilizer use are reported per Maryland pesticide and fertilizer laws	Pesticide and fertilizer applications are not reported.	N/A	N/A	90 days	N/A	N/A	30 days	2
9.37	Annuals and bulbs	The presence of noxious weeds is less than or equal to 5% of coverage of the total vegetated area after all planting operations have been completed.	Visual Inspection	Monthly	Noxious weeds managed per Maryland weed control laws	Presence of noxious weeds are greater than 5% of coverage of the total vegetated area.	N/A	N/A	30 days	N/A	N/A	14 days	2
9.38	Annuals and bulbs	The presence of invasive weeds is less than or equal to 5% of coverage of the total vegetated area after all planting operations have been completed.	Visual Inspection	Monthly	Invasive weeds controlled per the Maryland Invasive Plants Prevention and Control Law	Presence of invasive weeds are greater than 5% of coverage of the total vegetated area.	N/A	N/A	90 days	N/A	N/A	30 days	1
9.39	Annuals and bulbs	Submitted nutrient management Plan	Review of report	Annually	Nutrient management Plans filed	Nutrient management Plans are not filed in accordance with MS4 permits	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	3

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
9.40	Annuals and bulbs	Reporting nutrient management	Review of report	Annually	Nutrient management reports filed, IPM Plan filed, and IPM program reports filed	Nutrient management reports are not filed in accordance with MS4, or IPM Plan not filed, or IPM reports not filed in accordance with MS4 permits	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	Per MS4 requirements	3
10.) Earthwork, Embankments, and Cut Slopes													
10.1	Slope failure	All structural or natural failures of the embankment and cut slopes of the Relevant Infrastructure are repaired and revegetated	Visual Inspection by geotechnical specialist and further tests as recommended by the specialist	Monthly or as reported	a) Recorded instances of critical slope failures that threaten infrastructure or public safety	Critical slope failures of the embankment and cut slopes of the Relevant Infrastructure are not repaired and revegetated that threaten infrastructure or public safety	1 day	2 days	14 days	4 hours	5 days	20 days	4
					b) Recorded instances of non-critical slope failures	Non-critical slope failures of the embankment and cut slopes of the Relevant Infrastructure are not repaired and revegetated	5 days	14 days	30 days	1 day	5 days	20 days	2
11.) Litter and Obstructions/Debris Removal, Sweeping													
11.1	ROW litter	Keep all travel lanes, shoulders, and all areas within ROW in a neat condition. Remove litter regularly.	Visual Inspection and physical measurement	Monthly	Inspection records for 1,000 foot increments	Inspection reports not provided on a quarter annual basis for every 1,000 feet of Work limits	N/A	N/A	90 days	N/A	N/A	7 days	2
11.2	ROW litter	No visual distractions resulting from litter within ROW	Visual Inspection	Monthly	Inspection records for 1,000 foot increments	Any instance where ROW is not kept clear of visual distractions resulting from litter	1 hour (Show up)	N/A	4 hours	15 minutes	N/A	15 minutes	5
11.3	ROW litter	Pick up litter items before mowing operations.	Visual Inspections	Monthly	No more than 15 pieces of litter (4 inches or greater in any dimension) over a distance of 0.1 miles	Any instance where ROW not kept in a neat condition: More than 15 pieces of litter (4 inches or greater in any dimension) over a distance of .1 miles	N/A	N/A	30 days	N/A	N/A	7 days	2

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
11.4	ROW litter	Dispose of litter and debris at approved solid waste sites.	Visual Inspections. Review of tonnage reports	Monthly	Litter picked up prior to mowing	In turf areas, 15 or greater pieces of litter (4 inches or greater in any dimension) in a 1,000 linear foot distance of Work limits	N/A	N/A	30 days	N/A	N/A	7 days	2
					Disposal in accordance with Applicable Law	Litter and debris are not disposed of at approved solid waste sites	N/A	N/A	30 days	N/A	N/A	7 days	2
11.5	Sweeping	Remove all sweepings stockpiling in the ROW.	Visual Inspections, physical measurements, review of tonnage reports	Monthly	No accumulated buildup of dirt, road salt, debris, and litter. on roadways, bridges, pedestrian crossings or carpool lot greater than 24 inches wide or 0.50 inches deep Tonnage tickets submitted	Accumulated buildup of dirt, road salt, debris, and litter on roadways, bridges, or in the ROW. Tonnage reporting not provided	N/A	N/A	14 days	N/A	N/A	7 days	2
							N/A	N/A	30 days	N/A	N/A	7 days	2
11.6	Obstructions and debris	Keep roadways and construction zones clear of obstructions and debris. Remove animal carcasses.	Visual Inspection or notification	Monthly	No debris or obstructions > 0.5 cubic feet in travel lanes	Any debris or obstructions in travel lanes	N/A	N/A	30 minutes	N/A	N/A	10 minutes	5
					Obstacles, debris and animal carcasses on roadway shoulders	Any obstacles, debris or animal carcasses on roadway shoulders	N/A	N/A	12 hours	N/A	N/A	2 hours	2
12.) Lighting													
12.1	Roadway lighting	Maintain functionality of roadway lighting system	Visual Inspection	Monthly	Maintain functionality of at least 90% of all roadway luminaires at all times. Ensure the light levels meet criteria established in <u>Exhibit 6 Article 17 (Signing, Pavement Markings, Signals, and Lighting)</u> .	<90% of all roadway lighting luminaires not functioning (more than one in 10 consecutive lights is not functioning).	N/A	N/A	14 days	N/A	N/A	14 days	2

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
12.2	Roadway lighting	Maintain functionality of roadway lighting system	Visual Inspection	Monthly	No more than 2 consecutive roadway luminaires shall be inoperable.	More than 2 consecutive roadway luminaires inoperable	N/A	N/A	14 days	N/A	N/A	14 days	2
12.3	Sign lighting	Maintain functionality of sign lighting system	Visual Inspection	Monthly	Maintain functionality of at least 80% of all sign luminaires at all times. Ensure the light levels meet criteria established in <u>Exhibit 6 Article 17 (Signing, Pavement Markings, Signals, and Lighting)</u> .	<80% of all sign lighting luminaires not functioning (more than two in 10 consecutive sign lights are not functioning.)	N/A	N/A	14 days	N/A	N/A	14 days	2
12.4	Roadway lighting electrical components	Maintain functionality of electrical system.	Documentation of testing performed and included in the Monthly O&M Report	Monthly	Conduct routing Inspections, testing and maintenance of all electrical components including: control and distribution equipment, lighting control cabinets, and internal equipment including: panel board, lighting contactor, photoelectric control unit, circuit breakers, thermostat, and fan. All roadway lighting control cabinets must have rodent protection. Document the Inspection, testing, and maintenance that has occurred over	Missed routine Inspection, testing, or maintenance.	7 days	N/A	20 days	7 days	N/A	20 days	2

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
					each monthly period. Documentation must include photographs.								
12.5	Underpass Lighting	Maintain functionality of underpass lighting system	Visual Inspection	Monthly	Maintain functionality of at least 90% of all underpass luminaires at all times. Ensure the light levels meet the criteria established in <u>Exhibit 6 Article 17 (Signing, Pavement Markings, Signals, and Lighting)</u> .	<90% of all underpass luminaires not functioning at any individual underpass	N/A	N/A	14 days	N/A	N/A	14 days	2
13.) Guardrails and Safety Barriers													
13.1	Guardrails	All guardrails: meet FHWA repair and maintenance guidelines; meet AASHTO Manual for Assessing Safety Hardware standards; are correctly installed at the correct height and distance from roadway and obstacles	Visual Inspection	Monthly	No damage of any rail beam that is torn, separated or rusted thru; no more than two posts are broken; no more than two posts are separated from the rail; and no damaged rail beam that is pushed more than 12 inches	Any guardrail not maintained free of Defects	24 hours	N/A	14 days	24 hours	N/A	1 day	5

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
13.2	Concrete barrier	All concrete barriers are: maintained free of Defects; appropriately placed; and correctly installed at the correct height and distance from roadway and obstacles	Visual Inspection	Monthly	Inspection record indicating Defect and or noncompliance	Barriers contain Defects, inappropriately placed, incorrectly installed in terms of height and distance from roadway and obstacles per the Section P3 Agreement	24 hours	N/A	14 days	24 hours	N/A	1 day	5
13.3	Impact attenuators	All impact attenuators are appropriately placed and correctly installed, and all impact attenuators energy-absorbing systems have integrity and are effective	Visual Inspection	Monthly	Number of impact attenuators that are incorrectly placed or installed	Any impact attenuator is incorrectly placed or installed	24 hours	N/A	3 days	4 hours	N/A	1 day	5
					Number of energy-absorbing components that are compromised and do not provide the intended function.	Any impact attenuator energy-absorbing system is compromised and does not provide the intended function	2 hours	N/A	30 days	1 hour	N/A	5 days	5
13.4	Movable barriers	All movable barriers are: maintained free of Defects; appropriately placed; and correctly installed at the correct height and distance from roadway and obstacles	Visual Inspections	Monthly	Inspection record indicating Defect and or noncompliance	Barriers contain Defects, inappropriately placed or installed incorrectly as per the Section P3 Agreement	24 hours	N/A	14 days	24 hours	N/A	1 day	5
14.) Traffic Incident Management (See Note 8 following this table)													
14.1	General	Respond to Incidents and Emergencies in accordance with Exhibit 6 Article 25 (Operations and Maintenance) Section 25.6.3.1	Incident response times in minutes recorded on a 12-month rolling basis	Monthly	Inspection records including records or reports from first responders showing the number of failures to meet Incident response times:	a) Any failure to meet Wrecker Incident response time in < 30 minutes	N/A	N/A	10 minutes	N/A	N/A	10 minutes	3

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
		(Incident Management).			a) wrecker response time is < 30 minutes								
					b) Section Developer to respond to Incidents < 30 minutes	b) Any failure to meet Section Developer Incident response time in < 30 minutes	N/A	N/A	10 minutes	N/A	N/A	10 minutes	3
					c) All blocked lanes cleared in < 2 hours after the area has been released by first responders if they are on the scene	c) Any failure to clear a blocked lane in < 2 hours after the area has been released by first responders if they are on the scene	N/A	N/A	2 hours	N/A	N/A	10 minutes	5
14.2	Damage assessment	Evaluate structural damage to structures/ Hazardous Materials to all environmental aspects	Inspections, surveys, and analyses required by the Incident	Monthly	Deliver draft and final Incident Report and structural/environmental analysis.	Failure to propose temporary measures or permanent repairs to Defects arising from any Incident	8 hours (onsite investigation)	24 hours (draft report and analysis)	5 days (final report and remediation Plan)	15 minutes	1 hour	1 day	5
14.3	Temporary and permanent remedy Plan	Propose temporary measures or permanent repairs to Defects arising from the Incident	Repair reports	Monthly	Deliver repair Plan.	Failure to propose temporary measures or permanent repairs to Defects arising from any Incident	8 hours (onsite investigation)	24 hours (draft report and analysis)	5 days (final report and remediation Plan)	15 minutes	1 hour	1 day	5
15.) ETTM System and Electrical													
15.1	Usable Image-Based Transactions	99.0% of all Image-Based Transactions submitted to MDTA shall include readable images and complete and correct information in the lane transaction message	Section Developer report submission and MDTA report	Daily/ monthly	ETCS Daily Check Report and ETCS Activity Monthly Report	< 99% of Toll Transactions sent have readable images or correct information.	12 hours	24 hours	36 hours	12 hours	24 hours	36 hours	3
15.2	License Plate Attributes (See Note 9 following this table)	99.5% of all license plate attributes for Imaged-Based Transactions (characters, state, plate type, etc.) be reported accurately to MDTA in accordance with Maryland	MDTA report	Daily/ monthly	ETCS Daily Check Report and ETCS Activity Monthly Report	<99.5% of Image-Based Transactions are accurately submitted to MDTA.	8 hours	16 hours	1 day	8 hours	16 hours	1 day	4

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
		Department of Motor Vehicles rules											
15.3	Trip processing (See Note 10 following this table)	All Trips completed and submitted to MDTA within 96 hours.	Section Developer report submission	Daily/ monthly	ETCS Daily Check Report and ETCS Activity Monthly Report	<100% of completed Trips submitted to MDTA within 96 hours	24 hours	N/A	1 day	24 hours	N/A	1 day	5
15.4	Trip/Toll Transaction accuracy (See Note 9 following this table)	Trips/ Toll Transactions shall be 100% accurate 99.5% of the time. Trips/Toll Transactions shall provide all accurate data needed to process. Toll Transaction data provided shall be accurate for the Section Developer to create single Trips across the Phase for each User. Split Trips created or duplicate Trips created and sent over for processing shall be also classified as non-compliant.	MDTA report	Daily/ Monthly	ETCS Activity Monthly Report	<99.5% of Trips/Toll Transactions are 100% accurate.	24 hours	N/A	1 day	24 hours	N/A	1 day	5
15.5	ETCS Synchronization	All ETCS Elements shall be synchronized to within 1/100 of a second and the ETCS host shall be synchronized to the MDOT wide area network master clock to within 1/1,000 of a second	Section Developer shall demonstrate that all components of the ETCS are to be synchronized to the ETCS host and that the ETCS host is synchronized to the MDOT wide area network master clock	Monthly	ETCS Daily Check Reports for previous 30 days	ETCS Elements are synchronized to >1/100 of a second or ETCS Host synchronized to MDOT wide area network master clock >1/1,000 of a second	24 hours	N/A	48 hours	24 hours	N/A	48 hours	1

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
15.6	Transponder file processing	Initiate processing of Transponder status files, including incremental files, received from MDTA within 5 minutes and complete distribution of Transponder status files including incremental files to lanes within 15 minutes	The time for the ETCS to process Transponder status files received from MDTA shall be measured and reported by the Section Developer's maintenance system.	Daily/ Monthly Report	ETCS Daily Check Reports for previous 30 days and MDOT and MDTA observations	Initiate processing of Transponder status files, including incremental files, received from MDTA greater than 5 minutes or complete distribution of Transponder status files including incremental files to lanes greater than 15 minutes	N/A	N/A	6 Hours	N/A	N/A	6 Hours	1
15.7	AVI read accuracy	Correctly read and write to 99.8% of all Transponders, measured in each lane, for all accepted Transponder protocols, at any vehicular speed up to 100 mph (write functions are only needed for time-division multiplexing feedback Transponders)	Section Developer statistical analysis submission of AVI Toll Transactions shall be conducted across multiple toll lanes to verify read/write accuracy. Test scripts to test this function shall be developed by the Section Developer and as accepted by MDOT and MDTA	Monthly Report	Factory acceptance testing/ testing/ certification/ recertification reports and MDOT and MDTA observations	Correctly read and write < 99.8% of all Transponders, measured in each lane, for all accepted Transponder protocols, at any vehicular speed up to 100 mph	12 hours	24 hours	36 hours	12 hours	24 hours	36 hours	5
15.8	Immediate Messaging	Send all Transponder reads with plaza/ lane/ date/ time to the text/SMS interface within 2 minutes (as near real time as possible).	Section Developer report submission of text/SMS interface confirmation	Daily/ monthly report	Daily/monthly reports and MDOT and MDTA observations	Failure to send Transponder reads to the text/SMS interface within allowable time frame	6 hours	12 hours	36 hours	6 hours	12 hours	36 hours	3
15.9	Image association (See Note 9 following this table)	100% of images shall be associated with the correct Toll Transaction	A statistically significant sampling of Toll Transactions shall be reviewed to verify images are correctly associated with Toll Transactions upon User concern. Test scripts to test this function shall be developed by the Section	Monthly	ETCS Daily Check Reports for previous 30 days MDOT and MDTA observations	< 100% of images associated with correct Toll Transaction.	24 hours	N/A	1 day	24 hours	N/A	1 day	5

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
			Developer and as accepted by MDOT and MDTA										
15.10	ETCS vehicle classification accuracy (See Note 9 following this table)	≥ 99.8% of 2-axle vehicles shall be classified correctly and ≥ 98% of 3+ axle vehicles shall be classified correctly	A Section Developer statistical analysis of Toll Transactions shall be reviewed to verify classification accuracy.	Daily/monthly report	ETCS Activity Monthly Report and MDOT and MDTA observations	< 99.8% of 2-axle vehicles shall be classified correctly and <98% of 3+ axle vehicles shall be classified correctly.	24 hours	N/A	1 day	24 hours	N/A	1 day	5
15.11	Toll Rate accuracy (See Note 9 following this table)	Toll Rate data submitted to MDTA shall be 100% accurate 99.5% of the time. Toll Rate data shall provide all accurate information needed to process Trips and support User inquiries.	A Section Developer statistical analysis of Toll Rate data shall be reviewed to verify accuracy	Daily/monthly report	ETCS Daily Check Report and ETCS Activity Monthly Report and MDOT and MDTA observations	<99.5% of Toll Rate data submitted to MDTA is 100% accurate.	24 hours	N/A	1 day	24 hours	N/A	1 day	5
15.12	Report generation	Reports for immediate (same day) use will be generated and the results returned within 180 seconds. The response time will be calculated by measuring the time between the Submittal of the report request and the time when the report results are available. Reports shall include those needed for auditing, User inquiries and non-compliance events.	The Section Developer shall measure the average report generation times and include these statistics in their monthly operations reports. In the event that MDTA Users experience delays in running reports during production, the issue will be reported to the Toll Systems Operator for investigation and mitigation.	As observed by MDTA Users	Database metrics or timing of actual report execution	> 180 seconds to have requested results available.	24 hours	72 hours	5 days	N/A	N/A	5 days	2

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
15.13	System response time (web accessible reporting tool)	≤ 2 seconds for 99.5% of all User actions. The system shall respond to MDTA User inputs within 2 seconds. System response includes the system completing an action requested by a User, including log-on/log-off, navigating between screens, toggling functions, processing data inputs, and other routine processes that may be carried out by MDTA Users. This shall not include report generation.	MDTA observation of the system will also be used to identify if the system responsiveness is greater than the requirement.	As observed by MDTA Users	Time of actual actions requested by Users.	> 2 seconds for 99.5% or less of all User actions	24 hours	48 hours	3 days	N/A	N/A	3 days	1
15.14	MDOT CHART Interface	Publish Toll Rates successfully and on time to the MDOT CHART interface 99.95% of the time.	Section Developer report submission	Monthly	Interface success/failure report log.	Any failure to publish the rates, or negative acknowledgement of the attempted publishing.	30 minutes	30 minutes	1 day	30 minutes	30 minutes	1 day	5
15.15	Toll Rate dynamic message sign ("DMS")	Toll Rate DMS and DMS audit camera must be operating and displaying the correct information 99.95% of the time,	Section Developer report submission	Daily/monthly	ETCS MMIS Activity Monthly Report	< 99.95%	8 hours	N/A	12 hours	8 hours	N/A	12 hours	5
15.16	Dynamic pricing system ("DPS")	DPS with all of its devices, software, applications and processes properly functioning and successfully communicating with in-lane systems 99.95% of the time.	Section Developer report submission	Daily/monthly	ETCS MMIS Activity Monthly Report	< 99.95%	6 hours	12 hours	24 hours	6 hours	12 hours	24 hours	5

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
15.17	ITS – traffic data transmission	100% of required traffic data is transmitted to the DPS for processing in time to be used in calculations 99.5% of the time.	Section Developer report submission	Daily/ Monthly	ETCS MMIS Activity Monthly Report	< 99.5%	6 hours	12 hours	24 hours	6 hours	12 hours	24 hours	4
15.18	HOV transactions (See Note 9 following this table)	99.95% of correctly declared HOV 3+ Trips/Toll Transactions must not be submitted to MDTA.	Section Developer report submission	Monthly	ETCS Activity Monthly Report	>0.05%	24 hours	36 hours	3 days	24 hours	36 hours	3 days	5
15.19	Price Managed Lane Federal Minimum Average Speed Standard	Maintain compliance with the Federal Minimum Average Speed Standard. This event will not constitute a Non-compliance Event if the Toll Rate is set to the Toll Rate Range Maximum at the time the event occurs.	This requirement applies monthly when the PMLs are in compliance with the Federal Minimum Average Speed Standard, OR every seven days when the Lanes are not in compliance with the Federal Minimum Average Speed Standard.	Weekly/ monthly	ETCS Activity Monthly Report	< 45mph	24 hours	36 hours	3 days	24 hours	36 hours	3 days	3
15.20	Traveler information DMS	Traveler information DMS and DMS audit cameras must be operating and displaying the correct messages 99% of the time.	Section Developer report submission	Monthly	O&M Monthly Report	<99%	24 hours	48 hours	5 days	24 hours	48 hours	3 days	3
15.21	VDS	VDS must be operating and collecting accurate traffic data 99.5% of the time.	Section Developer report submission	Monthly	O&M Monthly Report	<99.5%	24 hours	48 hours	5 days	24 hours	48 hours	3 days	3
15.22	VDS data transmission to MDOT in real time	100% of the collected VDS data must be transmitted to MDOT.	Section Developer weekly data reports and MDOT observations.	Weekly	Weekly data reports for the previous 4 week and MDOT observations	<100%	4 hours	8 hours	24 hours	4 hours	8 hours	2 days	3

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
15.23	VDS data accuracy	≥ 99.9% of all vehicles are accurately classified and counted and vehicle speeds are accurately measured.	Section Developer report submission	Monthly	O&M Monthly Report	<99.9%	24 hours	48 hours	5 days	12 hours	24 hours	3 days	3
15.24	CCTV system	The CCTV system must be operating (where PTZ is present, operating includes that the PTZ functions are working) and transmitting video to all required agencies/applications > 99% of time.	Section Developer report submission	Monthly	O&M Monthly Report	<99%	24 hours	48 hours	5 days	12 hours	24 hours	3 days	3
15.25	ITS routine maintenance	Conduct routine Inspections, testing, and maintenance in accordance with the equipment manufacturer's recommendations and industry practice.	Section Developer report submission	Monthly	O&M Monthly Report	Missed routine Inspection, testing, or maintenance.	2 weeks	N/A	4 weeks	1 week	N/A	2 weeks	1
15.26	All other ITS systems	Maintain other ITS system operation greater than 95% of the time.	Section Developer report submission	Monthly	O&M Monthly Report	<95%	12 hours	24 hours	48 hours	6 hours	12 hours	24 hours	1
15.27	ITS Emergency repair	Maintenance staff must arrive on site to repair issue	Self-reporting	As needed	Section Developer's maintenance staff shall arrive at the site of the ITS Emergency within 30 minutes during the period of 5:00 a.m. to 9:00 p.m., Monday through Friday, and within one hour at all other times, once Section Developer	Section Developer staff does not arrive at site within allowable timeframe	30 minutes/ 1 hour as per performance measurement record	10 minutes	N/A	30 minutes/ 1 hour as per performance measurement record	10 minutes	N/A	3

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
					detects or is notified of the ITS Emergency maintenance related system failure								
15.28	Non-scheduled ITS Maintenance Work	Maintenance staff must arrive on site to repair issues	Self-reporting	As needed	Section Developer's maintenance staff shall arrive at the Work site within 24 hours once Section Developer detects or is notified of the non-scheduled maintenance related system failure.	Section Developer staff does not arrive at site within allowable timeframe	24 hours	1 hour	N/A	24 hours	1 hour	N/A	2
16.) Graffiti													
16.1	Graffiti	Graffiti is removed in a manner and using materials that restore the surface to a like appearance similar to adjoining surfaces	Visual Inspection	Monthly	Inspection records identifying Defects	Any failure to remove graffiti	24 hours	N/A	30 days	24 hours	N/A	7 days	2
17.) Stakeholder Communication													
17.1	Communication	Educate motorists about driver information systems in use on the PMLs, so motorists understand on-road sources of information that will facilitate choice	N/A	Monthly	a.) Conduct pre- and post-awareness and acceptance online surveys of motorists one year and six months before the opening of the price managed lanes with a goal of achieving at least a 60 percent unaided awareness	Failure to achieve 60 percent unaided awareness/ Failure to achieve 50 percent acceptance of managed lanes	Increased PR, marketing and advertising efforts	Follow-up survey	N/A	6 months	N/A	N/A	1

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
					<p>(respondents understand how the managed lanes work, the pricing structure and options for getting around) and a 50 percent acceptance level (respondents are either indifferent or support the managed lanes and benefits they bring to various target audiences) within six months of the managed lanes opening.</p> <p>b.) Assess fine and increase outreach, marketing, and advertising efforts if needed to achieve 60 percent awareness/50 percent acceptance by the 30 days before the managed lanes open.</p> <p>c.) Continue to survey same audience set annually to ensure awareness and acceptance levels remain high.</p>								

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
17.2	Communication	Educate motorists about driver information systems in use on the PMLs, so motorists understand on-road sources of information that will facilitate choice	N/A	Monthly	Monitor and respond to comments and questions received via website, email, or 800 number within two Business Days.	Failure to respond to comments and questions within two Business Days	Improved response times	Increase manpower/personnel change to address responsiveness	N/A	1 month	N/A	N/A	1
17.3	Communication	Interface with E-ZPass marketing and communications to facilitate distribution of Transponder to motorists who intend to use the PMLs	N/A	Monthly	Organize and hold monthly meetings with MDOT starting one year before managed lanes open and continuing for a year after opening and coordinate communications and marketing messaging around distribution and use of Transponders, events in the corridor, upgrades, or updates to the system, etc.	Failure to hold monthly meetings	Increased phone check-ins, email reports	Send weekly and monthly email reports	Hold monthly meetings	1 month	N/A	N/A	1
17.4	Public information	Follow public information Submittals timeframes in these Technical Provisions	Report Submission	Monthly	Submit all public information Submittals on time as specified in these Technical Provisions	Failure to follow public information Submittal times as specified in these Technical Provisions	N/A	N/A	8 hours	N/A	N/A	8 hours	1
18.) General													
18.1	Public information	Follow public information Submittal times as specified in these Technical Provisions	Submittal	Ongoing	All public information Submittals to be submitted as per the Submittal timeframe outlined in these Technical Provisions	Failure to follow public information Submittal times as specified in these Technical Provisions	N/A	N/A	8 hours	N/A	N/A	8 hours	4

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
18.2	Work hours	Comply with work restrictions in place during regular time	Permit issuance	Ongoing	Work restrictions must be adhered to during regular time	Failure to comply with work restrictions in place during regular time	N/A	N/A	24 hours	N/A	N/A	24 hours	4
18.3	Work hours	Comply with work restrictions in place during holidays	Permit issuance	Ongoing	Work restrictions must be adhered to during holidays	Failure to comply with work restrictions in place during holidays	N/A	N/A	24 hours	N/A	N/A	24 hours	4
18.4	Maintain access	Maintain access for either: businesses or pedestrians	Visual Inspection/complaints	ongoing	Maintain access for either: businesses or pedestrians	Failure to maintain access for either: businesses or pedestrians	15 minutes	N/A	24 hours	15 minutes	N/A	24 hours	4
18.5	General	Provide notice to MDOT of damage to any Element of the Work	Issue of notice to MDOT	Ongoing	Provide Notice to MDOT of damage to any Element of the Work caused or contributed to by the Section Developer.	Any failure to provide Notice to MDOT of damage to any Element of the Work caused or contributed to by the Section Developer.	N/A	N/A	24 hours	N/A	N/A	24 hours	2
18.6	General	Repair damage to any Element of the Work	Visual Inspection	Daily	Repair damage to any Element of the Work caused or contributed to by the Section Developer.	Any failure to repair damage to any Element of the Work caused or contributed to by the Section Developer.	24 hours	N/A	7 days	4 hours	N/A	1 day	3
18.7	Work schedule Submittal	Submit all required schedules during the Operating Period	Submittal	Monthly	Submit all required schedules during the Operating Period	Any failure to submit any schedule during the Operating Period by the time prescribed or in accordance with the Section P3 Agreement.	N/A	N/A	24 hours	N/A	N/A	24 hours	3
18.8	Subcontractor payment	Issue payments to subcontractors within the time specified in Section P3 Agreement	N/A	Monthly	Issue payments to subcontractors within the time specified in the Section P3 Agreement	Any failure to pay, by the Section Developer or a subcontractor, of payments within the time specified in the Section P3 Agreement	N/A	N/A	48 hours	N/A	N/A	24 hours	3
18.9	Payment reporting	Submit specified subcontractor payment reports by the time prescribed or in accordance with the Section P3 Agreement	N/A	Monthly	Submit specified subcontractor payment reports by the time prescribed or in accordance with the Section P3 Agreement	Any failure to submit specified subcontractor payment reports by the time prescribed or in accordance with the Section P3 Agreement	N/A	N/A	24 hours	N/A	N/A	24 hours	3

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
18.10	Payment reporting	Submit specified subcontractor payment reports	Submittal	Monthly	Submit specified subcontractor payment reports by the time prescribed or in accordance with the Section P3 Agreement on three consecutive occasions.	Any failure to submit specified subcontractor payment reports by the time prescribed or in accordance with the Section P3 Agreement on three consecutive occasions.	N/A	N/A	30 days	N/A	N/A	7 days	3
18.11	Payment reporting	Submit accurate payrolls to MDOT	Submittal	Monthly	Submit accurate payrolls to MDOT by the time prescribed or in accordance with the Section P3 Agreement,	Any failure to submit accurate payrolls to MDOT by the time prescribed or in accordance with the Section P3 Agreement,	N/A	N/A	3 days	N/A	N/A	1 day	5
18.12	General - Compliance with Section Developer prepared Plans	Comply with all Section Developer prepared Plans as prescribed and in accordance with the Section P3 Agreement	Submittal	Monthly	Comply with any Section Developer prepared Plan by the time prescribed and in accordance with the Section P3 Agreement	Any failure to comply with any Section Developer prepared Plan by the time prescribed and in accordance with the Section P3 Agreement where such failure is not otherwise expressly specified in a different Noncompliance Event in this table.	24 hours	24 hours	7 days	24 hours	24 hours	7 days	4
18.13	General – Submittal of Section Developer prepared Plans	Submit or update any Section Developer prepared Plan as prescribed and in accordance with the Section P3 Agreement	Submittal	Monthly	Submit or update any Section Developer prepared Plan by the time prescribed or in accordance with the Section P3 Agreement.	Any failure to submit or update any Section Developer prepared Plan by the time prescribed or in accordance with the Section P3 Agreement.	N/A	N/A	7 days	N/A	N/A	1 day	3
18.14	Meetings	Schedule and attend all required meetings	Meeting attendance record	Monthly	Schedule or attend any meeting by the time prescribed in the Section P3 Agreement	Any failure to schedule or attend any meeting by the time prescribed in the Section P3 Agreement.	N/A	N/A	24 hours	N/A	N/A	24 hours	2
18.15	Submittals	Provide Submittals as specified in the	Submittal	Monthly	Provide any Submittal not otherwise	Any failure to provide any Submittal not otherwise expressly	N/A	N/A	3 days	N/A	N/A	1 day	3

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
		Section P3 Agreement			expressly specified in this table by the time prescribed or in accordance with the Section P3 Agreement	specified in this table by the time prescribed or in accordance with the Section P3 Agreement.							
18.16	Payrolls	Submit correct payrolls to MDOT	Monthly report	Monthly	Submit missing or corrected payrolls within 10 days of notice by MDOT	Any failure to submit missing or corrected payrolls within 10 days of notice by MDOT	N/A	N/A	1 day	N/A	N/A	1 day	2
18.17	General	Meet all required work zone safety, management, MOT, and detour routes during maintenance operating hours	<u>Exhibit 6 Article 22 (Maintenance of Traffic)</u>	Monthly	Visual Inspection	The Section Developer fails to meet requirements relative to work zone safety, management, MOT, and detour routes for regular maintenance during operations.	N/A	N/A	15 days	N/A	N/A	1 day	2
18.18	Utilities	Mark all subsurface utilities maintained by Section Developer	Timeframe established by Miss Utility	Monthly	Mark all subsurface utilities maintained by Section Developer as required by Miss Utility	< 100% of Section Developer utilities marked within window established	N/A	N/A	48 Hours	N/A	N/A	24 hours	2
18.19	Utilities	Maintain access to all external Stakeholder utilities	All Stakeholder to have access to their utilities at all times	Monthly	Visual Inspection	Utilities are inaccessible to external Stakeholder	1 day	N/A	2 weeks	1 day	N/A	2 weeks	3
18.20	Public information	Issue all information to the public	Information issues to the public to be factually correct	Monthly	Visual Inspection & User complaints	The Section Developer issues information to the public or in press releases, whether through variable message signs or other means that is factually incorrect.	24 hours	N/A	15 days	1 hour	N/A	30 days	4
18.21	Information sharing	Section Developer to send all required information to MDOT CHART	Section Developer to issue information to transmit Incident management data, speed and volume data for	Monthly	Report submission	The Section Developer fails to transmit the following to MDOT CHART:	N/A	N/A	5 days	N/A	N/A	30 days	3

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
			PMLs, and video stream to MDOT CHART			a.) Incident management data; b.) real-time speed and volume data for the Priced Managed Lanes; and c.) streaming video from CCTV cameras with a view of the Priced Managed Lanes. The minimum refresh rates for such data transmissions shall be pursuant to these Technical Provisions.							
18.22	Inspections	All inspectors to have proper certification	All inspectors to be certified pursuant to these Technical Provisions, and applicable standards and specifications.	Monthly	Report Submission	The Section Developer fails to have all inspectors certified pursuant to the Section P3 Agreement	N/A	N/A	14 days	N/A	N/A	30 days	4
18.23	Inspections	All material Defects must be properly identified	Identify all material Defects in the Inspection reports, life cycle Maintenance Plan, or work currently undertaken.	Monthly	Visual Inspection	The Section Developer fails to identify material Defects in the Inspection reports, Maintenance Plan, or work currently undertaken.	N/A	N/A	3 days	N/A	N/A	15 days	4
18.24	Inspections	Identified Section Developer material Defects to be repaired	Section Developer's annual Maintenance Plan	Annual	Report Submission	The Section Developer fails to include identified material Defects to be repaired in the Section Developer's annual Maintenance Plan.	N/A	N/A	14 days	N/A	N/A	30 days	3
18.25	LOS	Ensure the tolling mechanism is fully functional	Visual Inspection	Monthly	Manage appropriately the dynamic tolling mechanism to ensure the LOS of the Work does not become degraded as required by the Section P3 Agreement.	The Section Developer fails to manage appropriately the dynamic tolling mechanism to ensure the LOS of the Work does not become degraded as required	N/A	N/A	7 days	N/A	N/A	15 days	4

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
						by the Section P3 Agreement. In addition, and to be measured separately, upon receiving notice of a problem with the dynamic tolling mechanism, the Section Developer fails to submit a rectification Plan to MDOT for acceptance.							
18.26	Maintenance	All safety Hazard issues to identified	Visual Inspection in accordance with the Section Developer's SaMP	Monthly	Act in accordance with Section Developer's SaMP with regard to responding to safety hazard issues during the Operating Period	The Section Developer fails to act in accordance with Section Developer's SaMP with regard to responding to safety hazard issues during the Operating Period	N/A	N/A	15 days	N/A	N/A	15 days	5
18.27	Work management	Submit and comply with O&M Plan requirements	Plan submission	Monthly	Submit for acceptance, update as necessary, and comply with the Operations and Maintenance Plan.	The Section Developer fails to produce, submit for acceptance, update as necessary, and comply with the Operations and Maintenance Plan.	N/A	N/A	30 days	N/A	N/A	15 days	3
18.28	NPDES permit	Comply with NPDES permit	Permit	As needed	NPDES notice of coverage is submitted and complied with	Any instance where earth disturbance occurs and an NPDES notice of coverage is not submitted or complied with	N/A	N/A	1 day	N/A	N/A	1 day	5
18.29	General	Carry out any maintenance activity in absence of the SaMP or in a manner that represents a hazard to workers or the general public.	Visual Inspection	Monthly	All components of the SaMP must be followed	Failure to carry out any maintenance activity in accordance with the SaMP To carry out a maintenance activity in a manner that represents a hazard to workers or the general public	< 1 minute	N/A	1 day	< 1 minute	N/A	1 day	5
18.30	General	Remediate in accordance with Good Industry	Visual Inspection	Monthly	Remediate in accordance with Good Industry	Failure to remediate a material hazard to workers or the	< 5 minutes	1 day	1 week	< 5 minutes	1 day	1 week	5

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
		Practice and any other terms of the Section P3 Agreement a condition within the maintenance limits that represents a material hazard to workers or the general public			Practice and any other terms of the Section P3 Agreement a condition within the maintenance limits that represents a material hazard to workers or the general public	general public in accordance with Good Industry Practice and any other terms of the Section P3 Agreement a condition within the maintenance limits							
18.31	General	Provide accurate, complete, and timely reporting of the Noncompliance Events and Noncompliance Points assessed and accrued as required by the Section P3 Agreement.	Report	Monthly	All reporting requirements must be met as required by the Section P3 Agreement	Failure to Provide accurate, complete, and timely reporting of the Noncompliance Events and Noncompliance Points assessed and accrued as required by the Section P3 Agreement.	N/A	N/A	3 days	N/A	N/A	1 day	4
18.32	CCMS	Maintain a log of User comments and Section Developer responses throughout the Operating Period.	Section Developer to inform MDOT	Monthly	Section Developer shall analyze the inquiries, comments, and complaints and provide suggested resolution to the MDOT.	Section Developer fails to analyze the inquiries, comments, complaints, or provide suggested resolution to the MDOT.	N/A	N/A	30 days	N/A	N/A	14 days	3
18.33	User response	Timely and effective response to User inquiries and complaints	Section Developer to inform MDOT	Monthly	a.) Contact the User within 48 hours following being notified of or receiving initial User inquiry b.) All Work resulting from User requests is scheduled within 48 hours of User contact/ notification c.) Follow-up contact with the	Section Developer fails to perform any of the actions detailed in the "Performance and Measurement Record" column of this ID#	2 days	N/A	1 week	2 days	N/A	1 week	3

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
					User within 72 hours of initial inquiry/ notification d.) All User concerns/requests are resolved to MDOT's satisfaction within 2 weeks of the initial inquiry/ notification								
18.34	Information sharing	Section Developer to send all required information to MDOT CHART	Report submission	Monthly	Section Developer to issue information to transmit Incident management data, speed and volume data for PMLs, and video stream to MDOT CHART	The Section Developer fails to transmit the following to MDOT CHART: a.) Incident management data; b.) real-time speed and volume data for Price Managed Lanes; and c.) streaming video from CCTV cameras with a view of the Price Managed Lanes. The minimum refresh rates for such data transmissions shall be pursuant to these Technical Provisions.	N/A	N/A	5 days	N/A	N/A	30 days	3
18.35	As-Built	Section Developer to provide As-Built Drawings as required and specified in these Technical Provisions	Drawing Submission	Monthly	As-Built Drawings are submitted within the timeframe specified in these Technical Provisions	Section Developer fails to provide As-Built Drawings within the timeframe specified in these Technical Provisions	N/A	N/A	15 days	N/A	N/A	15 days	2
18.36	Courtesy Patrol	Courtesy Patrol to arrive on-site	Visual Inspection	As reported	Either respond to a stranded motorist on the shoulders or travel lanes.	Failure to respond to a stranded motorist on the shoulders or travel lanes.	N/A	N/A	30 minutes	N/A	N/A	30 minutes	3
18.37	Courtesy Patrol	Courtesy Patrol operator must not be under the influence of alcohol or any controlled	Visual Inspection/ User reported	As reported	No Courtesy Patrol operator found to be or accused of being under the	Courtesy Patrol operator found to be or accused of being under the influence of alcohol or any	N/A	N/A	8 hours	N/A	N/A	1 minute	5

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
		substance or drug, except where prescribed by a physician while on duty			influence of alcohol or any controlled substance or drug.	controlled substance or drug.							
18.38	Courtesy Patrol	Courtesy Patrol operator must not accept payment for services	Visual Inspection/ User reported	As reported	No Courtesy Patrol operator found to be or accused of accepting payment for services	Courtesy Patrol operator found to be or accused of accepting payment for services	N/A	N/A	8 hours	N/A	N/A	1 minute	5
18.39	Courtesy Patrol	Courtesy Patrol operator must not sleep while on duty	Visual Inspection/ User reported	As reported	No Courtesy Patrol operator found to be or accused of sleeping while on duty	Courtesy Patrol operator found to be or accused of sleeping while on duty	N/A	N/A	8 hours	N/A	N/A	1 minute	4
18.40	Courtesy Patrol	Customer satisfaction survey for Courtesy Patrol service	Survey results	Quarterly	Maintain customer satisfaction survey on a quarterly basis at least 80% of respondents satisfied with service.	Less than 80% of the respondents are satisfied with service	N/A	N/A	1 day	N/A	N/A	3 months	3
18.41	Interface agreements	Meet all interface agreements	Section P3 Agreement	As specified in the Section P3 Agreement	Meet all interface agreements as specified in the Section P3 Agreement	Failure to meet interface agreements	1 day	1 week	2 weeks	12 hours	1 day	1 week	5
18.42	Audits and reviews performed by MDOT, MDTA or other Governmental Entity	Comply with audit findings or address review comments	Audit, review, Section P3 Agreement, Third Party MOU's or a combination thereof	When performed	Audit or review	Failure to comply with audit or review findings or provide information to complete audit or review	N/A	N/A	10 days	N/A	N/A	10 days	4
18.43	Staffing	Comply with requirements for Key Personnel and any personnel specified in Exhibit 6 or the Section P3 Agreement	Personnel qualifications submitted to MDOT for acceptance	As needed	Provide qualifications and submit for MDOT acceptance as required, for any personnel and replacement personnel specified in any portion of Exhibit	a.) Failure to submit qualifications for personnel specified in Exhibit 6 or the Section P3 Agreement; b.) Failure to submit qualifications for replacement	N/A	N/A	30 days	N/A	N/A	14 days	3

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
					<u>6</u> (Predevelopment Work Requirements)	personnel as specified in Exhibit 6 or the Section P3 Agreement; c.) failure to receive MDOT acceptance for personnel prior to that individual commencing work on the Phase or Section							
18.44	Knockdown of Poles & Overhead Lighting	All poles along the roadway (light, utility, etc.) must be upright, functional, and undamaged	Visual inspection	Monthly	100% of poles (light, utility, etc.) are upright, functional, and in good condition	Less than 100% poles are upright, functional and in good condition	24 hours	7 days	1 month	24 hours	7 days	1 month	5
18.45	Cameras, traffic control devices and ITS equipment on poles	All camera and, ITS equipment, and traffic control devices remain fully functional, undamaged, unobstructed, and properly fastened to pole	Visual Inspection, MDTA inspection	Monthly	All camera and, ITS equipment, and traffic control devices located on poles or structures remain fully functional, unobstructed and undamaged.	Less than 100% of cameras and ITS equipment, and traffic control devices located on Poles or structures are fully functioning, unobstructed and undamaged.	24 hours	7 days	1 month	24 hours	7 days	1 month	5
19.) Winter Maintenance													
19.1	Winter maintenance	As appropriate under prevailing weather conditions, provide a paved surface over all lanes and shoulders that is generally bare of ice and snow	Visual Inspection, snow and ice related Incident Reports, reports, and complaints from MDOT, Users, and others.	As reported	Continuously clear the paved area over its entire width during and after the weather event.	Section Developer fails to maintain all driving surfaces and shoulders clear of snow and ice	N/A	N/A	2 hours	N/A	N/A	2 hours	3
19.2	Continuous plowing and deicing	Continuous plowing and deicing PML	Circuit time measurement	As reported	Continuous plowing and deicing application to achieve a maximum circuit time of 2 hours	Failure to achieve a maximum circuit time of 2 hours during plowing and deicing application	2 hours	N/A	N/A	2 hours	N/A	N/A	3
19.3	Snow accumulation	Remove snow accumulation adjacent to barrier walls during	Visual Inspection	As reported	Snow accumulation adjacent to barrier walls	Failure to remove Snow accumulation adjacent to barrier walls concurrently	2 hours	N/A	N/A	2 hours	N/A	N/A	3

Table 25-6 Operating Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
					removed concurrently with Mainline pavement snow removal	with Mainline pavement snow removal							
19.4	Lanes and ramps	Achieve bare pavement after end of a winter event	Visual Inspection	As reported	Achieve bare pavement after end of the winter event	Failure to Achieve bare pavement after end of the winter event	2 hours	N/A	N/A	2 hours	N/A	N/A	3
19.5	Shoulders/ medians/ crossovers	Plow shoulders/medians/ crossovers within the timeframe established after the end of a winter event	Visual Inspection	As reported	Plowed within 8 hours of the end of the winter event, up to 6-inch total accumulation winter event	Failure to plow 8 hours of the end of the winter event	8 hours	N/A	1 day	2 hours	N/A	1 day	3
			Visual Inspection	As reported	Plowed within 12 hours of the end of the winter event, over 6-inch and up to 10-inch total accumulation winter event	Failure to plow 12 hours of the end of the winter event	12 hours	N/A	1 day	2 hours	N/A	1 day	3
			Visual Inspection	As reported	Plowed within 16 hours of the end of the winter event over 10-inch total accumulation winter event	Failure to plow 16 hours of the end of the winter event	16 hours	N/A	1 day	2 hours	N/A	1 day	3
19.6	Hazards	Address hazards and slippery conditions during winter events	Visual Inspection or upon notification	As reported	Address any hazard immediately upon detection or being made aware	Failure to address any hazard immediately upon detection or being made aware	1 hour	N/A	1 day	1 hour	N/A	1 day	4
					Address isolated slippery conditions 100% of the time	Failure to address isolated slippery conditions 100% of the time	2 hours	N/A	1 day	2 hours	N/A	1 day	4
19.7	Salt storage	Store salt in covered buildings	Visual Inspection	As reported	Instances of uncovered salt storage	Failure to store salt in covered buildings 100% of the time	1 day	N/A	3 days	1 day	N/A	3 days	2

Notes to Accompany Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance):

- Where permit requirement and this table conflict or overlap, the more stringent criteria will apply.
- See also the Environmental (ID #3) for related items and additional information.

3. Elements for abutment backwall (218), sidewalk (062), median (070), crashwall (213), wingwall (251), retaining wall (350), and noise wall (355) as defined in MDOT SHA PONTIS Element Data Collection Manual, shall be evaluated with this group of elements. For non-structural portions of sound barriers, see ID 8.1.
4. Elements for protective slope (260), unprotective slope (261), fencing (342), railroad shielding (343), drainage devices (344), and gabion wall (346) as defined in MDOT SHA PONTIS Element Data Collection Manual, shall be evaluated with this group of elements.
5. Winter damage to SRPMs must be addressed by April 1 following the winter season.
6. For fences attached to structures or structural portions of sound barriers, see ID # 4.
7. Refer also to Maryland pesticide and fertilizer laws.
8. Requirements are exclusive of times when law enforcement/first responders control the site. Section Developer shall coordinate with law enforcement/first responders when they control the site.
9. MDTA may refuse to continue processing any category of Trips affected by an Unacceptable Customer Service Event as set out in Appendix 4 to the Tolling Services Agreement Term Sheet. Noncompliance Events that reference this footnote shall not take into account Trips that MDTA is not processing due to an Unacceptable Customer Service Event.
10. Noncompliance Event ID#15.3 (Trip processing) shall not apply to Trips that are resubmitted following resolution of any Unacceptable Customer Service Event pursuant to Section 1.7 of Appendix 4 to the Tolling Services Agreement Term Sheet provided that they are submitted to MDTA within the time period required under that Section.
11. Upon the occurrence of a Noncompliance Event as described in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) or Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance), the Section Developer is required to achieve the Mitigation, Temporary Repair or Permanent Repair of that Noncompliance as soon as practicable within the respective timeframe required for Mitigation, Temporary Repair or Permanent Repair of that Noncompliance Event.
12. The timeframe for Mitigation, Temporary Repair or Permanent Repair commences on the Noncompliance Event Start Time and ends upon the expiration of the relevant period listed under Mitigation, Temporary Repair or Permanent Repair for that Noncompliance Event's Mitigation, Temporary Repair or Permanent Repair in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance). These timeframes for any Noncompliance Event shall run concurrently. If the timeframe is listed under Mitigation, Temporary Repair or Permanent Repair as N/A in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) or Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance) the Section Developer will have no obligation for the Mitigation, Temporary Repair or Permanent Repair of that Noncompliance Event (as applicable).
13. The Section Developer will be assessed the applicable Noncompliance Points for the relevant Noncompliance Event if the Section Developer has not achieved the Mitigation, Temporary Repair or Permanent Repair of the Noncompliance Event upon the expiration of the timeframe listed for the Mitigation, Temporary Repair or Permanent Repair that Noncompliance Event in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) or Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance).
14. Following the expiration of the timeframe required for the Mitigation, Temporary Repair or Permanent Repair of a Noncompliance Event, if the Section Developer then fails to achieve Mitigation, Temporary Repair or Permanent Repair of that Noncompliance Event within the relevant Recurrence Interval, the Section Developer will be assessed the applicable Noncompliance Points for that Noncompliance Event. If a Noncompliance Event remains unremedied beyond the Recurrence Interval period for Mitigation, Temporary Repair or Permanent Repair, a new Recurrence Interval will commence upon the expiration of the previous Recurrence Interval.

Table 25-7 D&C Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
1.) Pavement (Roadway, Ramps, Access Roads and Other Paved Areas)													
1.1	Pavement condition	All pavement is free from deleterious material such as tires, wood, metal, stone, glass, and any other solid material debris	Visual Inspection	Daily	As reported	Failure to keep the roadway clear of deleterious material	N/A	N/A	2 hours	N/A	N/A	2 hours	1
1.2	Pavement condition	All pavement is free from potholes, cracks, ruts, and any other similar type of pavement Defect.	Visual Inspection	Daily	As reported	Failure to keep the pavement free of potholes, ruts, and other Defects	N/A	24 hours	3 days	N/A	2 hours	21 days	4
2.) Drainage (See Notes 1 and 2 following this table)													
2.1	Stormwater ponds, appurtenances, and discharge structures/ locations	Stormwater Ponds, appurtenances, and discharges installed, performing, and maintained in accordance with standards, specifications, Plans, permits, shop drawings, etc.	Visual Inspection	Daily	As reported	Stormwater ponds, appurtenances, and discharge points not properly installed, functioning, or maintained	8 hours	1 day	2 days	8 hours	1 day	21 days	5
2.2	Standing water on travel lanes as a result of construction operations	Prevent and remove standing water on any travel lane as a result of construction operations	Visual Inspection	Daily	As reported	Failure to prevent or remove standing water from the travel lanes as a result of construction operations	2 hours	1 day	3 days	2 hours	1 day	14 days	3
2.3	Standing water on travel lanes	Respond to instances of standing water on travel lanes	Visual Inspection	Daily	As reported	Failure to prevent or remove standing water covering 25% or greater of the width of the travel lanes	2 hours	N/A	N/A	1 hour	N/A	N/A	5
2.4	Roadway underdrains	Placement, protection, and performance of roadway underdrains	Visual inspection or as a result of camera inspection	Weekly	As reported	Underdrain not properly installed, maintained, or functioning	2 days	4 days	7 days	2 days	4 days	14 days	1
2.5	Storm drain pipes, channels, ditches, inlet	Conveyance structures installed, functioning, and maintained per	Visual Inspection	Daily	As reported	Any conveyance structure not properly installed, functioning, or maintained	1 day	2 days	7 days	N/A	2 days	21 days	2

Table 25-7 D&C Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
	structures, outfall structures, junction structures, manhole sections, etc.	Standards, specifications, Plan, shop drawings, etc.											
2.6.1	SWMFACs	Stormwater treatment systems, incl. flow and spillage control devices function in accordance with the Section Developer's specific design requirements as approved by the AHJ; location and means of operation are recorded adequately to permit correct operation.	Visual Inspection. All devices functioning	Daily	Devices functioning in accordance with the Section Developer's specific design requirements with means of operation and as determined by MDOT; Rating of I (No Action) in compliances with the MS4 permit.	Per MS4 Permit Requirements. Failure to complete Routine Maintenance Required. Per MDOT SWM Facility Routine Maintenance Manuals based on facility type (e.g. facility mowing and litter control)	7 days	30 days	60 Days	1 day	7 days	7 days	1
2.6.2	SWMFACs	See ID #2.6.1	See ID #2.6.1	See ID #2.6.1	Devices functioning in accordance with the Section Developer's specific design requirements with means of operation and as determined by MDOT; Rating of II (Minor Maintenance) in compliances with the MS4 permit.	Per MS4 Permit Requirements. Failure to complete minor maintenance required per MDOT SWM Facility Routine Maintenance Manuals based on facility type. Could include mowing, brush clearing, minor sediment removal, seeding bare spots, litter control and more.	7 days	30 days	60 Days	1 day	7 days	7 days	1
2.6.3	SWMFACs	See ID #2.6.1	See ID #2.6.1	See ID #2.6.1	Devices functioning in accordance with the Section Developer's specific design requirements with means of operation and as determined by	Per MS4 permit requirements. Failure to complete work order which may result in additional development of design; reconstruction; change in maintenance	7 days	90 days	Within 3 years of Inspection revealing major issues.	1 day	30 days	7 days	3

Table 25-7 D&C Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
					MDOT; Rating of III indicates non-compliance issues with the MS4 permit.	approach and additional permitting activities.							
2.6.4	SWMFACs	See ID #2.6.1	See ID #2.6.1	See ID #2.6.1	Devices functioning in accordance with the Section Developer's specific design requirements with means of operation and as determined by MDOT; Rating of IV indicates non-compliance issues with the MS4 permit.	Per MS4 permit requirements. Failure to complete retrofit design required, facility no longer functioning as designed and cannot be restored to original condition within original footprint or as original facility type. Full redesign, reconstruction and additional permitting activities may be required.	7 days	90 days	Within 3 years of Inspection revealing major issues.	1 day	30 days	7 days	5
2.6.5	SWMFACs	See ID #2.6.1	See ID #2.6.1	See ID #2.6.1	Devices functioning in accordance with the Phase Developer's specific design requirements with means of operation and as determined by MDOT; Action Rating of V to have catastrophically failed and pose an immediate threat to public safety.	Per MS4 Permit Requirements. Failure to complete Emergency design and repair followed by review and issuance of new permit. Emergency repairs may only bring facility to an Action Rating of IV condition and follow-up required.	3 days	30 days	Within 3 years of Inspection revealing major issues.	1 day	1 day	7 days	5
2.7.1	Significant and high hazard dams/ embankments	All dams in MDE dam safety inventory should be inspected and maintained in good condition in accordance with MDE dam inspection checklist requirements	Per MDE Dam checklists and standard procedures.	Weekly and after each significant rain event (significant as determined by MDE DSD)	Dams must be in excellent or good condition. Any lower condition must be remediated immediately.	Dam Inspection below good or breach event after a major storm. significant (B) and high(C) hazard dams must include an EAP in case there is a large scale storm and the dam fails. These Plans are updated	8 hours	3 days	30 days	1 hour	1 day	1 day	5

Table 25-7 D&C Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
						annually and will be provided to MDOT.							
2.7.2	Low hazard dams/ embankments	All dams in MDE dam safety inventory should be inspected and maintained in good condition in accordance with MDE dam inspection checklist requirements	Per MDE dam checklists and standard procedures.	Weekly and after each significant rain event (significant as determined by MDE DSD)	Dams must be in excellent or good condition. Any lower condition must be remediated immediately.	Dam Inspection below good or breach event after a major storm.	8 hours	7 days	60 days	1 hour	1 day	1 day	4
2.8	Maintain LOD/TOCF	Demarcate and maintain LOD with TOCF to avoid excursions outside approved LOD	Visual Inspection IQF and IEM	Daily by IQF; Weekly by IEM	Maintain TOCF so that there are no gaps, segments pushed down, etc.	Failure to make repairs to TOCF within 72 hours of initial Inspection	N/A	1 day	3 days	N/A	N/A	N/A	4
2.9.1	Maintenance of all ESC controls	Install and maintain all ESC controls in accordance with standards, specifications, Plans, permit requirements, regulatory requirements, etc.	Visual Inspection by IQF and IEM	Daily by IQF; IEM Inspection bi-weekly	Maintain all approved ESC controls per the MDOT ESC manual	Failure to install and maintain controls properly.	N/A	8 hours	2 days	N/A	N/A	14 days	4
2.9.2	MDOT Quality Assurance Ratings of all ESC controls	See MDOT SHA Standard Specifications for Construction and Materials Section 308.03.06	See MDOT SHA Standard Specifications for Construction and Materials Section 308.03.06	See MDOT SHA Standard Specifications for Construction and Materials Section 308.03.06	See MDOT SHA Standard Specifications for Construction and Materials Section 308.03.06	Rating of C	8 hours	24 hours	72 hours	72 hours	72 hours	72 hours	3
						Rating of D	8 hours	24 hours	72 hours	72 hours	72 hours	72 hours	4
						Rating of F	8 hours	24 hours	72 hours	72 hours	72 hours	72 hours	5
2.10	Maintenance of haul roads, timber mats, construction entrances, Site access, etc.	Install and maintain all haul routes, construction entrances, protective mats, and other Site access elements in accordance with standards, specifications, Plans, permit requirements,	Visual Inspection	Daily	As reported	Failure to install and maintain properly all haul routes, construction entrances, etc.	N/A	1 day	3 days	N/A	1 day	14 days	3

Table 25-7 D&C Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
		regulatory requirements, etc.											
2.11	Concrete wash outs	Install and maintain concrete washouts in accordance with standards, specifications, Plans, permit requirements, regulatory requirements, etc.	Visual Inspection	Daily	As reported	Failure to install and maintain properly concrete washouts.	N/A	1 day	2 days	N/A	N/A	14 days	2
2.12	Stockpiles	Maintain stockpiles and stockpile areas in accordance with standards, specifications, Plans, permit requirements, regulatory requirements, etc.	Visual Inspection	Daily	As reported	Failure to maintain stockpiles and areas.	N/A	1 day	3 days	N/A	1 day	14 days	2
2.13	Maintenance of Vegetation	Install and maintain native vegetation, tree protection, other plantings, etc. according to standards, specifications, Plans, Supplier recommendations, etc.	Visual Inspection	Weekly	As reported	Failure to install and maintain plantings, vegetation, trees, etc.	N/A	1 day	10 days	N/A	1 day	14 days	1
2.14	SWM As-built	As-builts accepted by MDOT SHA OHD PRD and provided to MDOT SHA HHD for NPDES Database	Accepted As-built Drawings	As needed for facilities constructed or re-constructed	Accepted As-built Drawing	Failure to complete and submit as-built drawing within 60 days of construction completion. Failure to obtain acceptance of As-Built Drawings with 6 months of construction	N/A	N/A	5 days	N/A	N/A	5 days	5
2.15	SWM Asset records	Inspections per MS4 permit conditions	Per Drainage and MDOT SHA OHD Highway Hydraulics Division SWM Assets Program Standard Operating Procedures and use of most current ArcCollector/Survey123 applications and coordinated into MDOT NPDES database.	As needed for facilities constructed or re-constructed	Records to be posted to NPDES database prior to Submittal of NPDES Annual Report to MDE.	MS4 Permit Violation for failure to inspect facilities.	7 days	30 days	30 days	1 day	1 day	1 day	5

Table 25-7 D&C Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
2.16	Maintenance of Equipment	Maintain equipment so that there is no leakage of hydraulic fluids, oils, and other harmful substances	Visual Inspection	Daily by IQF; bi-weekly by IEM	Maintain equipment according to BMPs and permit conditions	Evidence of fluids leaking from equipment. Failure to correct/make repairs.	N/A	1 day	3 days	N/A	N/A	N/A	2
2.17	Maintenance of Public Roadways	Maintain SCEs and prevent trucks and other vehicles from tracking sediment and other construction debris on roads.	Visual Inspection	Daily by IQF; bi-weekly by IEM	Maintain all approved ESC controls per the MDOT ESC manual	Failure to maintain controls per the MDOT ESC manual. Sediment/debris tracking evident on roadways. Failure to correct 72 hours after Inspection.	N/A	1 day	3 days	N/A	N/A	N/A	2
3.) Environmental													
3.1	Maintenance of stream flow	Maintain streamflow during construction	Visual Inspection	Daily	Maintain stream flow through use of pump around practices, partial or full stream diversions, and relocations	Failure to maintain stream flow according to permit and Plan. Failure to correct 72 hours after Inspection.	N/A	1 hour	1 day	N/A	1 hour	14 days	2
3.2	Maintenance of fish blockage nets (if fish relocation required)	Maintain fish blockage nets. Keep free of excessive debris, re-install after disturbance/high flows, reset as required.	Visual Inspection	Daily	As reported	Failure to maintain nets according to permit and Plan	N/A	1 hour	1 day	N/A	1 hour	14 days	2
3.3	Maintenance of water quality	Maintain water quality through the use of approved ESC controls. Do not exceed approved turbidity levels	Visual Inspection	Daily	As reported	Failure to maintain water quality according to permit and Plan	N/A	2 hours	1 day	N/A	2 hours	21 days	3
3.4	Stream relocations	Maintain stream relocation during construction	Visual Inspection	Daily	As reported	Failure to maintain stream relocation according to permit and Plan	N/A	2 hours	1 day	N/A	2 hours	14 days	2
4.) Structures													
4.1	Reinforced concrete including reinforcing steel	Placement and curing of concrete not in accordance with standards, specifications, Plans, shop drawings,	Visual Inspection	Anytime	As reported	Concrete not placed or cured properly	1 hour	2 hours	4 hours	N/A	N/A	14 days	3

Table 25-7 D&C Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
		manufacturer's recommendations, etc.											
4.2	Structural steel	Placement and protection of structural steel not in accordance with standards, specifications, Plans, shop drawings, manufacturer's recommendations, etc.	Visual Inspection	Anytime	As reported	Structural steel not handled, erected, or protected properly	4 hours	1 day	2 days	4 hours	N/A	14 days	3
4.3	Masonry	Placement and protection of masonry not in accordance with standards, specifications, Plans, shop drawings, manufacturer's recommendations, etc.	Visual Inspection	Anytime	As reported	Masonry not installed, cured, handled, or protected properly	4 hours	1 day	2 days	4 hours	N/A	14 days	2
4.4	Retaining Wall	Placement and protection of retaining wall including associated elements (including all types of walls) not in accordance with standards, specifications, Plans, shop drawings, manufacturer's recommendations, etc.	Visual Inspection	Anytime	As reported	Retaining wall elements not installed or protected properly	8 hours	1 day	2 days	8 hours	N/A	14 days	3
4.5	Other structural elements (i.e. bearings, pads, cross frames, anchors, bolts, plates, joints, panels, etc.)	Placement and protection of any structural Element not in accordance with standards, specifications, Plans, shop drawings, manufacturer's	Visual Inspection	Anytime	As reported	Any other structural Element not installed or protected properly	4 hours	1 day	2 days	4 hours	N/A	14 days	3

Table 25-7 D&C Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
		recommendations, etc.											
4.6	Temporary structures	Installation, functioning, and protection of any temporary construction Element (formwork, falsework, shoring towers, etc.) not in accordance standards, specifications, Plans, shop drawings, manufacturer's recommendations, etc.	Visual Inspection.	Anytime	As reported	Temporary structure not installed performing, or protected properly	4 hours	1 Day	2 days	4 hours	N/A	14 days	3
4.7	Demolition	Demolition and removal of structures or other elements performed in accordance with standards, specifications, Plans, shop drawings, manufacturer's recommendations, etc.	Visual Inspection.	Anytime	As reported	Failure of demolition activities to follow procedures and requirements properly	Immediate	8 hours	1 day	10 minutes	1 hour	21 days	5
5.) Pavement Markings, Object Markers, Barrier Markers, and Delineators (See Note 3 following this table)													
5.1	Pavement markings	Pavement marking, temporary and permanent are installed and maintained in accordance with standards, specifications, Plans, etc.	Visual Inspection	Weekly	As reported	Pavement markings are not properly installed or maintained properly or in compliance with MD MUTCD or are not: clean and visible; whole and complete and of the correct color type width and length; in compliance with retroreflectivity requirements	N/A	8 hours	2 days	N/A	N/A	14 days	3
5.2	Pavement markings	Symbols must be functioning as intended	Visual Inspection	Weekly	As reported	Less than 90% of each symbol functioning as intended	N/A	N/A	30 days	N/A	N/A	14 days	3

Table 25-7 D&C Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
5.3	Delineators & markers	Markers and delineators are installed and maintained in accordance with standards, specifications, Plans, etc.	Visual Inspection	Weekly	Number of object markers or delineators defective, damaged or missing.	Delineators and markers are not properly installed or more than 1 in every 10 object markers or delineators defective or missing. Damage such that the color may be misconstrued or unknown.	N/A	8 hours	2 days	N/A	1 day	14 days	3
5.4	SRPM	SRPMs are installed and maintained in accordance with standards, specifications, Plans, etc.	Visual Inspection	Monthly	As reported	SRPMs are not properly installed and maintained	N/A	8 hours	2 days	N/A	1 day	14 days	3
6.) Sign Structures, Foundations and Supports													
6.1	Sign Structures, foundations, and appurtenances both temporary and permanent	Sign structures, foundations, supports, and appurtenances are installed and maintained in accordance with standards, specifications, Plans, shop drawings, etc.	Visual Inspection	Weekly	As reported	Sign structures, supports, appurtenances, etc. not properly installed, erected, or maintained	24 hours	3 days	7 days	N/A	3 days	14 days	3
7.) Permanent Signs													
Not Used													
8.) Fences and Sound Abatement (See Note 4 following this table)													
8.1	ROW and other fencing	ROW Fencing, other fencing, and appurtenances are installed and maintained in accordance with standards, specifications, Plans, shop drawings, etc.	Visual Inspection	Daily	As reported	Fencing not installed and maintained properly	4 hours	1 day	7 days	4 hours	N/A	21 days	3
8.2	Temporary fencing	Temporary fencing and appurtenances are installed and maintained in accordance with standards,	Visual Inspection	Daily	As reported	Fencing not installed and maintained properly	2 hours	1 day	7 days	4 hours	1 day	21 days	3

Table 25-7 D&C Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
		specifications, Plans, shop drawings, etc.											
9.) Landscaping (See Note 5 following this table)													
9.1	Landscaped areas within ROW	The height of the turfgrass is maintained between 2 inches and 8 inches and mowed a minimum of 3 times per year	Visual Inspection and physical measurement	Monthly during growing season	Measure turf areas to between 2 inches and 8 inches	Turfgrass not maintained to a height between 2 inches and 8 inches within 10' of roadway edge.	N/A	N/A	14 days	N/A	N/A	14 days	2
9.2	Noxious weeds	The presence of noxious weeds is less than or equal to 5% of coverage of the total vegetated area after all seeding, planting or sodding operations have been completed, and when the seedlings have grown at least 4 in. tall, exhibit dark green color, and exhibit at least 95% groundcover.	Visual Inspection	Monthly	Noxious weeds managed per Maryland weed control laws	Presence of noxious weeds are greater than 5% of coverage of the total vegetated area.	N/A	N/A	30 days	N/A	N/A	14 days	2
9.3	Invasive weeds	The presence of invasive weeds is less than or equal to 5% of coverage of the total vegetated area after all seeding or sodding operations have been completed, and when the seedlings have grown at least 4 in. tall, exhibit dark green color, and exhibit at least 95% groundcover.	Visual Inspection	Monthly	Invasive weeds controlled per the Maryland Invasive Plants Prevention and Control Law	Presence of invasive weeds are greater than 5% of coverage of the total vegetated area.	N/A	N/A	90 days	N/A	N/A	30 days	2
10.) Earthwork, Embankments, and Cut Slopes													
10.1	Slopes, embankments, fills, cuts, etc.	Earthwork operations, slopes, fills, cuts,	Visual Inspection	Daily	As reported	Critical slope failures of the embankment and cut slopes of the	24 hours	2 days	14 days	N/A	N/A	14 days	2

Table 25-7 D&C Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
		embankments are installed and maintained in accordance with standards, specifications, Plans, etc.				Relevant Infrastructure are not repaired and revegetated that threaten infrastructure or public safety							
10.2	Temporary support of excavation structures	Support of excavation is installed and maintained in accordance with standards, specifications, Plans, etc.	Visual Inspection	Daily	As reported	Incorrect installation or maintenance of support of excavation	2 hours	1 day	4 days	N/A	N/A	14 days	4
11.) Litter and Obstructions/Debris Removal, Sweeping													
11.1	Litter	Keep all areas of the Work free of litter of all types	Visual Inspection	Daily	No more than 15 pieces of litter (4 inches or greater in any dimension) over a distance of 0.1 miles	Any instance where ROW not kept in a neat condition: More than 15 pieces of litter (4 inches or greater in any dimension) over a distance of .1 miles	N/A	N/A	24 hours	N/A	N/A	14 days	1
11.2	Sweeping	Sweep debris from the face of all temporary barriers, shoulders, and other roadway, sidewalk, driveway, or other surfaces	Visual Inspection	Daily	As reported	Failure to sweep debris	N/A	N/A	2 days	N/A	N/A	14 days	1
12.) Lighting													
12.1	Roadway lighting	Maintain functionality of roadway lighting system	Maintain functionality of at least 90% of all roadway luminaires at all times	Weekly	As reported	<90% of all roadway lighting luminaires not functioning (more than one in 10 consecutive lights is not functioning).	N/A	3 days	14 days	N/A	N/A	14 days	1
12.2	Sign lighting	Maintain functionality of sign lighting system	Maintain functionality of at least 80% of all sign luminaires at all times	Weekly	As reported	<80% of all sign luminaires not functioning (more than two in 10 consecutive lights are not functioning).	N/A	3 days	14 days	N/A	N/A	14 days	1

Table 25-7 D&C Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
12.3	Underpass lighting	Maintain functionality of underpass lighting system	Maintain functionality of at least 90% of all underpass luminaires at all times	Weekly	As reported	<90% of all underpass luminaires not functioning at each underpass	N/A	3 days	14 days	N/A	N/A	14 days	1
13.) Guardrails and Safety Barriers													
13.1	Guardrails and guardrail systems	Guardrail is installed and maintained in accordance with standards, specifications, Plans, shop drawings, etc.	Visual Inspection	Weekly	As reported	Guardrails and guardrail systems are not properly installed or maintained	N/A	24 hours	14 days	N/A	24 hours	1 day	4
13.2	Concrete barrier - permanent and temporary	Concrete barrier, permanent and temporary, is installed and maintained in accordance with standards, specifications, Plans, shop drawings, etc.	Visual Inspection	Weekly	As reported	Concrete barrier, permanent and temporary, are not properly installed or maintained	N/A	24 hours	14 days	N/A	24 hours	1 day	3
13.3	Impact attenuators	Impact attenuators are installed and maintained in accordance with standards, specifications, Plans, shop drawings, etc.	Visual Inspection	Daily	As reported	Impact attenuators are not properly installed or maintained	N/A	24 hours	7 days	N/A	24 hours	1 day	5
14.) Traffic Incident Management (See Note 6 following this table)													
14.1	General	Respond to Incidents and Emergencies in accordance with Exhibit 6 Article 24 (Electronic Toll Collection Infrastructure)	Incident response times in minutes recorded on a 12-month rolling basis	Monthly	Inspection records including records or reports from first responders showing the number of failures to meet Incident response times:	a) Any failure to meet Wrecker Incident response time in < 30 minutes	N/A	N/A	10 minutes	N/A	N/A	10 minutes	3
						a) wrecker response time is < 30 minutes							b) Section Developer to respond to

Table 25-7 D&C Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
					Incidents < 30 minutes								
					c) All blocked lanes cleared in < 2 hours after the area has been released by first responders if they are on the scene	c) Any failure to clear a blocked lane in < 2 hours after the area has been released by first responders if they are on the scene	N/A	N/A	2 hours	N/A	N/A	10 minutes	5
14.2	Damage assessment	Evaluate structural damage to structures, and Hazardous Materials to all environmental aspects	Inspections, surveys and analyses required by the Incident	Monthly	Deliver draft and final Incident Report and structural/environmental analysis.	Failure to propose temporary measures or permanent repairs to Defects arising from any Incident	8 hours (onsite investigation)	24 hours (draft report and analysis)	5 days (final report and remediation Plan)	15 minutes	1 hour	1 day	5
14.3	Temporary and permanent remedy Plan	Propose temporary measures or permanent repairs to Defects arising from the Incident	Repair reports	Monthly	Deliver repair Plan.	Failure to propose temporary measures or permanent repairs to Defects arising from any Incident	8 hours (onsite investigation)	24 hours (draft report and analysis)	5 days (final report and remediation Plan)	15 minutes	1 hour	1 day	5
15.) ETTM System and Electrical													
15.1	DMS signs - new and temporary	DMS signs, both new or temporary, are installed, functioning, and maintained according to Standards, specifications, Plans, MDOT system requirements, MDOT operational requirements, etc.	Visual Inspection or as reported by MDOT traffic operations	Daily	As reported	Failure to install, relocate, protect, make operable, maintain function, service, repair, etc. properly	4 hours	16 hours	2 days	N/A	16 hours	14 days	5
15.2	Microwave vehicle detection and other vehicle or traffic collection devices - new and temporary	Microwave vehicle detection and other vehicle or traffic collection systems, both new or temporary, are installed, functioning, and maintained according to standards, specifications, Plans, MDOT system requirements,	Visual Inspection or as reported by MDOT traffic operations	Weekly	As reported	Failure to install, relocate, protect, make operable, maintain function, service, repair, etc. properly	4 hours	8 hours	2 days	N/A	8 hours	14 days	5

Table 25-7 D&C Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
		MDOT operational requirements, etc.											
15.3	Roadside units - new and temporary	Roadside units, both new or temporary, are installed, functioning, and maintained according to standards, specifications, Plans, MDOT system requirements, MDOT operational requirements, etc.	Visual Inspection or as reported by MDOT traffic operations	Weekly	As reported	Failure to install, relocate, protect, make operable, maintain function, service, repair, etc. properly	4 hours	8 hours	2 days	N/A	8 hours	14 days	4
15.4	Cabinets and communication systems - new and temporary	ITS Cabinets, ITS appurtenances, fiber-optic communications, and all other ITS elements, both new or temporary, are installed, functioning, and maintained according to standards, specifications, Plans, MDOT system requirements, MDOT operational requirements, etc.	Visual Inspection or as reported by MDOT traffic operations	Weekly	As reported	Failure to install, relocate, protect, make operable, maintain function, service, repair, etc. properly	4 hours	8 hours	2 days	N/A	8 hours	14 days	4
15.5	CCTV system - new and temporary	CCTV systems and appurtenances, both new or temporary, are installed, functioning, and maintained according to standards,	Visual Inspection or as reported by MDOT traffic operations	Daily	As reported	Failure to install, relocate, protect, make operable, maintain function, service, repair, etc. properly	4 hours	8 hours	2 days	N/A	8 hours	14 days	5

Table 25-7 D&C Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
		specifications, Plans, MDOT system requirements, MDOT operational requirements, etc.											
15.6	ITS electrical system - new and temporary	ITS electrical system components, including feeders, transformers, etc., both new or temporary, are installed, functioning, and maintained according to standards, specifications, Plans, MDOT system requirements, MDOT operational requirements, etc.	Visual Inspection or as reported by MDOT traffic operations	Weekly	As reported	Failure to install, relocate, protect, make operable, maintain function, service, repair, etc. properly	4 hours	8 hours	2 days	N/A	8 hours	14 days	4
15.7	All other ITS systems - new and temporary	Any other ITS system or device, both new or temporary, are installed, functioning, and maintained according to standards, specifications, Plans, MDOT system requirements, MDOT operational requirements, etc.	Visual Inspection or as reported by MDOT traffic operations	Weekly	As reported	Failure to install, relocate, protect, make operable, maintain function, service, repair, etc. properly	4 hours	8 hours	2 days	N/A	8 hours	14 days	4
16.) Graffiti													
16.1	Graffiti	Remove all graffiti and restore surface condition to like new or matching adjoining surfaces	Visual Inspection	Weekly	As reported	Failure to remove graffiti	24 hours	2 days	7 days	N/A	N/A	21 days	1
17.) Stakeholder Communication													
Not Used													
18.) General													
18.1	Work management	Perform all Work management duties	Occurrence	Daily	As reported	Failure to comply with Work management	N/A	N/A	24 hours	N/A	N/A	14 days	4

Table 25-7 D&C Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
		and requirements in accordance with the Section P3 Agreement, standards, specifications, regulatory requirements, the SMP, directives from MDOT, etc.				requirements and commitments							
18.2	Safety management	Perform all safety management duties and requirements in accordance with the Section P3 Agreement, standards, specifications, regulatory requirements, the SaMP, directives from MDOT, etc.	Occurrence	Daily	As reported	Failure to comply with Work safety management requirements and commitments	N/A	N/A	4 hours	N/A	N/A	14 days	5
18.3	Environmental management	Perform all environmental management duties and requirements in accordance with the Section P3 Agreement, standards, specifications, regulatory requirements, the Environmental Compliance Plan, directives from MDOT, etc.	Occurrence	Daily	As reported	Failure to comply with environmental management requirements and commitments	N/A	N/A	24 hours	N/A	N/A	14 days	4
18.4	Design management	Perform all design management duties and requirements in accordance with the Section P3 Agreement, standards, specifications, regulatory requirements, the	Occurrence	Daily	As reported	Failure to comply with design management requirements and commitments	N/A	N/A	24 hours	N/A	N/A	14 days	3

Table 25-7 D&C Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
		SMP, directives from MDOT, etc.											
18.5	Construction management	Perform all construction management duties and requirements in accordance with the Section P3 Agreement, standards, specifications, regulatory requirements, the SMP, directives from MDOT, etc.	Occurrence	Daily	As reported	Failure to comply with construction management requirements and commitments	N/A	N/A	24 hours	N/A	N/A	14 days	3
18.6	Traffic management	Perform all traffic management duties and requirements in accordance with the Section P3 Agreement, standards, specifications, regulatory requirements, the Traffic Management Plan, directives from MDOT, etc.	Occurrence	Daily	As reported	Failure to comply with traffic management requirements and commitments	N/A	N/A	12 hours	N/A	N/A	14 days	4
18.7	DBE business/civil rights management	Perform all DBE and civil rights management duties and requirements in accordance with the Section P3 Agreement, standards, specifications, regulatory requirements, the DBE Participation Plan, directives from MDOT, etc.	Occurrence	Daily	As reported	Failure to comply with DBE /civil rights management requirements and commitments	N/A	N/A	2 days	N/A	N/A	14 days	3
18.8	Public involvement management	Perform all public involvement and communication management duties and requirements in	Occurrence	Daily	As reported	Failure to comply with public involvement and communication management	N/A	N/A	24 hours	N/A	N/A	14 days	4

Table 25-7 D&C Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
		accordance with the Section P3 Agreement, standards, specifications, regulatory requirements, the Public Outreach and Engagement Objectives, directives from MDOT, etc.				requirements and commitments							
18.9	Quality management	Perform all quality management duties and requirements in accordance with the Section P3 Agreement, standards, specifications, regulatory requirements, the QMP (including both design and construction quality), directives from MDOT, etc.	Occurrence	Daily	As reported	Failure to comply with quality management requirements and commitments	N/A	N/A	24 hours	N/A	N/A	14 days	5
18.10	ROW management	Perform all ROW management duties and requirements in accordance with the Section P3 Agreement, standards, specifications, regulatory requirements, the ROW Acquisition Plan, directives from MDOT, etc.	Occurrence	Daily	As reported	Failure to comply with ROW management requirements and commitments	N/A	N/A	24 hours	N/A	N/A	14 days	3
18.11	Utility management	Perform all Utility coordination and relocation management duties and requirements in accordance with the Section P3 Agreement,	Occurrence	Daily	As reported	Failure to comply with Utility management requirements and commitments	N/A	N/A	24 hours	N/A	N/A	14 days	3

Table 25-7 D&C Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
		standards, specifications, regulatory requirements, the Utility Work Plan, directives from MDOT, etc.											
18.12	Document management	Perform all document management duties and requirements in accordance with the Section P3 Agreement, standards, specifications, regulatory requirements, the DDMP, directives from MDOT, etc.	Occurrence	Daily	As reported	Failure to comply with document management requirements and commitments	N/A	N/A	24 hours	N/A	N/A	14 days	3
18.13	Commencement & commissioning management	Perform all commencement and commissioning management duties and requirements of the tolling system in accordance with the Section P3 Agreement, standards, specifications, regulatory requirements, the ETCS Testing Plan, directives from MDOT, etc.	Occurrence	Daily	As reported	Failure to comply with commencement & commissioning management requirements and commitments	N/A	N/A	24 hours	N/A	N/A	7 days	3
18.14	Permit management	Obtain, and perform all permit and regulatory management duties and requirements in accordance with the Section P3 Agreement, standards, specifications, regulatory requirements, the	Occurrence	Daily	As reported	Failure to comply with permit and regulatory management requirements and commitments	N/A	N/A	48 hours	N/A	N/A	2 days	4

Table 25-7 D&C Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
		Governmental Approvals Plan, directives from MDOT, etc.											
18.15	Permit management	Obtain all permits prior to commencement of work	Occurrence	Daily	As reported	Failure to obtain required/necessary permits	N/A	N/A	48 hours	N/A	N/A	2 days	4
18.16	Hazardous Material management	Perform all Hazardous Material management duties and requirements in accordance with the Section P3 Agreement, Standards, specifications, Regulatory requirements, the Hazardous Material Management Plan, directives from MDOT, etc.	Occurrence	Daily	As reported	Failure to comply with Hazardous Material management requirements and commitments	N/A	N/A	8 hours	N/A	N/A	14 days	5
18.17	General	Perform any other Work-related management duty or requirement in accordance with the Section P3 Agreement, Standards, specifications, Regulatory requirements, directives from MDOT, etc.	Occurrence	Daily	As reported	Failure to comply	N/A	N/A	24 hours	N/A	N/A	14 days	3
18.18	Work schedule Submittal	Submit all required schedules during the D&C Period	Submittal	Monthly	Submit all required schedules during the D&C Period	Any failure to submit any schedule during the Operating Period by the time prescribed or in accordance with the Section P3 Agreement.	N/A	N/A	24 hours	N/A	N/A	24 hours	3
18.19	General - compliance with Plans	Comply with all Plans as prescribed and in accordance with the Section P3 Agreement	Submittal	Monthly	Comply with any Plan by the time prescribed and in accordance with	Any failure to comply with any Plan by the time prescribed and in accordance with the Section P3 Agreement	24 hours	24 hours	7 days	24 hours	24 hours	7 days	4

Table 25-7 D&C Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
					the Section P3 Agreement	where such failure is not otherwise expressly specified in a different Noncompliance Event in this table.							
18.20	General – Submittal of Section Developer prepared Plans	Submit or update any Section Developer prepared plan as prescribed and in accordance with the Section P3 Agreement	Submittal	Monthly	Submit or update any Section Developer prepared Plan by the time prescribed or in accordance with the Section P3 Agreement.	Any failure to submit or update any Section Developer prepared Plan by the time prescribed or in accordance with the Section P3 Agreement.	N/A	N/A	7 days	N/A	N/A	1 day	3
18.21	Meetings	Schedule and attend all required meetings	Meeting attendance record	Monthly	Schedule or attend any meeting by the time prescribed in the Section P3 Agreement	Any failure to schedule or attend any meeting by the time prescribed in the Section P3 Agreement.	N/A	N/A	24 hours	N/A	N/A	24 hours	2
18.22	General	Meet all required work zone safety, management, MOT, and detour routes during maintenance operating hours	<u>Exhibit 6 Article 22 (Maintenance of Traffic)</u>	Monthly	Visual Inspection	The Section Developer fails to meet requirements relative to work zone safety, management, MOT, and detour routes for regular maintenance during operations.	N/A	4 hours	15 days	N/A	4 hours	1 day	2
18.23	Utilities	Mark all subsurface utilities maintained by Section Developer	Timeframe established by Miss Utility	Monthly	Mark all subsurface utilities maintained by Section Developer as required by Miss Utility	< 100% of Section Developer utilities marked within window established	N/A	N/A	48 Hours	N/A	N/A	24 hours	2
18.24	NPDES Permit	Comply with NPDES Permit	Permit	As needed	NPDES notice of coverage is submitted and complied with	Any instance where earth disturbance occurs and an NPDES notice of coverage is not submitted or complied with	N/A	N/A	24 hours	N/A	N/A	1 day	5
18.25	Submittals	Provide Submittals as specified in the Section P3 Agreement	Submittal	Monthly	Provide any Submittal not otherwise expressly specified in this	Any failure to provide any Submittal not otherwise expressly specified in this table by the time	N/A	N/A	3 days	N/A	N/A	1 day	3

Table 25-7 D&C Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
					table by the time prescribed or in accordance with the Section P3 Agreement	prescribed or in accordance with the Section P3 Agreement.							
18.26	Audits and reviews performed by MDOT, MDTA or other Governmental Entity	Comply with audit findings or address review comments	Audit, review, Section P3 Agreement, Third Party MOU's or a combination thereof	When performed	Audit or review	Failure to comply with audit or review findings or provide information to complete audit or review	N/A	N/A	10 days	N/A	N/A	10 days	4
18.27	Payrolls	Submit correct payrolls to MDOT	Monthly report	Monthly	Submit missing or corrected payrolls within 10 days of Notice by MDOT	Any failure to submit missing or corrected payrolls within 10 days of Notice by MDOT	N/A	N/A	1 day	N/A	N/A	1 day	2
18.28	Insurance	Submit evidence of insurance coverage	Submittal	Monthly	Submit evidence of insurance coverage by the time prescribed or in accordance with the Section P3 Agreement	Any failure to submit evidence of insurance coverage by the time prescribed or in accordance with the Section P3 Agreement	N/A	N/A	3 days	N/A	N/A	1 day	3
18.29	User response	Timely and effective response to User inquiries and complaints	Section Developer to inform MDOT	Monthly	a.) Contact the User within 48 hours following being notified of or receiving initial User inquiry b.) all Work resulting from User requests is scheduled within 48 hours of User contact/ notification c.) follow-up contact with the User within 72 hours of initial inquiry/ notification d.) all User concerns/requests are resolved to MDOT's	Section Developer fails to perform any of the actions detailed in the "Performance and Measurement Record" column of this ID#	2 days	N/A	1 week	2 days	N/A	1 week	3

Table 25-7 D&C Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
					satisfaction within 2 weeks of the initial inquiry/ notification								
18.30	Courtesy Patrol	Courtesy Patrol to arrive on-site	Visual Inspection	As reported	Either respond to a stranded motorist on the shoulders or travel lanes.	Failure to respond to a stranded motorist on the shoulders or travel lanes.	N/A	N/A	30 minutes	N/A	N/A	30 minutes	3
18.31	Courtesy Patrol	Courtesy Patrol operator must not be under the influence of alcohol or any controlled substance or drug, except where prescribed by a physician while on duty	Visual Inspection/ User reported	As reported	No Courtesy Patrol operator found to be or accused of being under the influence of alcohol or any controlled substance or drug.	Courtesy Patrol operator found to be or accused of being under the influence of alcohol or any controlled substance or drug.	N/A	N/A	8 Hours	N/A	N/A	Immediately	5
18.32	Courtesy Patrol	Courtesy Patrol operator must not accept payment for services	Visual Inspection/ User reported	As reported	No Courtesy Patrol operator found to be or accused of accepting payment for services	Courtesy Patrol operator found to be or accused of accepting payment for services	N/A	N/A	8 Hours	N/A	N/A	Immediately	5
18.33	Courtesy Patrol	Courtesy Patrol operator must not sleep while on duty	Visual Inspection/ User reported	As reported	No Courtesy Patrol operator found to be or accused of sleeping while on duty	Courtesy Patrol operator found to be or accused of sleeping while on duty	N/A	N/A	8 Hours	N/A	N/A	Immediately	4
18.34	Courtesy Patrol	Customer satisfaction survey for Courtesy Patrol service	Survey results	Quarterly	Maintain Customer Satisfaction Survey on a quarterly basis at least 80% of respondents satisfied with service.	Less than 80% of the respondents are satisfied with service	N/A	N/A	1 day	N/A	N/A	3 months	3
18.35	Staffing	Comply with requirements for Key Personnel and any personnel specified in Exhibit 6 or the Section P3 Agreement	Personnel qualifications submitted to MDOT for acceptance	As needed	Provide qualifications and submit for MDOT acceptance as required, for any personnel and replacement	a.) Failure to submit qualifications for personnel specified in Exhibit 6 or the Section P3 Agreement; b.) Failure to submit	N/A	N/A	30 days	N/A	N/A	14 days	3

Table 25-7 D&C Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
					personnel specified in any portion of <u>Exhibit 6 (Predevelopment Work Requirements)</u>	qualifications for replacement personnel as specified in Exhibit 6 or the Section P3 Agreement; c.) failure to receive MDOT acceptance for personnel prior to that individual commencing work on the Phase or Section							
19.) Winter Maintenance													
19.1	Winter maintenance	As appropriate under prevailing weather conditions, provide a paved surface over all lanes and shoulders that is generally bare of ice and snow	Visual Inspection, snow and ice related Incident Reports, reports, and complaints from MDOT, Users, and others.	As reported	Continuously clear the paved area over its entire width during and after the weather event.	Section Developer fails to maintain all driving surfaces and shoulders clear of snow and ice	N/A	N/A	2 hours	N/A	N/A	2 hours	3
19.2	Continuous plowing and deicing	Continuous plowing and deicing entire roadway	Circuit time measurement	As reported	Continuous plowing and deicing application to achieve a maximum circuit time of 2 hours	Failure to achieve a maximum circuit time of 2 hours during plowing and deicing application	2 hours	N/A	1 day	2 hours	N/A	1 day	3
19.3	Snow accumulation	Remove snow accumulation adjacent to barrier walls during	Visual Inspection	As reported	Snow accumulation adjacent to barrier walls removed concurrently with Mainline pavement snow removal	Failure to remove snow accumulation adjacent to barrier walls concurrently with Mainline pavement snow removal	2 hours	N/A	1 day	2 hours	N/A	1 day	3

Table 25-7 D&C Period Performance

ID #	Element	Performance Requirement	Inspection and Measurement Method	Inspection Frequency	Performance Measurement Record	Description of Noncompliance Event	Mitigation	Temporary Repair	Permanent Repair	Recurrence Intervals			Applicable Non-compliance Points
										Mitigation	Temporary Repair	Permanent Repair	
19.4	Lanes and ramps	Achieve bare pavement after end of a winter event	Visual Inspection	As reported	Achieve bare pavement after end of the winter event	Failure to achieve bare pavement after end of the winter event	2 hours	N/A	1 day	2 hours	N/A	1 day	3
19.5	Shoulders/ medians/ crossovers	Plow shoulders/medians/ crossovers within the timeframe established after the end of a winter event	Visual Inspection	As reported	Plowed within 8 hours of the end of the winter event, up to 6-inch total accumulation winter event	Failure to plow 8 hours of the end of the winter event	8 hours	N/A	1 day	2 hours	N/A	1 day	3
			Visual Inspection	As reported	Plowed within 12 hours of the end of the winter event, over 6-inch and up to 10-inch total accumulation winter event	Failure to plow 12 hours of the end of the winter event	12 hours	N/A	1 day	2 hours	N/A	1 day	3
			Visual Inspection	As reported	Plowed within 16 hours of the end of the winter event over 10-inch total accumulation winter event	Failure to plow 16 hours of the end of the winter event	16 hours	N/A	1 day	2 hours	N/A	1 day	3
19.6	Hazards	Address hazards and slippery conditions during winter events	Visual Inspection or upon notification	As reported	Address any hazard immediately upon detection or being made aware	Failure to Address any hazard immediately upon detection or being made aware	1 hour	N/A	1 day	1 hour	N/A	1 day	4
					Address isolated slippery conditions 100% of the time	Failure to address isolated slippery conditions 100% of the time	2 hours	N/A	1 day	2 hours	N/A	1 day	4
19.7	Salt storage	Store salt in covered buildings	Visual Inspection	As reported	Instances of uncovered salt storage	Failure to store salt in covered buildings 100% of the time	1 day	N/A	3 days	1 day	N/A	N/A	2

Notes to Accompany Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance):

- Where permit requirement and this table conflict or overlap, the more stringent criteria will apply.

2. See also the Environmental (ID #3) for related items and additional information.
3. Winter damage to SRPMs must be addressed by April 1 following the winter season.
4. For fences attached to structures or structural portions of sound barriers, see ID #4.
5. Refer also to Maryland pesticide and fertilizer laws.
6. Requirements are exclusive of times when law enforcement/first responders control the site. Section Developer shall coordinate with law enforcement/first responders when they control the site.
7. Noncompliance Event ID#15.5 (Trip processing) shall not apply to Trips that are resubmitted following resolution of any Unacceptable Customer Service Event pursuant to Section 1.7 of Appendix 4 to the Tolling Services Agreement Term Sheet provided that they are submitted to MDTA within the time period required under that Section.
8. Upon the occurrence of a Noncompliance Event as described in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) or Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance), the Section Developer is required to achieve the Mitigation, Temporary Repair or Permanent Repair of that Noncompliance as soon as practicable within the respective timeframe required for Mitigation, Temporary Repair or Permanent Repair of that Noncompliance Event.
9. The timeframe for Mitigation, Temporary Repair or Permanent Repair commences on the Noncompliance Event Start Time and ends upon the expiration of the relevant period listed under Mitigation, Temporary Repair or Permanent Repair for that Noncompliance Event's Mitigation, Temporary Repair or Permanent Repair in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance). These timeframes for any Noncompliance Event shall run concurrently. If the timeframe is listed under Mitigation, Temporary Repair or Permanent Repair as N/A in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) or Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance) the Section Developer will have no obligation for the Mitigation, Temporary Repair or Permanent Repair of that Noncompliance Event (as applicable).
10. The Section Developer will be assessed the applicable Noncompliance Points for the relevant Noncompliance Event if the Section Developer has not achieved the Mitigation, Temporary Repair or Permanent Repair of the Noncompliance Event upon the expiration of the timeframe listed for the Mitigation, Temporary Repair or Permanent Repair that Noncompliance Event in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) or Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance).
11. Following the expiration of the timeframe required for the Mitigation, Temporary Repair or Permanent Repair of a Noncompliance Event, if the Section Developer then fails to achieve Mitigation, Temporary Repair or Permanent Repair of that Noncompliance Event within the relevant Recurrence Interval, the Section Developer will be assessed the applicable Noncompliance Points for that Noncompliance Event. If a Noncompliance Event remains unremedied beyond the Recurrence Interval period for Mitigation, Temporary Repair or Permanent Repair, a new Recurrence Interval will commence upon the expiration of the previous Recurrence Interval.

ARTICLE 26. Handback

26.1 Scope

Turn the Section over to MDOT at the end of the term of the Section P3 Agreement in accordance with the requirements of the Section P3 Agreement. Identify areas that may need major or minor Renewal Work to meet these requirements and include in the Handback Work Plan. Identify these items of Work and properly Plan for this Work to be accomplished in accordance with this [Exhibit 6 Article 26 \(Handback\)](#).

26.2 Handback Work Plan

Prepare a Handback Work Plan that contains the methodologies and activities that will be undertaken or employed to ensure that the Handback Requirements in the Section P3 Agreement are achieved at the end of the term of the Section P3 Agreement. Include a Residual Life Methodology in the Handback Work Plan. Submit the preliminary Handback Work Plan six (6) months prior to Substantial Completion to MDOT for review and then annually thereafter. Submit a final Handback Work Plan subject to review and acceptance by MDOT at least 60 months before the anticipated expiration of the term of the Section P3 Agreement or earlier termination of the Section P3 Agreement. The Handback Work Plan shall set out the proposed processes for:

- assessment of the condition, performance and Residual Life of Elements;
- Renewal Work through maintenance, repair, reconstruction, rehabilitation, restoration, rehabilitation or replacement of Elements such that the Elements comply with the acceptance criteria that measure the condition, performance, and specified life of the respective Elements remaining at the end of the term of the Section P3 Agreement;
- Plan for the transition of O&M responsibilities to MDOT (including ITS, ETCS and all other systems, technology, buildings, and infrastructure related to the operations and maintenance of the Priced Managed Lanes) and acceptance of the Elements and O&M responsibilities upon satisfaction of the acceptance criteria; and
- MDOT staff training on all O&M manuals, systems, and procedures for the continued O&M by MDOT after the end of the term of the Section P3 Agreement.

Coordinate all aspects of the development and execution of the Handback Work Plan with MDOT, including conducting maintenance, independent or joint Inspections of the Elements and performance of the acceptance tests that measure the condition, performance, and Residual Life of the respective Elements remaining at the end of the term of the Section P3 Agreement.

26.2.1 Assessment of Condition, Performance, and Residual Life

Detail in the Handback Work Plan the methods and tests which will be used during condition and performance assessments, the acceptance criteria, acceptance measures or limits that must be satisfied, and the conditions and data that will be used to calculate Residual Life of all Elements included in the Relevant Work.

26.2.1.1 Residual Life Methodology

Prepare and submit, subject to review and acceptance by MDOT, a Residual Life Methodology, in conjunction with the Handback Work Plan.

The Residual Life Methodology requirements identified in these Technical Provisions are minimum requirements. Include the evaluation and calculation criteria to be adopted for the calculation of the Residual Life at Handback of all Relevant Infrastructure. Include the proposed scope of any Residual Life testing, together with a list of all independent Residual Life testing organizations proposed. Submit the names of the organizations, subject to review and acceptance by MDOT, along with third party quality certifications, and certifications that the organizations are financially independent of the Section Developer and not an Affiliate.

MDOT's acceptance of the Residual Life Methodology, including the scope and schedule of Inspections, is required before commencement of Handback Condition Inspections.

26.2.1.2 Tests and Inspections

In the Handback Work Plan, include the scope, schedule, detailed tests and Inspection procedures, processes and evaluations required, acceptance criteria, and acceptance measures to be used to verify and demonstrate to MDOT that all facilities, equipment, and systems function as specified; that they comply with applicable codes and standards set forth in the Section P3 Agreement; and that they meet Residual Life requirements specified in the Exhibit 6 Article 26 (Handback) Table 26-2 (Residual Life). This includes test verification and documentation of material grades and quality as specified in Exhibit 6 Article 26 (Handback) Table 26-2 (Residual Life).

Include all test and Inspection procedures in the Handback Work Plan, including industry and, or other information used to justify and support the testing, Inspection, and Asset evaluation process, including any updates to standards that occur during the term of the Section P3 Agreement.

Use the list of Elements to be handed back, developed for the Handback Work Plan, to determine which Inspections and tests are required. Inspections and testing are to be performed with appropriate coverage such that the results are representative of the Relevant Infrastructure. Prepare a schedule of Inspection and Testing and include in the Handback Work Plan.

26.2.2 Handback Work Plan Approach

Detail the approach to performing O&M Work, repair, reconstruction, rehabilitation, overhaul, and replacement of the Elements so that they meet operational, performance, and Residual Life requirements in the Handback Work Plan.

Develop the Handback Work Plan based on:

- assessment of the performance, and Residual Life of Relevant Infrastructure; and
- assumptions for operating and maintaining the Assets in accordance with the Section P3 Agreement for the remainder of the term of the Section P3 Agreement to include:
 - a proposed schedule for implementation of O&M, repair, reconstruction, rehabilitation, overhaul, or replacement of Relevant Infrastructure Elements;
 - details of the cost of executing Handback Work;

- any areas which are under remedial Work; and
- retaining all remediation responsibility (and liability) until such time that the Section Developer submits to MDOT a full description of remedial Work and results of such Work and receives from MDOT acceptable documentation indicating that the Section Developer has complied with all directives and fulfilled and completed its remediation obligations.

26.3 Execution of Handback Work Plan

After receiving acceptance of the Handback Work Plan, execute the Handback Work in accordance with the Handback Work Plan and the Section P3 Agreement. All references to Work in other portions of the Section P3 Agreement shall also apply to the Handback Work.

Perform all Inspections and Work necessary to meet or exceed the Residual Life requirements by the time of Handback of the Relevant Infrastructure to MDOT.

Perform all Handback Condition Inspections and prepare and submit Handback Condition Reports to facilitate the calculation of Handback Work Costs.

At the point of Handback, certify that all Relevant Infrastructure complies with the Residual Life requirements defined in the Section P3 Agreement.

26.4 Handback Conditions Report

Produce and deliver to MDOT a Handback Condition Report, at intervals detailed below, that summarize the Inspections and the Handback Work requirements in accordance with the Handback Work Plan. Update and amend the Handback Work Plan to include Work identified in the Handback Condition Reports that has not been previously identified.

Provide MDOT and MDTA the opportunity to witness any of the Inspections or tests. Provide a minimum of 10 Business Days' notice to MDOT prior to the performance of any such Inspections or tests. Deliver to MDOT, within 30 days after it is created, the output data arising from any testing and any interpretation thereof made by the testers as part of the Handback Condition Report.

Provide preliminary, prefinal, and final Handback Condition Reports as described in the following sections.

26.4.1 Preliminary Handback Condition Report

Not less than 42 months before the end of the term of the Section P3 Agreement, perform a Preliminary Handback Condition Inspection for the Relevant Infrastructure.

Within 30 days following performance of this Inspection, submit a Preliminary Handback Condition Report that presents the findings of the Inspection, including Residual Life test results, the report of the independent testing organization(s), the Section Developer's Residual Life calculations, and the Section Developer's calculation of Residual Life at Handback for all Elements and the calculation of the Handback Work Cost.

26.4.2 Prefinal Handback Condition Report

Perform a prefinal Handback Condition Inspection of Relevant Infrastructure; produce and submit an updated Handback Condition Report, entitled prefinal Handback Condition Report, on the first anniversary of the date of the preliminary Handback Condition Report.

26.4.3 Final Handback Condition Report

Perform a final Handback Condition Inspection of Relevant Infrastructure, whether or not the Section Developer has undertaken Renewal Work for a particular Element in the period since the preliminary and prefinal Condition Inspection.

Within 45 days following the end of the term of the Section P3 Agreement, submit a final Handback Condition Report subject to review and acceptance by MDOT that summarizes the findings of the Inspection, including Residual Life test results, the report of the independent testing organization(s), the Section Developer's Residual Life calculations, and the Section Developer's calculation of Residual Life at Handback for all Elements. Provide calculations and condition distress surveys that address both pavement functional and structural requirements. Document in the final Handback Condition Report any Handback Work remaining to be performed and its associated Handback Work Costs.

26.5 Residual Life Requirements

The Residual Life for individual Elements that are designed and constructed by the Section Developer is described in the following sections and as shown in Exhibit 6 Article 26 (Handback) Table 26-2 (Residual Life).

26.5.1 Design Life

Where a Design Life as specified in these Technical Provisions exceeds the term, the Residual Life at Handback shall be calculated as the Design Life minus the years of the term of the Section P3 Agreement. In no case shall the Residual Life be less than 3 years at the end of the term of the Section P3 Agreement unless specified otherwise in the Section P3 Agreement.

Where the Design Life of an Element, as specified in these Technical Provisions, of the Section P3 Agreement has been extended through planned or unplanned Renewal Work, the Residual Life shall be calculated as the Design Life minus the years remaining in the term of the Section P3 Agreement once the renewal work has been completed. In no case shall the Residual Life be less than 3 years at the end of the term of the Section P3 Agreement unless specified otherwise in the Section P3 Agreement.

The Design Life created at the time of an Element's last reconstruction, rehabilitation, restoration, renewal, or replacement before the end of the term of the Section P3 Agreement shall be equal to or greater than the period set forth in Exhibit 6 Article 26 (Handback) Table 26-2 (Residual Life). The Handback Condition Report shall estimate the cost of the next Renewal Work (after the end of the term of the Section P3 Agreement) on the assumption that such Renewal Work will be performed to create a new Useful Life of the same duration.

26.5.2 Residual Life of Pavement

26.5.2.1 Pavement Surface Condition

The pavement surface, including lanes and shoulders, shall be free of any evidence of structural weakness, pitting, potholes, rutting, raveling, segregation, scaling, delamination, localized roughness, and all other deficiencies. All cracks and joints shall be sealed with a sealant acceptable to MDOT. The pavement surface shall be free and clear of dirt, sand, and other debris.

26.5.2.2 Pavement Structural Requirements

At the time MDOT assumes responsibility for the roadway, the structural capacity of each and every lane of the roadway shall be such that a rehabilitation design for 10 years of traffic loading starting as of the date MDOT assumes responsibility for the roadway will require no more than a two-inch asphalt concrete overlay or equivalent treatment for the pavement type. The 10-year traffic loading will be determined based on traffic estimates at the time, but in no instance, shall it be less than 10 million equivalent single axle loads for any lane of any section of roadway.

Pavement strength testing to determine the structural capacity and the rehabilitation needed for the requirement above will be completed by the Section Developer. The Section Developer shall be responsible for providing all traffic accommodation to allow pavement strength testing or other testing (either destructive or non-destructive), as required.

26.6 Deliverables

Table 26-1 - Handback Submittals

DELIVERABLE/SUBMITTAL	REQUIRED TIMING
Handback Work Plan	6 months prior to substantial completion; then annually thereafter
Final Handback Work Plan	60 months before the anticipated expiration of the term of the Section P3 Agreement or earlier termination of the Section P3 Agreement
Residual Life methodology	Before commencement of Handback Condition Inspections
Preliminary Handback Condition Reports	Within 30 days following the preliminary Handback Condition Inspection
Prefinal Handback Condition Report	First anniversary of the date of the Preliminary Handback Condition Report
Final Handback Condition Report	Within 45 days following the end of the term of the Section P3 Agreement

Table 26-2 Residual Life

ASSET CATEGORY	DESCRIPTION	DESIGN LIFE (YEARS)	RESIDUAL LIFE (YEARS)/PERFORMANCE REQUIREMENT	HANDBACK EVALUATION TASKS	EVALUATION CRITERIA AT HANDBACK
Traffic	Traffic signals	25	10	Performance testing and Inspection	Must meet O&M Performance Requirements
Traffic	Overhead sign structures	30	10	Inspection	Must meet O&M Performance Requirements
Traffic	Ground mount sign supports	10	10	Inspection	Must meet O&M Performance Requirements
Traffic	Sign panels	20	10	Inspection	Must meet O&M Performance Requirements
Traffic	Roadway lighting (luminaires, lamps, Emergency lighting, photometers, light poles, mountings, high-mast poles, high-mast lowering device)	30	10	Performance testing and Inspection	Must meet O&M Performance Requirements
Traffic	Electric supply (including roadside systems)	25	10	Performance testing and Inspection	Must meet O&M Performance Requirements
Traffic	Data communications	25	10	Performance testing and Inspection	Must meet O&M Performance Requirements
Traffic	DMS	15	5	Performance testing and Inspection	Must meet O&M Performance Requirements

Table 26-2 Residual Life

ASSET CATEGORY	DESCRIPTION	DESIGN LIFE (YEARS)	RESIDUAL LIFE (YEARS)/PERFORMANCE REQUIREMENT	HANDBACK EVALUATION TASKS	EVALUATION CRITERIA AT HANDBACK
Traffic	CCTV Systems	65	15	Performance testing and Inspection	Manufacturer's recommended life, equipment Maintenance Records, equipment operating history
Traffic	Highway advisory radio systems	3	3	Performance testing and Inspection	Manufacturer's recommended life, equipment Maintenance Records, equipment operating history
Traffic	Two-way radio systems for Emergency personnel	3	3	Performance testing and Inspection	Manufacturer's recommended life, equipment Maintenance Records, equipment operating history
Traffic	ITS	15	10	Performance testing and Inspection	MD MUTCD, Manufacturer's recommended life, equipment Maintenance Records, equipment operating history
Traffic	Pavement marking/striping	5	5	Performance testing and Inspection	Must meet O&M Performance Requirements
Traffic	Guardrails and safety barriers	Concrete barrier: 40 Traffic barrier W-beam: 20	Concrete barrier: 30 Traffic barrier W-beam: 10	Inspection	Must meet O&M Performance Requirements

Table 26-2 Residual Life

ASSET CATEGORY	DESCRIPTION	DESIGN LIFE (YEARS)	RESIDUAL LIFE (YEARS)/PERFORMANCE REQUIREMENT	HANDBACK EVALUATION TASKS	EVALUATION CRITERIA AT HANDBACK
Tolling	ETCS	10	4	Review and test system functionalities, including roadside toll collection equipment, Priced Managed Lane Toll Transactions transferred to MDTA back-office system and speed monitoring equipment in the managed lanes.	Verify that all performance requirements are met by the tolling system.
Pavement	New PMLs (new pavement/reconstruction)	N/A If they meet the annual condition	25	Inspection	Must meet O&M Performance Requirements
Pavement	Existing Mainline used as PMLs	N/A If they meet the annual condition	15	Inspection	Must meet O&M Performance Requirements
Storm water management facilities	Aboveground/surface facilities	50	25	Performance testing and Inspection	Testing analysis and Inspection Report
Storm water management facilities	Underground structural facilities	100	50	Performance testing and Inspection	Must meet a rating of 5 or greater according to the MDTA's Facilities Inspection Manual
Storm water management facilities	Facilities having mechanical infrastructure (pumps)	50	25	Performance testing and Inspection	Testing analysis and Inspection Report

Table 26-2 Residual Life

ASSET CATEGORY	DESCRIPTION	DESIGN LIFE (YEARS)	RESIDUAL LIFE (YEARS)/PERFORMANCE REQUIREMENT	HANDBACK EVALUATION TASKS	EVALUATION CRITERIA AT HANDBACK
Storm water management facilities	Dams	50	25	Performance testing and Inspection	Testing analysis and Inspection Report
Storm water management	Storm drains	50	25	Performance testing and Inspection	Testing analysis and Inspection Report
Storm water management	Storm drains under roadways	100	25	Performance testing and Inspection	Testing analysis and Inspection Report
Storm water management	Pipes, manholes, inlets, etc.	50	25	Performance testing and Inspection	Testing analysis and Inspection Report
Storm water management	Pipes, manholes, inlets, etc. under roadways	100	50	Performance testing and Inspection	Testing analysis and Inspection Report
Structures	Bridges, Retaining Walls, other walls/fences and culverts	75	25	Performance testing and Inspection	Must meet a rating of 5 or greater according to the MDTA's Facilities Inspection Manual
Structures	American Legion Bridge	100	50	Performance testing and Inspection	Must meet a rating of 5 or greater according to the MDTA's Facilities Inspection Manual
Structures	Deck joints	25	10	Performance testing and Inspection	Must meet a rating of 5 or greater according to the MDTA's Facilities Inspection Manual

Table 26-2 Residual Life

ASSET CATEGORY	DESCRIPTION	DESIGN LIFE (YEARS)	RESIDUAL LIFE (YEARS)/PERFORMANCE REQUIREMENT	HANDBACK EVALUATION TASKS	EVALUATION CRITERIA AT HANDBACK
Structures	Supports for signs, ITS equipment, cameras, signals, tolling gantries, high-mast lighting, and low-level lighting	30	10	Performance testing and Inspection	Must meet a rating of 5 or greater according to the MDTA's Facilities Inspection Manual
Buildings	Buildings for O&M activities	50	10	Performance testing and Inspection	Testing and Inspection reports
Additional Non-Roadway Systems					
Mechanical Systems	Ventilation fans, ancillary sensory and instrumentation	20	10	Test airflow induced, vibration testing, and Inspection	Design airflow requirements, manufacturer's recommended life, average time between failures, equipment Maintenance Records.
Mechanical systems	HVAC system	20	10	Performance testing and Inspection	Manufacturer's recommended life, equipment Maintenance Records, equipment operating history
Mechanical systems	Diffusers & registers	Heavy gauge, coated: 30 perforated or light gauge: 15	10	Performance testing and Inspection	Manufacturer's recommended life, equipment Maintenance Records.

Table 26-2 Residual Life

ASSET CATEGORY	DESCRIPTION	DESIGN LIFE (YEARS)	RESIDUAL LIFE (YEARS)/PERFORMANCE REQUIREMENT	HANDBACK EVALUATION TASKS	EVALUATION CRITERIA AT HANDBACK
Mechanical systems (not otherwise listed)	Systems and components not otherwise listed	10	10	Performance testing, functional testing, Inspection	Manufacturer's recommended life, equipment Maintenance Records, equipment operating history
Piping systems	Pumps, piping and controls	3	Controls: 3 pumps and piping: 3	Performance testing, functional testing, Inspection	Manufacturer's recommended life, equipment Maintenance Records, equipment operating history
Fire protection systems	Standpipe systems and fire pumps	5	5	Performance testing, Inspection	NFPA requirements, manufacturer's recommended life, equipment and Maintenance Records, equipment operating history
Fire protection systems	Fire extinguishers	5	3	Inspections	NFPA requirements, manufacturer's recommended life, equipment Maintenance Records, equipment operating history
Fire protection systems	Sprinkler systems and fire pumps	5	3	Performance testing, Inspection	NFPA requirements, manufacturer's recommended life, equipment Maintenance Records, equipment operating history

Table 26-2 Residual Life

ASSET CATEGORY	DESCRIPTION	DESIGN LIFE (YEARS)	RESIDUAL LIFE (YEARS)/PERFORMANCE REQUIREMENT	HANDBACK EVALUATION TASKS	EVALUATION CRITERIA AT HANDBACK
Fire protection systems	Clean agent systems	5	4	Performance testing, Inspection	NFPA requirements, manufacturer's recommended life, equipment Maintenance Records, equipment operating history
Electrical distribution system	Motor control system	5	5	Performance testing and Inspection	Manufacturer's recommended life, equipment Maintenance Records, average time between failures, equipment operating history
Electrical distribution system	Transformers	5	5	Performance testing and Inspection	Manufacturer's recommended life, equipment Maintenance Records, average time between failures, equipment operating history
Electrical distribution system	Switchgear	5	5	Performance testing and Inspection	Manufacturer's recommended life, equipment Maintenance Records, average time between failures, equipment operating history

Table 26-2 Residual Life

ASSET CATEGORY	DESCRIPTION	DESIGN LIFE (YEARS)	RESIDUAL LIFE (YEARS)/PERFORMANCE REQUIREMENT	HANDBACK EVALUATION TASKS	EVALUATION CRITERIA AT HANDBACK
Electrical distribution system	Automatic transfer switch	5	5	Performance testing and Inspection	Manufacturer's recommended life, equipment Maintenance Records, average time between failures, equipment operating history
Electrical distribution system	High voltage cable	5	5	Inspection	Manufacturer's recommended life, equipment Maintenance Records, average time between failures, equipment operating history
Electrical distribution system	Low voltage cable	5	5	Inspection	Manufacturer's recommended life, equipment Maintenance Records, average time between failures, equipment operating history
Emergency generator set	Uninterruptable power supply, batteries, etc.	5	4	Performance testing, Inspection	Manufacturer's recommended life, equipment Maintenance Records, average time between failures, equipment operating history

Table 26-2 Residual Life

ASSET CATEGORY	DESCRIPTION	DESIGN LIFE (YEARS)	RESIDUAL LIFE (YEARS)/PERFORMANCE REQUIREMENT	HANDBACK EVALUATION TASKS	EVALUATION CRITERIA AT HANDBACK
Landscaping	Turfgrass/turfgrass sod establishment	To meet MDE stabilization requirements	See Note 1	Visual Inspection	COMAR, manufacturer's recommended life
Landscaping	Meadow establishment	To meet MDE stabilization requirements	See Note 1	Visual Inspection	COMAR, manufacturer's recommended life
Landscaping	Shrub seeding establishment	To meet MDE Stabilization Requirements	See Note 1	Visual Inspection	COMAR, manufacturer's recommended life
Landscaping	Trees	30	10	Visual Inspection	COMAR, manufacturer's recommended life
Landscaping	Shrubs	20	10	Visual Inspection	COMAR, manufacturer's recommended life
Landscaping	Perennials	10	10	Visual Inspection	COMAR, manufacturer's recommended life
Landscaping	Annuals and bulbs	3	3	Visual Inspection	COMAR, manufacturer's recommended life
Siding	Wood, metal, vinyl	30	20	Visual Inspection	manufacturer's recommended life
Commercial Fixtures	Water closets, urinals, sinks	30	20	Functional testing and Inspection	Manufacturer's recommended life

Note to Accompany Exhibit 6 Article 26 (Handback) Table 26-2 (Residual Life):

1. Need to provide a minimum of 95% coverage and plant establishment.

ARTICLE 27. Data Management for MDOT Systems

27.1 Scope

MDOT maintains Asset data in numerous information management systems, referred to herein as "MDOT Systems." MDOT uses the data in these systems for managing its statewide transportation program, which includes planning, design, construction, O&M, and Asset performance evaluation functions. MDOT requires that Asset data tracked or processed by MDOT Systems be delivered in the format, or with the method specified by the responsible MDOT office. The format or method needed for data delivery depends on the workflow or system used to track or process the data, or on the purpose the data serves.

The Work requires the Phase Developer to collect, maintain, track, provide, deliver, etc. certain data related to Assets or Elements of the Work.

The data is tracked, typically, in either electronic data management systems, such as databases, GIS, or in document management systems. The data is processed, typically, in off-the-shelf or custom software applications for reporting or other purposes.

The Phase Developer is advised the list of MDOT Systems contained in this [Exhibit 6 Article 27 \(Data Management for MDOT Systems\)](#) is dynamic in nature and therefore, should be expected to change during the term of the Section P3 Agreement.

27.1.1 MDOT Offices

The following MDOT offices are associated with the MDOT Systems:

- MDOT CHART;
- MDOT SHA District 3 ("MDOT SHA D3");
- MDOT SHA OED;
- MDOT SHA OHD;
- MDOT SHA Office of Information Technology ("MDOT SHA OIT");
- MDOT SHA Office of Materials and Technology ("MDOT SHA OMT");
- MDOT SHA OOC;
- MDOT SHA Office of Maintenance ("MDOT SHA OOM");
- MDOT SHA Office of Planning and Preliminary Engineering ("MDOT SHA OPPE");
- MDOT SHA OOS;
- MDOT SHA OOTS; and
- MDOT SHA ORE.

27.2 Data Deliverable Categories

The data delivery method for MDOT Systems is organized into data Deliverable categories described in the sub-sections below. Each data Deliverable category is represented by an icon appearing next to its description. The icon relevant to a specific MDOT System appears in the

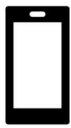
requirement column of the tabulation of MDOT Systems in this [Exhibit 6 Article 27 \(Data Management for MDOT Systems\)](#).

27.2.1 Phase Developer Staff



For data required to be collected and processed by MDOT or its authorized designee required by federal or other Governmental Entities (such as the real estate acquisition process) provide qualified staff to perform under the direct supervision and oversight of MDOT. MDOT will collect and process such data and provide training for such staff.

27.2.2 Update or Enter Data



For data required to reside on MDOT Systems in support of internal processes (such as Asset inventory, condition, or performance reporting), such data shall be entered into an MDOT-provided software or similar tool. Collect, supervise, and oversee data and hardware, such as computer or mobile device used to collect the data. MDOT will provide the training in the use of their provided software or tool.

27.2.3 Supply Data



For data not residing on MDOT Systems but required in support of MDOT processes at specific Milestones (such As-Built Drawings or construction test results) such data shall be supplied in the MDOT-specified format at identified Milestones.

27.2.4 Link Data



For data not residing on MDOT Systems but is required in support of MDOT real-time processes (such as to share traffic data or CCTV camera images with the public) streams of such data shall be linked with MDOT systems, so data is accessible in real or near-real-time.

27.2.5 Data Access



For historical Asset data available on either the public-facing Internet with anonymous access or on the secured MDOT intranet requiring a user-specific account. Data entered, supplied, or linked to MDOT systems may also appear on such systems. MDOT will provide necessary access credentials to its data that may be needed for planning, operations, and maintenance purposes. Access to the data will be a function of the data type and nature.

27.2.6 Data Collection Agreement



MDOT will need to collect data, such as condition of pavement, by driving sensor-equipped vehicles, such as automatic road analyzer vehicles, on the PMLs. Section

Developer shall permit MDOT vehicles to collect such data for its planning, performance evaluation, operations, and related purposes.




27.3 Tabulation of MDOT Systems with Data Management Requirements

This section is organized in subsections and arranged alphabetically by MDOT offices. Each subsection tabulates MDOT Systems relevant to that office. The tabulation is then followed by a description of each such system. On the following pages, a tabulation of MDOT Systems is presented. The tabulation is presented with the following headings:

- MDOT System: the name of the MDOT information management system, abbreviated with an explanation of the abbreviation below the table;
- Asset or process: the Asset class or type of workflow process;
- purpose: the function or purpose of the MDOT System;
- data format: the electronic format, if applicable, in which to supply data when it is not to be entered directly into the MDOT system;
- responsible office: the MDOT office to contact for an account or other details for the MDOT System; and
- requirement: the applicable data Deliverable category, as defined in this [Exhibit 6 Article 27 \(Data Management for MDOT Systems\)](#).

Though data for a specific Asset class or type of process may be managed by one or more MDOT offices, only the MDOT office responsible for its format or method of delivery is identified in the tabulation.

Table 27-1 - MDOT SHA Systems






MDOT SYSTEM	ASSET OR PROCESS	PURPOSE	DATA FORMAT	RESPONSIBLE OFFICE	REQUIREMENT
CCMS	Issue Tracker	Customer Service	N/A	MDOT SHA OIT	
eGIS	Historical Data	Planning and Design	N/A	MDOT SHA OPPE	
GODP	Historical Data	Planning and Design	N/A	MDOT SHA OPPE	

Customer care management system (“CCMS”) is an online application to receive service requests and comments from users of roads and allows users to monitor the progress of inquiries. Inquiries received that relate to managed lanes will be assigned to the Phase Developer for feedback that will be reviewed and released by MDOT. The Phase Developer will need an account to review and respond to issues assigned.

Enterprise GIS (“eGIS”) is a source of additional geospatial data sets with an organizational structure by MDOT SHA office and division responsible for that data. An account is required to gain access to these datasets from within the computer network on MDOT SHA’s intranet.

GIS Open Data Portal (“GODP”) is a source of open-to-the-public interactive maps, geospatial datasets, dashboards, and story maps of historical data from all MDOT SHA offices and divisions. Examples of available portals, applications, and datasets include, but are not limited to: annual average daily traffic, parcels, and plats, traffic and weather information, bridge inventory, stormwater facilities, pavement condition, road centerlines, mile markers, traffic cameras, among others. An account is required to gain access to additional datasets and granular details.

Table 27-2 - MDOT CHART Systems

MDOT SYSTEM	ASSET OR PROCESS	PURPOSE	DATA FORMAT	RESPONSIBLE OFFICE	REQUIREMENT
DMTS	ITS Devices	Performance Evaluation	To be provided in a later draft	MDOT CHART	
ITSAM	ITS Equipment	Planning and Design	To be provided in a later draft	MDOT CHART	
ATMS	Traffic Monitoring	Streaming (511)	To be provided in a later draft	MDOT CHART	
VM	Weather	Streaming	To be provided in a later draft	MDOT CHART	
EORS	Road closures	Operations	To be provided in a later draft	MDOT CHART	

Intelligent Transportation System (“ITS”) Device Maintenance Tracking System (“DMTS”) tracks the operational status of ITS devices and is also used to compute uptime for devices to ensure they meet the 95% uptime performance standard. Provide operational status of devices deployed by the Phase Developer to ensure their performance standard is consistent with those MDOT maintains.



ITS Asset Management System (“ITSAM”) is a desktop database repository of ITS equipment information, such as vendor, make, model, drawings, specifications, location, configuration, and the like. Provide to MDOT information about equipment installed by the Phase Developer.

Advanced Transportation Management System (“ATMS”) is used by MDOT to identify traffic flow disruptions, send responders, and notify the public. Implement a link between the Phase Developer’s traffic data streams and ATMS for seamless broadcast of traffic conditions on MDOT CHART’s systems and to take advantage of MDOT CHART ATMS’s artificial intelligence capabilities.

ViewMondo (“VM”) is a vendor Web portal used by MDOT to access weather data from its sensors. Provide access to weather data streams from sensors installed by the Phase Developer.

Emergency Operations Reporting System (“EORS”) tracks Incident and schedule information on road closures from construction and snow Emergency declarations at the county level. This information is reported and displayed on maps. The system also maintains a phone book for MDOT CHART operators to call. Coordinate with MDOT SHA CHART to implement an operational handshake protocol to enable access to the Phase Developer’s Emergency operations data.






Table 27-3 - MDOT SHA D3 Systems


MDOT SYSTEM	ASSET OR PROCESS	PURPOSE	DATA FORMAT	RESPONSIBLE OFFICE	REQUIREMENT
ProjectWise	Access Permits	Planning	Online	MDOT SHA OHD/DTSD	
UGV	Inventory	Planning	Online	MDOT SHA OOC	

ProjectWise is MDOT SHA’s engineering document management system that includes the District’s Access Permits spreadsheets and other data the Phase Developer may need for planning the Work.

Utility GIS Viewer (“UGV”) enables utility coordinators to report changes to existing, or additions of, new utility distribution lines using a mobile app. Coordinate with MDOT SHA OOC to obtain an account to use the system to report data.

Table 27-4 - MDOT SHA OED Systems

MDOT SYSTEM	ASSET OR PROCESS	PURPOSE	DATA FORMAT	RESPONSIBLE OFFICE	REQUIREMENT
ESCQATK*	Construction Process	Environmental Compliance	Online	MDOT SHA OED	
IEMTK*	Construction Process	Environmental Compliance	Online	MDOT SHA OED	
MDETK*	Design Process	Status of Review	Online	MDOT SHA OED	
OEAV	Asset Inventory	Planning	Online	MDOT SHA OED	
SHARCS	Maintenance Process	Environmental Compliance	Hardcopy	MDOT SHA OED	

MDOT SYSTEM	ASSET OR PROCESS	PURPOSE	DATA FORMAT	RESPONSIBLE OFFICE	REQUIREMENT
WMMS	Wetlands	Environmental Compliance	Hardcopy	MDOT SHA OED	

*MDOT SHA OED Toolkit Portal: MDOT SHA has designated authority for independent environmental monitoring and performance of ESC during construction, and of environmental permit reviews. The Toolkits used by MDOT SHA OED's Quality Assurance Division include:




- ESCQATK - the Erosion and Sediment Control Quality Assurance Toolkit (MDOT SHA OED Toolkit Portal);
- IEMTK - the Independent Environmental Monitor's Toolkit (MDOT SHA OED Toolkit Portal); and
- MDETK - the Maryland Department of the Environment Toolkit (MDOT SHA OED Toolkit Portal).

OEAV tracks inventory and type of landscape Assets and mitigation sites, and delineation of as-built condition of sound barriers, signs, among others. It is used by OED's Landscape Programs Division.

MDOT SHA Regulatory Compliance System ("SHARCS") tracks inspection and Maintenance Records and permits for facilities on MDOT SHA ROW for items such as asbestos, lead-based paint, boilers, underground storage tanks, etc. that fall under environmental compliance regulations. It is used by OED's Environmental Compliance Division.

Wetland Mitigation Monitoring System ("WMMS") tracks wetland mitigation monitoring data. The Section Developer shall transmit mitigation site data upon completion of the Section Developer's required monitoring period. The system is used by OED's Environmental Programs Division.

Table 27-5 - MDOT SHA OHD Systems

MDOT SYSTEM	ASSET OR PROCESS	PURPOSE	DATA FORMAT	RESPONSIBLE OFFICE	REQUIREMENT
NPDES GIS	Stormwater Facilities	Inventory and Inspection	Online	MDOT SHA OHD	
NDV	Noisewall	Inventory and Inspection	Online	MDOT SHA OHD	
SBLAD	ADA Compliance	Compliance	Hardcopy	MDOT SHA OHD	






National Pollutant Discharge Elimination System Geographic Information ("NPDES GIS") System data is managed by MDOT SHA OHD's NPDES GIS system for impacts to total

maximum daily load Assets and stormwater BMPs. Enter inventory and inspection data for stormwater facilities constructed and maintained by the Phase Developer as called for by MDOT SHA OHD processes for SWM standard operating procedures.

Noisewall Data Viewer ("NDV") tracks the inventory and inspection data for noisewalls and of the status of requests from communities for noisewalls. Should the Phase Developer be responsible for the construction and maintenance of any noisewalls, it shall receive an account in NDV to enter inspection data.

Sidewalk/Bike Lane Assets and Data ("SBLAD") tracks the inventory of sidewalks and bike lanes and whether or not they comply with Americans with Disabilities Act guidelines. For any sidewalks or bike lanes the Phase Developer may construct, it shall provide the location and length along with a report from an Americans with Disabilities Act compliance inspection for MDOT SHA to enter into SBLAD.

Table 27-6 - MDOT SHA OMT Systems

MDOT SYSTEM	ASSET OR PROCESS	PURPOSE	DATA FORMAT	RESPONSIBLE OFFICE	REQUIREMENT
GDR	Reference	Planning	Hardcopy	MDOT SHA OMT	
PMS	Asset Management	Planning	Online	MDOT SHA OMT	MOU
SBTD	Reference	Design	gINT, Excel Spreadsheet	MDOT SHA OMT	
ABPD	Reference	Planning	Excel Spreadsheet, Hardcopy	MDOT SHA OMT	
MDW	Pavement	Quality	Comma Separated Values	MDOT SHA OMT	
MMS	Material Sources	Quality	Online	MDOT SHA OMT	

Geotechnical Data Report ("GDR") is a repository of historical subsurface information for reference during planning and design. Submit geotechnical data as and when it is available for a particular phase or a Work location. Data is not to be supplied annually or with the As-Built Drawings.

Pavement Management System ("PMS") is a data warehouse that aggregates pavement data from several sources, including ARAN and friction vehicles and construction inspection data.



Soil Boring Test Data (“SBTD”) is material test data from soil borings requested by Work teams. This data is stored in the gINT software as supplied by Bentley, which can import data from spreadsheets.

As-Built Project Data (“ABPD”) is a data room for as-built information as pavement is installed and accepted by MDOT SHA. This information is collected on the MDOT SHA standard form PM-003 in a Microsoft Excel spreadsheet.

MDware (“MDW”) is a desktop software written using Microsoft Access. The master copy of the database is maintained by MDOT, and each pavement material Supplier is provided the software to track laboratory test information. Suppliers export the data they maintain in MDware as a spreadsheet and email it to MDOT, which in turn imports into their master copy of the system. Use MDware for entering Quality Assurance results while retaining the Quality Control results.

Materials Management System (MMS) is a Web-based system that, among other functions, serves as a repository of materials accepted for use on MDOT SHA projects. The Phase Developer is encouraged to have tested and listed any product(s) it uses that are not yet on MDOT’s accepted product list in MMS.




Table 27-7 - MDOT SHA OOC Systems

MDOT SYSTEM	ASSET OR PROCESS	PURPOSE	DATA FORMAT	RESPONSIBLE OFFICE	REQUIREMENT
SED	Reporting	Regulatory	Online	Department of General Services	
UGV	Utilities	Plan Room	Online	MDOT SHA OOC	

State Energy Database (“SED”) tracks energy usage by the State to comply with the EmPOWER Maryland Energy Efficiency Act (codified at Maryland Code Annotated, Public Utilities § 7-211). The Phase Developer will need to obtain an account in the system and update it with data from its utility bills. For additional details and to request information for obtaining a login account to report energy usage, navigate to <https://dgs.maryland.gov/Pages/Energy/Database/index.aspx>.

Utility GIS Viewer (“UGV”) enables utility coordinators to report changes to existing, or additions of new, utility distribution lines using a mobile app. Coordinate with MDOT SHA OOC to obtain an account to use the system to report data.

Table 27-8 - MDOT SHA OOM Systems



MDOT SYSTEM	ASSET OR PROCESS	PURPOSE	DATA FORMAT	RESPONSIBLE OFFICE	REQUIREMENT
eTAC	Problem Tracking	Customer Service	Online	MDOT SHA OOM	
MCARS	Roadside Assets	Planning	Hardcopy	MDOT SHA OOM	
WebEORS	Problem Tracking	Customer Service	Online	MDOT SHA OOM	

Electronic Team Activity Card (“eTAC”) tracks costs and accomplishments (both via contract and State forces) by maintenance type, or PCA, (e.g., mowing, litter removal, guardrail/end treatments, etc.) Accomplishments, via appropriate units of measure per maintenance activity, labor, equipment, and materials for all roadway maintenance activities are entered and accepted in eTAC daily. The Phase Developer will receive an account to regularly update data in the system.

Maryland Condition Assessment Reporting System (“MCARS”) annually assesses the condition of a Statewide sampling of roadway and roadside Assets. To support MDOT SHA’s yearly planning, the Phase Developer is to provide hardcopy data on the condition of roadway and roadside Assets for inclusion in MDOT’s annual report.

Web-based Emergency Operations Reporting System (“WebEORS”) tracks Emergency operations activities. Costs related to Emergency events, such as hurricanes, will require coordination with MDOT SHA OOM. The Phase Developer will receive an account to update data in the system.





Table 27-9 - MDOT SHA OOS Systems

MDOT SYSTEM	ASSET OR PROCESS	PURPOSE	DATA FORMAT	RESPONSIBLE OFFICE	REQUIREMENT
SAM	Structures	Condition rating	Online	MDOT SHA OOS	
Plan Room	Records Management	Customer Service	Electronic storage	MDOT SHA OOS	

Structural Asset Management (“SAM”) is an implementation of Bentley’s AssetWise Asset Reliability Inspections, CONNECT Edition solution for capturing inspection and maintenance data, and for generating reports. It is used by MDOT SHA OOS to manage the inventory of Bridges, Small Structures, and Retaining Walls. It is a browser-based tool to capture condition inspection data and includes tools to review Asset performance metrics system-wide, and to produce ad-hoc reports and to export data electronically in a format compatible with the National Bridge Inventory and inspection requirements.

Plan Room is an electronic storage repository for As-Built Drawings, catalog cuts, shop drawings, and other information needed to manage Assets.

Table 27-10 - MDOT SHA OOTS Systems

MDOT SYSTEM	ASSET OR PROCESS	PURPOSE	DATA FORMAT	RESPONSIBLE OFFICE	REQUIREMENT
SPL, SLPL	Traffic Signals	Plan Room	PDF	MDOT SHA OOTS	
TSIIM	TCD Assets	Condition Assessment	Online	MDOT SHA OOTS	
TAMS	Plans	Plan Room	PDF	MDOT SHA OOTS	
DPOLE	TCD Poles	Inspection	N/A	MDOT SHA OOTS	


Signal Plan Locator (“SPL”) and Signing and Lighting Plan Locator (“SLPL”) are tools to search for and access As-Built Drawings related to traffic signal, signing, and lighting Assets. The Phase Developer shall provide As-Built Drawings for signal, signing, and lighting Assets it installs. The Web-based SPL is available on MDOT SHA’s Website to search for existing Plans which may be needed in support of planning and design work.

Traffic Structure Inventory Inspection and Maintenance System (“TSIIM”) is a Web-accessible inventory of traffic sign structures Statewide. It also tracks condition inspection data for each structure. It offers role-based access to its modules. The Phase Developer shall provide As-Built Drawings and shop drawings for sign structures it installs. For sign structures the Phase Developer inspects, MDOT SHA OOTS will provide an account for the Phase Developer to enter inspection data.

Traffic Asset Management System (“TAMS”) tracks the inventory of signals and peripherals associated with a signalized intersection. Provide drawings, specifications, and related information for signals and peripherals installed by the Phase Developer.

DPOLE is a structural analysis tool developed by The Bridge Engineering Software & Technology Center of the University of Maryland for assessing the severity of damage to poles from a crash. The Phase Developer shall use this tool for consistency with MDOT’s pole damage evaluation procedures.

Table 27-11 - MDOT SHA ORE Systems

MDOT SYSTEM	ASSET OR PROCESS	PURPOSE	DATA FORMAT	RESPONSIBLE OFFICE	REQUIREMENT
OREMS	Land Parcels	Planning, Acquisition	Excel Spreadsheet, Comma Separated Values	MDOT SHA ORE	

OREMS is intranet software used by MDOT SHA ORE to track land parcels of interest, appraisals, title research, negotiations, and similar details in support of property acquisition. The tracking process starts by creating records for land parcels of interest, typically done by importing data from a spreadsheet. MDOT SHA ORE will provide the necessary training in the use of OREMS and will supervise the work performed by Phase Developer staff.

Exhibit 6

Appendix A - Abbreviations and Definitions

PART A – ABBREVIATIONS

Except as otherwise specified herein or as the context may otherwise require, the following abbreviations set out below are provided as references for purposes of the Technical Provisions in addition to abbreviations listed elsewhere in the Phase P3 Agreement.

AACE	Association for the Advancement of Cost Engineering
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ADA	Americans with Disabilities Act
AHJ	Agency Having Jurisdiction
ANSI	American National Standards Institute
AMRL	AASHTO Materials Reference Laboratory
AREMA	American Railway Engineering and Maintenance of Way Association
ASTM	American Society for Testing and Materials
ATMS	Advanced Transportation Management System
BMP	Best Management Practices
CCMS	Customer Care Management System (Customer Service Log)
CCTV	Closed-Circuit Television
CHART ATMS	CHART Advanced Transportation Management System
CLOMR	Conditional Letter of Map Revision
ConOps	Concept of Operations
CQMP	Construction Quality Management Plan
CRZ	Critical Root Zone
CSXT	CSX Transportation
CTD	Commitment Tracking Database
dB	Decibel
dba	Outside Sound Pressure Measurement Unit, Decibel
DBH	Diameter at Breast Height
DDMP	Document and Data Management Plan
DEIS	Draft Environmental Impact Statement
DMS	Dynamic Message Signs
DMTS	Intelligent Transportation System Device Management Tracking System
DNR	Maryland Department of Natural Resources
DPAMS	Design Package Avoidance and Minimization Summary
DPS	Dynamic Pricing System
DQMP	Design Quality Management Plan
DRP	Disaster Recovery Plan
EAP	Emergency Action Plan
ECM	Environmental Compliance Manager
ECP	Environmental Compliance Plan
EDMS	Electronic Document Management System
EEO	Equal Employment Opportunity
eGIS	Enterprise Geographic Information System
EmPOWER	Electric Power Usage Reporting System
EMT	Environmental Management Team
EORS	Emergency Operations Reporting System
ESC	Erosion and Sediment Control
ESCQATK	Erosion and Sediment Control Quality Assurance Toolkit
eTAC	Electronic Team Activity Card
ETC	Electronic Toll Collection
ETCS	Electronic Toll Collection System
ETTM	Electronic Toll and Traffic Management
FEMA	Federal Emergency Management Agency

FMP	Final Mitigation Plans
GDR	Geotechnical Data Report
GIS	Geographic Information System
GODP	Geographic Information System Open Data Portal
GPL, GPLs	General Purpose Lane, General Purpose Lanes
HIB	Hazard Identification Beacon
IEMTK	Independent Environmental Monitor's Toolkit
IAPA	Interchange Access Point Approval
ICD	Interface Control Document
IEM	Independent Environmental Monitor
IESNA	Illuminating Engineering Society of North America
IP	Internet Protocol
IPM	Integrated Pest Management
IRI	International Roughness Index
ITS	Intelligent Transportation System
ITSAM	Intelligent Transportation System Asset Management System
IQF	Independent Quality Firm
LCN	Lane Closure Notice
LED	Light-Emitting Diode
LiDAR	Light Detection and Ranging
LOD	Limits of Disturbance
LOMR	Letter of Map Revision
LOS	Level of Service
LRFD	Load and Resistance Factor Design
LTPP	Strategic Highway Research Program's Long-Term Pavement Performance Program
MASH	AASHTO Manual for Assessing Safety Hardware
MCARS	Maryland Condition Assessment Reporting System
MD MUTCD	MDOT SHA Maryland Manual on Uniform Traffic Control Devices
MDE	Maryland Department of the Environment
MDE DSD	MDE Dam Safety Division
MDE PRD	MDE Plan Review Division
MDETK	Maryland Department of the Environment Toolkit
MDFMP	Maryland Floodplain Mapping Program
MDOT CHART	MDOT Coordinated Highways Action Response Team
MDOT MTA	MDOT Maryland Transit Administration
MDOT SHA D3	MDOT SHA District 3
MDOT SHA D7	MDOT SHA District 7
MDOT SHA ADE-T	MDOT SHA Assistant District Engineer-Traffic
MDOT SHA OHD HHD	MDOT SHA OHD Highway Hydraulics Division
MDOT SHA OED	MDOT SHA Office of Environmental Design
MDOT SHA OHD	MDOT SHA Office of Highway Development
MDOT SHA OHD PSD	MDOT SHA OHD Plans and Surveys Division
MDOT SHA OIT	MDOT SHA Office of Information Technology
MDOT SHA OMT	MDOT SHA Office of Materials and Technology
MDOT SHA OOC	MDOT SHA Office of Construction
MDOT SHA OOM	MDOT SHA Office of Maintenance
MDOT SHA OOS	MDOT SHA Office of Structures
MDOT SHA OOTS	MDOT SHA Office of Traffic and Safety
MDOT SHA OPPE	MDOT SHA Office of Planning and Preliminary Engineering
MDOT SHA ORE	MDOT SHA Office of Real Estate
MDOT SHA OREMS	MDOT SHA Office of Real Estate Management System
MDOT SHA OHD PRD	MDOT SHA OHD Plan Review Division

MDRC	MDE General Permit for Stormwater Associated with Construction Activity 14GP
MDW	MDware
MLS	Managed Lanes Study
MMF	Multimode Fiber
MMIS	Maintenance Management Information System
MMS	Materials Management System
MOT	Maintenance of Traffic
MOU	Memorandum of Understandings
MPH	Miles per Hour
MS4	Municipal Separate Storm Sewer System
MSE	Mechanically Stabilized Earth
MSMT	Maryland Standard Method of Tests
NAC	Noise Abatement Criteria
NAWP	Noise Analysis Work Plan
NBIS	National Bridge Inspection Standards
NCHRP	National Cooperative Highway Research Program
NEC	National Electric Code
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Prevention Association
NOTD	Notice of Toll Due
NPDES	National Pollutant Discharge Elimination System
NPDES GIS	National Pollutant Discharge Elimination System Geographic Information System
NSA	Noise-Sensitive Area
NDV	Noisewall Data Viewer
O&M SaMP	O&M Safety Management Plan
OAG	Office of the Attorney General of Maryland
OLTS	Optical Loss Test Sets
OSHA	Occupational Safety and Health Administration
OTDR	Optical Time-Domain Reflectometer
PCIDSS	Payment Card Industry Data Security Standard
PA	Programmatic Agreement
PDF	Portable Document Format
PMBase	Pavement Management Database
PML, PMLs	Priced Managed Lane, Priced Managed Lanes
PMS	Pavement Management System
psi	Pounds per Square Inch
PTZ	Pan-Tilt-Zoom
PVC	Polyvinyl Chloride
QATK	Erosion and Sediment Control Quality Assurance Toolkit
QMP	Quality Management Plan
RACM	Regulated Asbestos Materials
RFC	Release for Construction
RITIS	Regional Integrated Transportation Information System
ROE	Right-of-Entry
ROI	Region of Interest
RWP	Renewal Work Plan
SAM	Structural Asset Management
SaMP	Safety Management Plan
SBLAD	Sidewalk/Bike Lane Asset Data
SBTD	Soil Boring Test Data
SE	Systems Engineering
SED	State Energy Database

SEMP	Systems Engineering Management Plan
SF. ft ²	Square Feet; Square Foot
SHARCS	MDOT SHA Regulatory Compliance System
SHPO	either the Maryland Historical Trust or the Virginia Division of Historic Resources or both
SICP	Snow and Ice Control Plan
SLPL	Signing and Lighting Plan Locator
SMF	Single-Mode Fiber
SMP	Section Management Plan
SMPr	Stormwater Management Program Report
SMS	Short Message Service
SPL	Signal Plan Locator
SPPTD	System Preservation Projects Tracking Database
SRC	State Roads Commission
SRPM	Snowplowable Raised Pavement Markers
SW	ScanWeb
SWM	Stormwater Management
SWMFACs	Stormwater Management Facilities
TAMS	Traffic Asset Management System
TCA	Temporary Construction Area
TCD	Traffic Control Device
TCP	Traffic Control Plans
TIA	Telecommunications Industry Association
TMDL	Total Maximum Daily Load
TMP	Transportation Management Plan
TNAR	Technical Noise Analysis Report
TNM	Traffic Noise Model
TOCF	Temporary Orange Construction Fence
TSA	Tolling Services Agreement
TSIIM	Traffic Structure Inventory Inspection and Maintenance System
TTCIRS	Temporary Traffic Control Inspection Rating System
UPS	Uninterruptible Power Supply
US EPA	US Environmental Protection Agency
UGV	Utility Geographic Information System Viewer
VDEQ	Virginia Department of Environmental Quality
VDS	Vehicle Detection System
VLV	Video Log Viewer
VM	ViewMondo
VMS	Video Monitoring System
WBS	Work Breakdown Structure
WebEOM	Web-Based Emergency Operations Center
WebEORS	Web-Based Emergency Operations Reporting System
WMMS	Wetland Mitigation Monitoring System
XER	Primavera Proprietary Exchange Format

PART B – DEFINITIONS

Except as otherwise specified herein or as the context may otherwise require, the following definitions set out below are provided as references for purposes of this Exhibit 6.

“Access and Mobility Plan” is a written document prepared in accordance with Exhibit 6 Article 22 (Maintenance of Traffic) Section 22.3.8 (Access and Mobility Plan).

“Access Justification Report” documentation including traffic analysis demonstrating that the proposed interchange configuration and geometry meets MDOT and FHWA requirements in support of an Interchange Access Point Approval request.

“Acquisition Package” a Deliverable used in the ROW acquisition process which presents the information deemed necessary by MDOT SHA, in its sole discretion, to purchase a parcel or parcels.

“Additional Properties Costs Amount” has the meaning given to it in Exhibit 6 Article 1 (Predevelopment Work) Section 1.11 (Right-of-Way).

“Additional Properties Costs Escrow Amount” has the meaning given to it in Exhibit 6 Article 1 (Predevelopment Work) Section 1.11 (Right-of-Way).

“Administration Plan” a written document presenting details of how the Section Work will be managed and organized.

“Aesthetics and Landscaping Guidelines – I-495/I-270 P3 Program – (“The Guidelines”)” a document prepared by MDOT and provided to the Phase Developer to offer direction on the concepts and approaches to be used for landscape design and aesthetic enhancements for the Phase.

“Agency Having Jurisdiction” means the Governmental Entity having control and approval authority over Elements or portions of the Work.

“Allowable Lane Closures” means the lane closures allowed in accordance with Exhibit 6 Article 22 (Maintenance of Traffic) Section 22.10 (Lane Closure Hour Restrictions).

“Annual O&M Report” means the report specified in Exhibit 6 Article 25 (Operations and Maintenance).

“Annual Renewal Work Schedule” means the Plan described in Exhibit 6 Article 25 (Operations and Maintenance).

“As-Built Schedule” historical Work record showing actual start and finish dates for Work performed. Generally, shows the logic used in the sequence of construction, along with actual start and finish dates.

“Asset” means Elements, property or equipment owned by MDOT, a Governmental entity or a third party regarded as having value and requiring to be protected, maintained or Inspected.

“Asset Operations and Maintenance Responsibility Matrix” means the information included in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-5 (Asset O&M Responsibility Matrix).

“Bare Pavement” means a condition under which the entire driving surface and shoulders have been cleared of loose snow and ice. The driving surface may have isolated patches of ice, snow, or slush that, when treated with chemicals or abrasives or a combination of these, may be negotiated safely by the average driver at a reduced speed.

“Baseline Schedule” a fixed Work record showing the planned start and finish dates for Work to be performed and showing the logic used in the sequence of construction, which is used as the standard by which Work performance is measured.

"Basemap" a graphical design file, or compilation of files, defining the existing conditions of the Phase or Section as applicable. The information typically contained in a basemap is the planimetrics, topography, contours, and text labeling of the information. The supporting files for a basemap are the raw survey data, survey control information, and a digital terrain model.

"Best Management Practice" or "BMP" means a structural or non-structural practice approved by US EPA, MDE or both, providing water quality benefits or treatment, as defined in the MDE document "Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permits" or as defined by supplementary US EPA, MDE, or both, regulatory guidance applicable to NPDES MS4 Permits or US EPA approved TMDLs.

"Blasting and Vibration Monitoring Plan" a written document outline of the approach to the safe use of explosives for demolition as part of the Work.

"Boundary Workmap" a graphical design file, or compilation of files, defining the boundary lines of the parcels of land adjoining Work, as well as existing ROW lines, easement lines, and text labeling of the evidence shown, the parcel information. The evidence or monumentation presented in the mosaic that is field located to support the analysis and establishment of the right of ROW lines and is also shown and labeled on the Boundary Workmap.

"Business Rules" has the meaning given to it in the Tolling Services Agreement Term Sheet.

"Bridge" a structure including supports erected over a depression or an obstruction, such as water, highway, or railway, and having a track or passageway for carrying traffic or other moving loads, and having an opening measured along the center of the roadway of 20 feet or more between undercopings of abutments, spring lines of arches, or extreme ends of openings for multiple boxes; it may also include multiple pipes, where the clear distance between openings is less than half of the smaller contiguous opening. For lengths, all dimensions shall be parallel to the centerline of the roadway. The dimensions of handrails will not be taken into account in measuring structure length.

"Capital Beltway Accord" means the bi-state accord between the State of Maryland the Commonwealth of Virginia regarding the coordination of works within Virginia and the approach to the replacement of the American Legion Bridge.

"Change Management Plan" means a written document as described in Exhibit 6 Article 3 Section 3.5 (Change Management Plan).

"Code 378" means the Natural Resources Conservation Service Maryland, Conservation Practice Standard, Pond Code 378

"Commercial Closing Date" has the meaning given to it in the Section P3 Agreement Term Sheet.

"Concept of Operations" or "ConOps" a user-oriented document describing system characteristics for a proposed system (such as tolling or ITS) from the user's viewpoint and lays the foundation for future steps or decisions in the project's implementation.

"Conceptual Design" the first stage of design representing the initial development prepared as a Predevelopment Work activity presenting the basic configuration of the Work and included in the Committed Section Proposal.

"Condemnation Package" a Deliverable used in the ROW process which presents the information deemed necessary by MDOT SHA, in its sole discretion, to condemn a parcel or parcels.

"Condemnation Process Schedule" has the meaning given to it in Exhibit 6 Article 8 (Right-of-Way) Section 8.6.2.4 (Condemnation Support).

"Condition State" an indication of the degree of deterioration present on or within an Element as identified during an Inspection of a structure or component of a structure.

"Construction Deliverable" a Submittal to support the construction activities which may represent an Element, a portion of a Section or the entire Section.

"Construction Protection Plan" a written document prepared by MDOT and used to inform the Phase Developer of Applicable Law requiring the consideration and protection of cultural resources, including built historic properties and archaeological resources.

"Construction Quality Manager" means the individual meeting the requirements of Exhibit 6 Article 3 (Management and Administration of the Work) Section 3.4.1 (Staffing).

"Construction Quality Management Plan" a written document and a Sub-Plan of the Quality Management Plan detailing the approach to ensuring quality for the Construction Work.

"Construction Work" has the meaning given to it in the Section P3 Agreement Term Sheet.

"Contingency Plan" a written document specifying actions to be taken to minimize traffic impacts should unexpected events occur in the work zone.

"Contractor Markup Cost" means general and administrative indirect overhead costs and profit applied to self-performed and subcontracted D&C Work for each Section. Contractor Markup Costs shall include all markups applied to all cost categories including labor, equipment, materials, and subcontract costs.

"Contractor Markup Percentage" means the maximum percentage that may be applied to the D&C Costs (excluding D&C General Conditions Costs and Contractor Markup Costs) for each Section of the Phase on account of Contractor Markup Costs in the D&C Costing Model derived from the "Contractor Markup Percentage" in the Phase Developer's Financial Proposal.

"Courtesy Patrol" a service provided by the Section Developer providing aid to travelers and vehicles for minor Incidents such as flat tires, cars that run out of gas, etc. as discussed in Exhibit 6 Article 25 (Operations and Maintenance) Section 25.6.3.1 (Incident Management).

"Critical Path" the longest continuous sequence of work or chain of activities throughout the Work schedule defining the overall time needed to complete the Work.

"Critical Path Method" a specific technique of schedule network analysis used to determine the amount of flexibility existing in the scheduling of a particular and specific logical network path within the network of the overall schedule.

"Critical Path Schedule" a record depicting the sequence of Work, along with start and finish dates for all tasks of work actually performed or to be performed, which shows a Critical Path.

"Critical Root Zone" means one foot of radial distance for every inch of tree diameter measured at 4.5 feet above the ground, with a minimum radius of 8 feet. For specimen trees (size defined by jurisdiction), the Critical Root Zone is 1.5 feet for every inch of tree diameter as defined by the Maryland Department of Natural Resources. Local jurisdictions may amend or supplement these requirements.

"D&C Cost" means the design and construction cost included in each Committed Section Proposal, including ROW costs.

"D&C Costing Model" has the meaning given to it in Exhibit 6 Article 1 (Scope of Predevelopment Work) Section 1.20.2 (The D&C Costing Model).

"D&C General Conditions Cost Percentage" means the maximum percentage that may be applied to the D&C Costs (excluding D&C General Conditions Costs and Contractor Markup Costs) for each section of the Phase on account of D&C General Conditions Costs in the D&C Costing Model derived from the Proposal "D&C General Conditions Cost Percentage" in the Phase Developer's Financial Proposal.

"D&C General Conditions Costs" means direct project overhead costs, without contingencies, incurred for supervision and administration of the D&C Work inclusive of all self-performed and subcontracted D&C work. For the avoidance of doubt, D&C General Conditions Costs shall include the following items required for D&C Work, excluding O&M Work, for each Section:

- bonds, all types;
- non-payroll insurance;
- licenses, permits, and fees;
- mobilization/demobilization, including all construction preparatory/dissolution operations which involve the movement of personnel and equipment to/from the Phase 1 site;
- material and equipment handling, transportation, and storage;
- subcontractor mobilization/demobilization, including all construction preparatory/dissolution operations that involve the movement of personnel and equipment to/from the Phase 1 site;
- staffing including, but not limited to, oversight, supervision, administration, management, and safety;
- site security;
- subsistence (covers any expenses for staff outside of the travel, lodging, relocation, per diem);
- travel;
- lodging;
- relocation/housing expenses;
- per diem;
- vehicles for project oversight including, but not limited to, registrations, fuel, maintenance, and insurance;
- technology and communications;
- project safety expense;
- temporary facilities including, but not limited to, rent, security and access control, utilities, office equipment, office expenses, furniture, insurance, and taxes;
- temporary staging areas, fuel depots, and storage yards; and
- miscellaneous including escalations, certifications for staff required for the Work, and incidentals.

"D&C Independent Estimate" has the meaning given to it in Exhibit 6 Article 1 (Scope of Predevelopment Work) Section 1.20.3 (D&C Independent Estimates).

"D&C Limits" means the boundaries within the Phase or Section where the Phase or Section Developer is responsible for design and construction.

"D&C O&M Plan" means the Plan specified in Exhibit 6 Article 25 (Operations and Maintenance).

"D&C Period" has the meaning given to it in the Section P3 Agreement Term Sheet.

"D&C Section O&M Work" means Section O&M Work performed during the D&C Period.

"D&C Period O&M Report" means the Plan specified in Exhibit 6 Article 25 (Operations and Maintenance).

"D&C Work" has the meaning given to it in the Section P3 Agreement Term Sheet.

"Data Date" the date day on which the schedule status is being determined.

"Dead Woody Plant Material" a plant having hard lignified tissues with 25% or more dead tissue.

"Defect" has the meaning given to it in the Section P3 Agreement Term Sheet.

"Delay Event" occurrence which causes the Work or some portion of the Work to start or be completed later than planned or later than scheduled.

"Deliverable" is a Submittal.

"Demobilization Plan" a written document outlining the approach to completing the Work and restoring the Site to its original condition.

"Demolition Plan" a written document presenting the approach for the safe removal of existing Assets, Elements, features, or facilities within the Phase that are conflicting with the Work.

"Design-Build Price" has the meaning given to it in Exhibit 6 Article 1 (Scope of Predevelopment Work) Section 1.20.1 (D&C Price and Price Reasonableness).

"Design Deliverable" a Submittal to support the design activities which may represent an Element, a portion of a Section, a portion of a Phase, the entire Section, or the entire Phase.

"Design Exception" formal MDOT acceptance to deviate from any of the ten controlling geometric criteria as defined by FHWA and design criteria identified in 23 CFR 625.3(b).

"Design Life" the period of time for which a component, Element, or structure is expected to function for its designated purpose.

"Design Quality Manager" means the individual meeting the requirements of Exhibit 6 Article 3 (Management and Administration of the Work) Section 3.4.1 (Staffing).

"Design Quality Management Plan" a written document and a Sub-Plan of the Quality Management Plan detailing the approach to ensuring quality for the Design Work.

"Design Variance" formal MDOT acceptance to deviate from any MDOT geometric standard or design criteria.

"Design Work" has the meaning give to it in the Section P3 Agreement Term Sheet.

"Developer's Design" means the Design Work.

"Diameter at Breast Height" the diameter of a tree measured at 4.5 feet above the ground.

"Digital Flood Insurance Rate Maps" the official map of a community on which the Federal Emergency Management Agency has delineated both the special hazard areas and the risk premium zones applicable to the community from potential flood events.

"Disaster Recovery Plan" a written document establishing the systems and procedures for limiting disruption to Work in case of disaster.

"Document and Data Management Plan" a written document detailing the procedures for maintaining all records and documents associated with the Work.

"Drainage Design Report" a written document presenting hydraulic and hydrologic data used to support the design of a Section or Elements of a Section.

"Element" means:

- in relation to the Design Work an individual structure, component, portion, system, or subsystem of the Section; or
- in relation to the Section O&M Work, include at a minimum a breakdown into the items described in the MDOT SHA PONTIS Element Data Collection Manual.

"Emergency" a sudden, urgent, usually unexpected occurrence or the resulting state that calls for immediate action on the part of the Phase Developer or Section Developer.

"Emergency Action Plan" a written document detailing the procedures to be implemented in the event of a Hazardous Material release.

"Emergency Management Incident" means an Incident that may occur or has occurred as described in Exhibit 6 Article 25 (Operations and Maintenance).

"Emergency Response Plan" means the Plan specified in Exhibit 6 Article 25 (Operations and Maintenance).

"Emergency Response Procedures" means at a minimum the procedures described in Exhibit 6 Article 25 (Operations and Maintenance).

"Environmental Compliance Manager" an individual with the duties and responsibilities are as identified in Exhibit 6 Article 5 (Environmental Management) Section 5.4.1.1 (Environmental Compliance Manager).

"Environmental Compliance Plan" a written document describing the approach and process to be used when meeting all permit conditions and commitments for the Work.

"Environmental Summary/NEPA Re-evaluation" a modification to the ROD following the process outlined in Exhibit 6 Article 5 (Environmental Management).

"ETCS Activity Monthly Report" a written document submitted monthly describing tolling activity as described in Exhibit 6 Article 24 (Electronic Toll Collection Infrastructure) Section 24.10 (ETCS Reporting Requirements).

"ETCS Daily Check Report" a daily reporting on the status of the ETCS as described in Exhibit 6 Article 24 (Electronic Toll Collection Infrastructure) Section 24.10 (ETCS Reporting Requirements).

"ETCS Testing Plan" a written document describing the procedures to be used to ensure the ETCS as constructed meets the requirements of the Section P3 Agreement.

"ETTM System" has the meaning given to it in the Tolling Services Agreement Term Sheet.

"Exempt Vehicles" has the meaning given to it in the Section P3 Agreement Term Sheet.

"Expedited SWM/ESC Reviewers" means individuals provided meeting the requirements of Exhibit 6 Article 13 (Drainage, SWM & ESC) Section 13.6.1 (Stormwater Management - General Requirements)

"Fiber-optic Splicing and Testing Plan" a written document describing the procedures to be used to ensure the ITS fiber as constructed meets the requirements of the Section P3 Agreement.

"Final Completion" has the meaning given to it in the Section P3 Agreement Term Sheet.

"Final Design" a stage of design development representing the complete design for an Element, Section, or portion of a Section. Final Design may include Plan sheets, specifications, technical memoranda, reports, studies, calculations, and other pertinent data, as applicable to completely convey the intent.

"Final Design Certificate" documentation produced by the IOF indicating the design is in accordance with all requirements of the Section P3 Agreement.

"Fracture-Critical Member" a steel primary member or portion thereof subject to tension whose failure would probably cause a portion of or the entire Bridge to collapse.

"Fragmentary Network or Fragnet" a subnet of the overall Work network schedule. A Fragnet is typically made up of related work activities to allow greater detail and better control of the Work.

"Freeway and Interchanging Cross-Street" an interstate highway and the junction with another roadway where ingress and egress from the interstate highway is provided.

"General Purpose Lanes" has the meaning given to it in the Section P3 Agreement Term Sheet.

"Governmental Approvals Plan" a written document used to track the status of all documents requiring Governmental Approval.

"Governor Declared State of Emergency" an event significant enough for the Governor of the State of Maryland to issue an executive order in accordance with COMAR 14.107.

"Handback Period" has the meaning given to it in the Section P3 Agreement Term Sheet.

"Handback" means the stage when the Section Developer has satisfied the Section P3 Agreement requirements enabling the Section Developer to return the Relevant Infrastructure to MDOT at the end of the term of the Section P3 Agreement.

"Handback Condition Inspections" has the meaning given in Exhibit 6 Article 26 (Handback).

"Handback Condition Report" has the meaning given in Exhibit 6 Article 26 (Handback).

"Handback Requirements" the obligations identified in Exhibit 6 Article 26 (Handback).

"Handback Technical Provisions" means the requirements stated in Exhibit 6 Article 26 (Handback).

"Handback Work" has the meaning given in Exhibit 6 Article 26 (Handback).

"Handback Work Costs" means an estimate of the costs to perform the Handback Work.

"Handback Work Plan" means a written document detailing the procedures and activities to be performed to achieve the Handback Requirements described in Exhibit 6 Article 26 (Handback).

"Handover" means the process of turning over the Non-Maintained work to MDOT at the time of Substantial Completion.

"Hazardous Materials Manager" means the individual meeting the requirements of Exhibit 6 Article 5 (Environmental Management) Section 5.4.1.2 (Hazardous Materials Manager).

"Hazardous Materials Management Plan" a written document describing the approach used for the safe handling, treatment, and disposal of Hazardous Materials encountered in the course of the Work.

"High Occupancy Vehicle Declaration Report" a written document submitted monthly describing activity by high occupancy vehicles as described in Exhibit 6 Article 24.

"HOV" has the meaning given to it in the Tolling Services Agreement Term Sheet.

"I-270 East Spur" means the highway extending from I-270 near Tuckerman Lane to I-495 near Rockville Pike.

"I-270 West Spur" means the highway extending from I-270 near Tuckerman Lane to I-495 near Bradley Boulevard.

"Image-Based Transaction" has the meaning given to it in the Tolling Services Agreement Term Sheet.

"Implementation and Monitoring Plan" is a written document prepared in accordance with Exhibit 6 Article 22 (Maintenance of Traffic) Section 22.3.11 (Implementation and Monitoring Plan).

"Incident" means an unplanned event requiring action on the part of the Section Developer.

"Incident Management" means the provisions described in Exhibit 6 Article 25 (Operations and Maintenance).

"Incident Management Plan" a written document detailing the approach to addressing Incidents occurring during the term of the Section P3 Agreement.

"Incident Report" means documentation of an Incident as described in Exhibit 6 Article 25 (Operations and Maintenance) Section 25.6.3 (Traffic Incident Management).

"Independent Environmental Monitors" mean individuals provided by MDOT as identified in Exhibit 6 Article 5 (Environmental Management) Section 5.2.2 (Independent Environmental Monitors).

"Independent Quality Firm" has the meaning given to it in the Section P3 Agreement Term Sheet.

"Inspection" means a careful examination of an Element for the purpose of determining condition or comparison versus an established standard. Inspection may also mean the steps described in Exhibit 6 Article 25 (Operations and Maintenance), depending on the context.

"Inspection and Measurement Method" means the methods required to report an Inspection of an Element accurately.

"Integrated Pest Management" an environmentally focused program for pest management that uses a range of practices to prevent, monitor, and control pests to eliminate or reduce the use of chemical pesticides and minimize the toxicity and exposure to products used. Integrated Pest Management emphasizes biological and structural strategies as a first course with pesticide use as a last course of action.

"Intelligent Transportation System/Tolling Lead" means the individual meeting the requirements of Exhibit 6 Article 24 (Electronic Toll Collection Infrastructure) Section 24.6 (Staffing).

"Interchange Access Point Approval" formal letter of approval from MDOT and FHWA to modify an existing interchange or create a new access point or interchange on the interstate system.

"Interface Control Document" has the meaning given to it in the Tolling Services Agreement Term Sheet.

"Interim Completion Segment" means a logical and stand-alone portion of a Section which after construction is completed, has been accepted by MDOT and Section O&M Work can commence. An Interim Completion Segment may be composed of one or more Interim Completion Elements.

"ITS Emergency" means the event described in Exhibit 6 Article 25 (Operations and Maintenance).

"ITS Equipment" means all equipment necessary to keep the ITS system fully operational and functional and to comply with the minimum performance requirements for all ITS system components.

"ITS Testing Plan" a written document describing the procedures to be used to ensure the ITS as constructed meets the requirements of the Section P3 Agreement.

"Land Acquisition Petition" or "Complaint for Condemnation" is a document prepared by the Phase Developer and filed with the courts at the outset of condemnation proceedings as described in Exhibit 6 Article 8 (Right-of-Way) Section 8.6.2.4.4 (Additional Procedures for Condemnation Packages).

"Landscape LOD" has the meaning given to it in Exhibit 6 Article 15 (Landscaping and Aesthetics) Section 15.5.2 (Limit of Disturbance/Landscape Limit of Disturbance).

"Landscape Maintenance Plan" a written document describing the procedures to be used to ensure all installed landscaping meets the warranty requirements.

"Lane Closure" a restriction on the use of a portion of a traveled roadway in accordance with Exhibit 6 Article 22 (Maintenance of Traffic).

"Lane Closure Hour Restrictions" constraints on the Work to reduce the potential for the Work to impact the public.

"Lane Closure Plans" are the approach and details used to implement a closure corresponding to an Allowable Lane Closure as described in Exhibit 6 Article 22 (Maintenance of Traffic).

"Lead Surveyor" means an individual meeting the requirements of Exhibit 6 Article 10 (Surveying) Section 10.2 (Staffing).

"LiDAR" surveying and measurement system working on the principle of radar, but using light from a laser.

"Limited Access Highways" has the definition given in National Fire Prevention Association Specification 502, "Standard for Road Tunnels, Bridges, and Other Limited Access Highways."

"Mainline" means any General Purpose Lane, Priced Managed Lane, and on or off ramps associated with I-495, I-270 or I-70.

"Mainline Structure" a structure carrying any General Purpose Lane, Priced Managed Lane, and on/off ramps associated with I-495 and I-270.

"Maintenance Schedule" means a schedule of tasks and required frequencies to maintain all Assets in the Phase.

"Maintenance Records" documentation of activities and actions performed to ensure all Assets in the Phase are functioning as intended.

"Maintenance Work" means the D&C Period Section O&M Work or the Section O&M Work or both as the context requires.

"Maintenance of Traffic" activities performed to implement Traffic Control Plans as defined in Exhibit 6 Article 22 (Maintenance of Traffic).

"Major Damage" means significant deterioration or similar impairment of an Element's ability to function as intended referred to in Exhibit 6 Article 25 (Operations and Maintenance).

"Materials Tracking Log" a document used to record the status of all procured materials required for the Work.

"Maryland Pesticide Applicator License" means the license required to perform the duties described in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-2 (Specialist Inspections).

"MD-378" means the MDOT SHA Maryland Stormwater Design Manual, Volumes I and II Appendix B.1, Natural Resources Conservation Service Maryland Code No. 378 "Pond Standards/ Specifications."

"MDOT-Provided Parcel" has the meaning given to it in the Section P3 Agreement Term Sheet.

"MDOT Systems" Asset data in numerous information management systems maintained by MDOT.

"Milestone" an event or a date marking the start or completion of a specified portion of the Work.

"Minor Damage" means deterioration or similar impairment of an Element's ability to function as intended referred to in Exhibit 6 Article 25 (Operations and Maintenance).

"Mitigation" means, following the occurrence of a Noncompliance Event the Section Developer has taken actions to:

- (a) restore the surrounding area to a state or condition such that in MDOT's reasonable opinion, hazards, damage, or other adverse conditions creating the Noncompliance Event are alleviated; and
- (b) sufficiently reduce the risk that further damage, nonperformance, safety hazards or adverse consequences caused by the Noncompliance Event might occur during the remainder of the Temporary Repair Period or Permanent Repair Period.

"Mobilization Plan" a written document describing the procedures and tasks needed to start the Work.

"Monthly Renewal Work Schedule" means the Plan described in Exhibit 6 Article 25 (Operations and Maintenance).

"Monthly Schedule Update" process of revising the schedule to reflect the current status of the Work.

"Monthly Schedule Progress Meeting" a meeting held to review the Work performed during the previous month and the Work planned for the upcoming month.

"Monthly Update Narrative" a written document provided with the monthly schedule update.

"Mosaic" a graphical file, or compilation of files, showing the approximate ROW lines, easement lines, and or boundary information for the roads and parcels of land. The information is computed and plotted according to record information and the items labeled. A mosaic is a tool for a field survey crew to search for evidence that can be used to establish the boundaries, rights-of-way, easement areas, etc.

"National Flood Insurance Program" a program developed and maintained by the federal government intended to share the risk of flood losses through flood insurance and to reduce flood damages by restricting floodplain development.

"NPDES Stormwater Permit" means the NPDES MS4 Permit as described in Exhibit 6 Article 13 (Drainage, SWM & ESC).

"Noise Analysis Work Plan" a written document presenting the approach to completing noise analyses including tasks needed to obtain field data.

"Non-Conformance Reports" means reports that identify the location, the nature and cause of the material Defect and the steps that will be, or have been, taken to address the material Defect; and are also included in D&C Period O&M Reports and Operating Period O&M Reports.

"Noncompliance Event" means any Section Developer failure to comply with the obligations of the Section P3 Agreement that is identified as a Noncompliance Event in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance).

"Noncompliance Event Start Time" means the earlier of the date that when the Section Developer:

- (a) first obtains knowledge of the Noncompliance Event; or
- (b) first should have reasonably known of the occurrence of the Noncompliance Event.

"Noncompliance Points" means the points that may be assessed for each Noncompliance Event in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance).

"Non-Encroachment Area" the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a specified limit.

"Non-Maintained Facilities" means the facilities described in Exhibit 6 Article 25 (Operations and Maintenance).

"Non-Maintained Work" has the definition given in Exhibit 6 Article 25 (Operations and Maintenance).

"O&M Costs" means the operations and maintenance cost included in each Committed Section Proposal.

"O&M Costing Model" has the meaning given to it in Exhibit 6 Article 1 (Scope of Predevelopment Work) Section 1.21.2 (The O&M Costing Model).

"O&M Commencement Date" or "O&M Commencement Service Date" means the date the Section Developer will assume responsibility for O&M of the PML Limits.

"O&M Independent Estimate" has the meaning given to it in Exhibit 6 Article 1 (Scope of Predevelopment Work) Section 1.21.3 (O&M Independent Estimates).

"O&M Manager" means the individual meeting the requirements described in Exhibit 6 Article 25 (Operations and Maintenance) Section 25.3.3 (Staffing).

"O&M Limits" means the areas to which the Section Developer will have access to and be responsible for Section O&M Work during the period from Substantial Completion to the end of the term of the Section P3 Agreement.

"O&M Limit Drawings" mean the Plans prepared during the Predevelopment Work depicting the extents of the Section O&M Work during the D&C Period and the Operating Period including a depiction of Assets shared with or maintained by MDOT or a third party.

"O&M Quality Manager" means the individual meeting the requirements of Exhibit 6 Article 3 (Management and Administration of the Work) Section 3.4.1 (Staffing).

"O&M Performance Requirements" means the requirements in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance).

"O&M Plan" means the Plan specified in Exhibit 6 Article 25 (Operations and Maintenance).

"O&M Quality Management Plan" a written document and a Sub-Plan of the Quality Management Plan detailing the approach to ensuring quality for the Section O&M Work.

"O&M Renewal Work" means Renewal Work.

"O&M Report" means the Monthly and Quarterly O&M Report specified in Exhibit 6 Article 25 (Operations and Maintenance) Section 25.9.1 (Monthly and Quarterly O&M Reports).

"O&M Requirements" are the provisions identified in Exhibit 6 Article 25 (Operations and Maintenance).

"O&M Safety Management Plan" a written document detailing the procedures to be used to avoid Incidents related to health and safety for all Persons involved in the Section O&M Work.

"O&M Work" has the meaning given to it in the Section P3 Agreement Term Sheet.

"Offer of Just Compensation" a letter provided to a property owner providing the planned acquisition price for a property.

"Open Book Basis" means all of the Phase Developer's books, data (including cost on pricing data), records, documents, reports, computations and projections, accounting procedures and practices and other evidence, in all forms (paper or machine readable media such as disk, tape, etc.) or types (e.g. databases, applications software, database management software, utilities, etc.) sufficient to properly reflect the Design-Build Price including, without limitation, quantity development, design and productivity allowances, production rates, unit price estimates, estimate assumptions, ROW estimates and acquisition schedule (including the assumed order of parcel acquisition), utility impact estimates and schedule (including the assumed order of utility relocations), construction methodologies, labor and equipment rates and estimates, lay down areas, location and types of key construction materials, pricing methodologies, subcontractor quotes, Supplier quotes, logistical issues, applicable risks, contingencies, mark-ups, profit margins, inflation and deflation rates, hedge rates, insurance and bonding rates and costs, letter of credit fees, mobilization and facilities costs, permitting costs, costs, maintenance of traffic costs, escalations and any other factor utilized to develop or support the Design-Build Price to account for the entire scope of Work as required.

"Operating Period" has the meaning given to it in the Section P3 Agreement Term Sheet.

"Operating Period O&M Report" means the report described in Exhibit 6 Article 25 (Operations and Maintenance).

"Operating Period Traffic Incident Management Plan" means the Plan described in Exhibit 6 Article 25 (Operations and Maintenance).

"Operations and Maintenance Plan" a written document and a Sub-Plan of the Section Management Plan as described in Exhibit 6 Article 25 (Operations and Maintenance).

"Operations Reporting System" means a process, method or form of organization used to tabulate, document, and report on Operations Work.

"Opportunity MDOT" means a program established by MDOT designed to strengthen and grow Maryland's businesses, workforce and economy by creating more diverse and inclusive teams, foster innovative ideas, broaden stakeholder involvement, and successfully deliver transportation projects in new and better ways.

"Option Assembly Package" has the meaning given to it in Exhibit 6 Article 8 (Right-of-Way) Section 8.6.2.1 (ROW Negotiations).

"Over-the-Shoulder Reviews" means an informal evaluation of design progress as described in Exhibit 6 Article 2 (Technical Provisions) Section 2.7.1 (Over-the-Shoulder Reviews).

"Pavement Design Report" a design document supporting the selected pavement section used for the Work.

"Pavement Management Database" is defined in Exhibit 6 Article 27 (Data Management for MDOT Systems).

"Performance Inspections" are described in Exhibit 6 Article 25 (Operations and Maintenance).

"Performance Measures" refers to O&M Performance Requirements in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance).

"Performance Measures Report" is described in Exhibit 6 Article 25 (Operations and Maintenance).

"Permanent Repair" means, following the occurrence of a Noncompliance Event, the resolution and cure of the Noncompliance Event in a way that the Section Developer is in full compliance with the Section P3 Agreement.

"Permitted Lane Closures" a restriction on the use of a portion of a traveled roadway in accordance with Exhibit 6 Article 22 (Maintenance of Traffic) which has been accepted by MDOT or the AHJ.

"Permitted Vehicles" has the meaning given to it in the Section P3 Agreement Term Sheet.

"Phase Office" means the facilities described in Exhibit 6 Article 23 (Construction) Section 23.5 (Phase and Section Offices).

"Phase Wide Objectives" means the expected outcomes of the Work as described in Exhibit 6 Article 1 (Scope of Predevelopment Work) Section 1.2 (Phase Wide Objectives).

"Pipes and Drainage" mean the stormwater conveyance systems listed in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-5 (Asset O&M Responsibility Matrix).

"Plan" refers to:

- any of the named written procedures identified in the Phase P3 Agreement detailing how the Work will be executed; or
- any procedure required for the Work where detail of the process, procedures, steps, etc. are needed for the proper execution of the Work; or
- drawings or graphical depictions of an Element or Elements used for the Work; or
- a combination of the above as the context requires.

“PML Structure” a structure carrying only Priced Managed Lanes or direct access on/off ramps. On/off ramp structures associated with direct access are considered PML Structures up to the joint between the structure and the outside face of the traffic barrier of the opposing structure. In the case where two separate superstructures are supported by common substructure units, and one of the superstructures carry only Priced Managed Lanes, that superstructure is considered a PML Structure, but the common substructure is not considered a PLM Structure.

“Precedence Diagram Method” a means of preparing schedule network diagram using nodes to represent activities and connecting them with arrows that show the dependencies, also referred to as the activity-on-node method.

“Preliminary Section Design Activity” the first stage of the Design Work representing the initial development and presenting the basic configuration of the Work. Preliminary Section Design Activities may be completed as part of the Predevelopment Work. If not included with Predevelopment Work, Preliminary Section Design Activities shall be performed at the outset of the Section Design Work.

“Preliminary Maintenance Schedule” means the schedule outlining the schedule of maintenance activities of Elements.

“Primavera Proprietary Exchange Format” an electronic file format used to transfer schedule information to or from Primavera scheduling software.

“Privately Owned Additional Properties” has the meaning given to it in the Section P3 Agreement Term Sheet.

“Programmatic Agreement” a written document prepared by MDOT used to govern the implementation of the P3 Program environmental compliance responsibilities and the resolution of adverse effects resulting from the P3 Program and as defined in Title 36 of CFR Part 800.14(b).

“Project Calendar” see “Work Calendar.”

“Protection of Existing Structures Plan” a written document detailing the strategies and approaches used to avoid damage to existing structures that might be impacted by the Work.

“Public Education and Awareness Program” means the public outreach and engagement approach as described in Exhibit 6 Article 4 (Public Outreach and Engagement) Section 4.6 (Public Education and Awareness Program).

“Public Outreach and Engagement Plan” a written document detailing the strategies and approaches to be used to interact with the public and keep them informed of activities affiliated with the Phase or Section as described in Exhibit 6 Article 4 (Public Outreach and Engagement) Section 4.5 (Stakeholder Outreach and Information).

“Public Relations Coordinator” mean the individuals meeting the requirements of Exhibit 6 Article 4 (Public Outreach and Engagement) Section 4.4 (Public Relations Coordinator).

“Publicly Owned Additional Properties” has the meaning given to it in the Section P3 Agreement Term Sheet.

"Quality Management Plan" a written document presenting the procedures, roles and responsibilities requirements to be met to achieve quality in all aspects of the Work as described in Exhibit 6 Article 3 (Management and Administration of the Work) Section 3.4.2 (Quality Management Plan).

"Quality Management System" a collection of processes intended to ensure Work meets the requirements of the Section P3 Agreement.

"Railroad" any rail transportation system (regardless of Class as defined by the Interstate Commerce Commission) or any transit system operating on a rail network within or adjacent to the Phase.

"Railroad Agreement" means a Third Party MOU executed by MDOT for the purposes of defining the relationship between a Railroad and the P3 Program.

"Record of Negotiations" is documentation of the ROW acquisition process using MDOT SHA ORE Form 17 as noted in Exhibit 6 Article 8 (Right-of-Way) Section 8.6.2.1 (ROW Negotiations).

"Recovery Schedule" a special schedule showing special efforts to be performed when the projected finish date is no longer showing timely completion.

"Recurrence Interval" means the timeframe for Mitigation, Temporary Repair, or Permanent Repair commencing upon expiration of the prior Mitigation Period, Temporary Repair Period or Permanent Repair Period identified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-6 (Operating Period Performance) and Exhibit 6 Article 25 (Operations and Maintenance) Table 25-7 (D&C Period Performance).

"Reference Design" –mean designs prepared by MDOT and consisting of various documents including Plans, reports, testing, and other related information used to support the environmental approvals process.

"Reforestation Law" has the meaning given in Exhibit 6 Article 5 (Environmental Management) Section 5.4.7.1 (Forest and Tree Permits and Approvals).

"Release for Construction Certificate" documentation indicating the design is in accordance with all requirements of the Section P3 Agreement and is suitable to be used to start the Construction Work.

"Release for Construction" or "Released for Construction" a Design Deliverable that can be used for Construction Work.

"Relevant Infrastructure" means:

- during the D&C Period, all infrastructure within the construction zone, including the Section D&C Work and any infrastructure subject to the D&C Section O&M Work; and
- during the Operating Period, all infrastructure within the O&M Limits with the exception of Non-Maintained Infrastructure.

"Reliability" has the definition given in Exhibit 6 Article 25 (Operations and Maintenance).

"Renewal Work" means major maintenance, repair, reconstruction, rehabilitation, restoration or replacement of any Element, Elements, portion of the Section or the entire Section that is not normally included as routine maintenance for transportation facilities of similar natures and in similar environments as the Section.

"Renewal Work General Conditions Cost Percentage" means the maximum percentage that may be applied to the portion of the O&M Costs attributable to Renewal Work for each Section of the Phase on account of Renewal Work General Conditions Costs in the O&M Costing Model derived from the

Proposal "Renewal Work General Conditions Cost Percentage" in the Phase Developer's Financial Proposal.

"Renewal Work General Conditions Costs" means direct project overhead costs incurred for any subcontract for Renewal Work. For the avoidance of doubt, Renewal Work General Conditions Costs shall include the following items required for subcontracted Renewal Work for each section:

- bonds, all types;
- non-payroll insurance;
- mobilization/demobilization including all O&M preparatory/dissolution operations that include the movement of personnel and equipment to/from the Phase 1 site;
- subsistence (covers any expenses for staff outside of the travel, lodging, relocation, per diem);
- travel;
- lodging;
- per diem;
- project oversight, supervision, and administration;
- vehicles for project oversight, supervision, administration, and management including, but not limited to, registrations, fuel, maintenance, and insurance;
- technology and communications, including, but not limited to, phones, computers, internet connections, radios, and tablets;
- temporary facilities including, but not limited to, rent, security and access control, utilities, office equipment, office expenses, furniture, insurance, and taxes;
- temporary staging areas, fuel depots, laydown areas, and storage yards; and
- miscellaneous including escalations, certifications for staff required for the Work, and incidentals .

"Renewal Work Plan" means the Plan as described in Exhibit 6 Article 25 (Operations and Maintenance) Section 25.8.1 (Renewal Work Plan).

"Renewal Work Schedule" means the record showing planned start and finish dates for all Renewal Work to be performed.

"Residual Element" portions of a structure remaining after other portions are removed, replaced, or rehabilitated.

"Residual Life" period of time an Element or Asset can serve its intended function after Handback.

"Residual Life Methodology" means the procedure used to determine the Residual Life of an Element, in accordance with the minimum requirements specified in Exhibit 6 Article 26 (Handback)

"Restoration Credit" means a regulatory currency tied to, and granted for, implementation of BMPs to comply with NPDES MS4 Permits or to meet applicable wasteload allocations for US EPA approved TMDLs, whereby respective amounts are granted based on the MDE document "Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permits" or based on supplementary US EPA, MDE, or both, regulatory guidance applicable to NPDES MS4 Permits or US EPA approved TMDLs.

"Restoration Plan" means a written document submitted by an MS4 jurisdiction to, and approved by, MDE or US EPA identifying water quality improvement opportunities and a schedule for BMP

implementation to meet stormwater wasteload allocations included in US EPA approved TMDLs or to meet impervious surface area treatment requirements established as conditions in an NPDES MS4 Permit.

“Retained Elements” portions of the Work which are operated and maintained by the Section Developer, MDOT, or a third party.

“Retaining Wall” a structure supporting earth or other materials a minimum of five-feet tall measured from the top of footing to top of wall.

“Revised Baseline Schedule” a change to the Baseline Schedule made when the scope of the Work has been significantly modified.

“Routine Maintenance” means the repair from normal wear and tear due to traffic and weather, Incidents, etc. as described in Exhibit 6 Article 25 (Operations and Maintenance).

“Routine Maintenance Work Plan” means a written document described in Exhibit 6 Article 25 (Operations and Maintenance).

“Routine Section O&M Work” means all Section O&M Work other than Renewal Work.

“ROW” means all property or property interests acquired for the Phase including the Permanent ROW and Additional Properties.

“ROW Acquisition Manager” means the individual meeting the requirements stipulated in Exhibit 6 Article 8 (Right-of-Way) Section 8.5.6.1 (ROW Acquisition Manager).

“ROW Acquisition Plan” means a written document described in Exhibit 6 Article 8 (Right-of-Way) Section 8.5.2 (ROW Acquisition Plan).

“ROW Acquisition Schedule” means a work record showing planned start and finish dates for acquiring all necessary ROW for the Work as discussed in Exhibit 6 Article 8 (Right-of-Way) Section 8.5.3 (Schedule and Review Procedures).

“ROW Workmap” see “Boundary Workmap”.

“Safety Management Plan” a written document detailing the procedures to be used to avoid Incidents related to health and safety for all Persons involved in the Work.

“Schedule Activities” components of the Work used to Plan and sequence the Work.

“Schedule of Values” an allocation of portions of the Design-Build Price to various Work activities and used as the basis for reviewing D&C Contractor’s applications for payment.

“Section Closeout Plan” means a written document as described in Exhibit 6 Article 23 (Construction) Section 23.12 (Section Closeout).

“Section Management Plan” a written document serving as an overall guide to the administration and coordination of the Work describing the approaches, procedures, personnel, and strategies to be used to ensure the Work meets the requirement of the Section P3 Agreement.

“Section Office” means the facilities described in Exhibit 6 Article 23 (Construction) Section 23.5 (Phase and Section Offices).

“Section Quality Manager” means the individual meeting the requirements of Exhibit 6 Article 3 (Management and Administration of the Work) Section 3.4.1 (Staffing).

"Shared Elements" or "Shared Assets" means the elements that will be shared between the Section Developer and MDOT as specified in Exhibit 6 Article 25 (Operations and Maintenance) Table 25-5 (Asset O&M Responsibility Matrix).

"Shared O&M Protocols" are defined in Exhibit 6 Article 25 (Operations and Maintenance).

"Shared O&M Protocol Agreement" means an agreement between MDOT and the Section Developer defining Shared O&M Protocols and Shared O&M Responsibilities.

"Shared O&M Responsibilities" means O&M activities during the D&C and Operating Periods that will be shared between the Section Developer and MDOT.

"Shared Responsibility Protocols" is a component of the O&M Plan discussed in Exhibit 6 Article 25 (Operations and Maintenance).

"Shared Substructure" a substructure supporting both a Priced Managed Lane superstructure and General Purpose Lane superstructure. If a gap of greater than 2" existing between substructures and one of the substructure units only carry Priced Managed Lane superstructures, that substructure shall be considered a Priced Managed Lane Structure.

"Site" has the meaning given to it in the Section P3 Agreement Term Sheet.

"Site Wall" A structure supporting earth or other materials less than five-feet tall measured from the top of footing to top of wall.

"Small Structure" structure with clear span length less than 20 feet but greater than or equal to 60 inches or a structure with clear span length less than 60 inches but greater than or equal to 36 inches only if the fill height over the structure is less than the span length of the structure. Pipes without headwalls with a clear distance between openings less than or equal to ½ the diameter of the smaller contiguous opening will be considered a battery of pipes (one Small Structure). If this criterion is not met, but the pipes share a common headwall, they will be considered one Small Structure.

"Special Flood Hazard Area" a region depicted on a Flood Insurance Rate Map with a special risk such as the potential for mudflow or erosion.

"Specialty Calendars" restrictions on activities in a schedule imposed due to weather, holidays or other similar events.

"Spill Prevention, Control, and Countermeasure Plan" a written document and part of the Environmental Compliance Plan detailing procedures for addressing the accidental release of Hazardous Materials.

"Stakeholder" Motorists, citizens, businesses, communities, local groups and organizations, residential communities, elected officials, first responders, Governmental Entities, third parties or other similar individuals or organizations with an interest in the P3 Program.

"Stormwater Management/Erosion and Sediment Control Manager" an individual with the duties and responsibilities identified in Exhibit 6 Article 13 (Drainage, SWM & ESC) Section 13.2 (Stormwater Management/Erosion and Sediment Control Manager).

"Sub-Plan" a written document that is a portion of a parent document.

"Subsurface Exploration Plan" a written document detailing procedures for geotechnical engineering as described in Exhibit 6 Article 9 (Geotechnical Engineering) Section 9.3.1 (Subsurface Exploration Plan).

"Stormwater Management Facilities" defined in Exhibit 6 Article 25 (Operations and Maintenance).

"SWM Facility As-Built Certification Package" a Construction Deliverable presenting the final constructed condition of stormwater management Elements.

"Systems Engineering Management Plan" means a written document as described in Exhibit 6 Article 19 (Intelligent Transportation Systems) Section 19.5.2 (Systems Engineering Management Plan).

"Technical Noise Analysis Report" a design document supporting the parameters used for design and selection of sound barriers.

"Technical Provisions" means Exhibit 6 Articles 2 through 27.

"Temporary Construction Area" has the meaning given to it in the Section P3 Agreement Term Sheet.

"Temporary Repair" means, following the occurrence of a Noncompliance Event, Work of an interim nature that does not constitute Permanent Repair but in MDOT's reasonable opinion:

- (a) leaves the relevant Element in a state or condition that allows that Element to be used for the purpose designated under the Section P3 Agreement, Applicable Law and Good Industry Practice;
- (b) allows all users who are entitled to enter, leave, occupy or use the Site are able to do so safely and conveniently using normal access routes; and
- (c) substantially makes good the relevant Noncompliance Event until a Permanent Repair can be undertaken

"Third Party" means a Utility Owner or Governmental Entity with which MDOT has an agreement or MOU relating to the execution of the P3 Program.

"Third Party MOU" has the meaning given to it in the Section P3 Agreement Term Sheet.

"Time Impact Analysis" an evaluation of certain events and how those events may or have affected the progress of the Work as discussed in Exhibit 6 Article 3 (Management and Administration of the Work) Section 3.2.5.9 (Time Impact Analysis).

"Time Impact Analysis Schedule" a Work record showing planned start and finish dates for Work to be performed and showing the logic used in the sequence of construction which is used to present the results of a Time Impact Analysis.

"Toll Rate" has the meaning given to it in the Tolling Services Agreement Term Sheet.

"Toll Rate Range Maximum" has the meaning given to it in the Section P3 Agreement Term Sheet.

"Toll Rate Signs" means all signing required to properly advise drivers of entrances, exits, Toll Rates or other features of the PMLs.

"Toll Revenue" has the meaning given to it in the Section P3 Agreement Term Sheet.

"Toll Transaction" has the meaning given to it in the Tolling Services Agreement Term Sheet.

"Tolling Back-Office Systems" means the portion of the electronic toll collection system or customer service system functioning behind the scenes to minimize human intervention in Toll Transaction processing, account management, and reconciliation. The Tolling Back-Office System for each party's system is the interface between the Developer's ETCS Host and MDTA's Host.

"Tolling Manager" means the individual meeting the requirements described in Exhibit 6 Article 25 (Operations and Maintenance) Section 25.3.3 (Staffing).

"Tolling Point" has the meaning given to it in the Tolling Services Agreement Term Sheet.

"Tolling Services Agreement" has the meaning given to it in the Section P3 Agreement Term Sheet.

"Tolling Services Agreement Term Sheet" means the term sheet of the Tolling Services Agreement included as an exhibit to the Section P3 Agreement Term Sheet

"Tolling Strategy Plan" has the definition given in Exhibit 6 Article 24 (Electronic Toll Collection Infrastructure).

"Traffic and Revenue Annual Report" a written document submitted yearly as described in Exhibit 6 Article 24 (Electronic Toll Collection Infrastructure).

"Traffic and Revenue Monthly Report" a written document submitted monthly as described in Exhibit 6 Article 24 (Electronic Toll Collection Infrastructure).

"Traffic Control Design Manager" an individual with the duties and responsibilities identified in Exhibit 6 Article 22 (Maintenance of Traffic) Section 22.9.1 (Design).

"Traffic Control Construction Manager" an individual with the duties and responsibilities identified in Exhibit 6 Article 22 (Maintenance of Traffic) Section 22.9.2 (Construction).

"Traffic Operational Analysis" an evaluation of the flow of vehicles on a particular segment of a roadway.

"Transition and Coordination Plan" is the Plan described in Exhibit 6 Article 25 (Operations and Maintenance).

"Transaction Fee" has the meaning given to it in the Tolling Services Agreement Term Sheet.

"Transponder" has the meaning given to it in the Tolling Services Agreement Term Sheet.

"Transponder Transaction" has the meaning given to it in the Tolling Services Agreement Term Sheet.

"Transportation Management Plan" A written document describing strategies and methodologies to be used when controlling traffic during the Work.

"Trip" has the meaning given to it in the Tolling Services Agreement Term Sheet.

"Two-Lane or Multi-lane Overpass/Underpass Roadway" a highway crossing the over or under Mainline with a minimum of one travel lane in each direction.

"Unacceptable Customer Service Event" has the meaning given to it in the Tolling Services Agreement Term Sheet.

"Uniform Act" means Public Law 91-646, the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

"Unknown Archaeological Remains" has the meaning given to it in the Section P3 Agreement Term Sheet.

"Unknown Endangered Species" has the meaning given to it in the Section P3 Agreement Term Sheet.

"Unknown Hazardous Environmental Condition" has the meaning given to it in the Section P3 Agreement Term Sheet.

"Unknown Utility" has the meaning given to it in the Section P3 Agreement Term Sheet.

"Upfront Payment" has the meaning given to it in the Section P3 Agreement Term Sheet.

"USACE" has the meaning given to it in the Section P3 Agreement Term Sheet.

"Useful Life" means, for an Element, the period following its first installation, or following its last reconstruction, rehabilitation, restoration, renewal, or replacement, until the Element will next require reconstruction, rehabilitation, restoration, renewal, or replacement.

"User" has the meaning given to it in the Tolling Services Agreement Term Sheet.

"Utility Adjustment" has the meaning given to it in the Section P3 Agreement Term Sheet.

"Utility Adjustment Work" has the meaning given to it in the Section P3 Agreement Term Sheet.

"Utility Adjustment Matrix" is a listing of potential Utility Impacts.

"Utility Adjustment Package" a Submittal presenting design detailing proposed Work to be performed by a specific utility or for a specific portion of the Work in support of a particular Utility Adjustment.

"Utility Agreement" has the meaning given to it in Exhibit 6 Article 1 (Predevelopment Work) Section 1.12 (Utility Work).

"Utility Clearance Report" a final report stating that all utilities have been identified and adjusted as necessary so that no Utility impacts remain requiring further Utility Adjustments.

"Utility Conflict" a Utility impact in which the utility in its existing position or condition prevents the Work from occurring without a physical adjustment of the Utility or a change in the design.

"Utility Coordinator" an individual charged with the responsibility of working with Utility Owners to identify and resolve all utility issues encountered during the Work meeting the requirements of Exhibit 6 Article 7 (Utility Coordination) Section 7.1.2 (Utility Coordinator).

"Utility Framework Agreement" has the meaning given to it in Exhibit 6 Article 1 (Predevelopment Work) Section 1.12 (Utility Work).

"Utility Impact" an adverse effect on a Utility brought about by the Work.

"Utility Status Report" a monthly narrative discussing the current status of the Utility Work.

"Utility Work Plan" an outline of the Phase Developer's approach, procedures and processes for identifying and performing Utility Adjustments, including coordination with Utility Owners.

"Valid Trip" has the meaning given to it in the Tolling Services Agreement Term Sheet.

"VDOT I-495 Northern Extension Project" Also referred to as Project NEXT, the VDOT I-495 Northern Extension Project is a study to evaluate extending the 495 Express Lanes by approximately three miles from the I-495 and Dulles Toll Road interchange to the vicinity of the American Legion Bridge.

"Viable Planting" vegetation meeting minimum size requirements as specified, is healthy, and more than 75 percent of the individual plant is alive and surviving in its current growing conditions.

"Water Quality Certification" a permit required for the Work demonstrating compliance with the provisions of the Clean Water Act (Title 40 of CFR).

"Water Quality Summary Sheet" a tabulation presenting the status of the required water quality credits needed for the Work.

"Waters of the US" has the definition as provided in 40 CFR 230.3(s).

"Winter Patrol Diary" is as defined Exhibit 6 Article 25 (Operations and Maintenance).

"Winter Operations Record" is as defined Exhibit 6 Article 25 (Operations and Maintenance).

"Work Breakdown Structure" a Deliverable-oriented classification of the Work into smaller components to facilitate scheduling and management of the overall Work.

"Work Calendar" calendar defining global working and non-working periods.

"Written Narrative" text prepared to explain, describe or discuss a particular item or activity.

Exhibit 6

Appendix B – Standards and References

A list of potential references, standards, codes and guidelines is included in this appendix to the Technical Provisions. The listing of standards below is for the Phase Developer's convenience only, the list is not to be considered comprehensive and, accordingly, such listing shall not be interpreted as limiting the application of such standards only to one specified technical discipline if they are also applicable to other technical disciplines. The current edition at Setting Date (per the pertinent Section P3 Agreement) shall govern. The Phase Developer is alerted that portions of the Phase included on the National Highway System are required to adhere to design standards as listed in 23 CFR 625.

Federal:

- Federal Lands Project Development and Design Manual
- Eastern Federal Lands Supplements to the Project Development and Design Manual
- Federal Lands Standard Drawings
- FEMA - 44 CFR Part 10 - Environmental Considerations, October 2011
- FEMA - 44 CFR Part 9 - Floodplain Management and Protection of Wetlands, October 2011
- FEMA - 44 CFR Parts 69, 60, 65 and 70: National Flood Insurance Program (NFIP) Regulations
- FHWA - 23 CFR Part 772-Procedures for Abatement of Highway Traffic Noise and Construction Noise
- FHWA - Corrosion/Degradation of Soil Reinforcements for Mechanically Stabilized Earth Walls and Reinforced Soil Slopes
- FHWA - Design and Construction of Continuous Flight Auger Piles
- FHWA - Design Standards for Highways (23 CFR 625)
- FHWA - Foundation Reuse for Highway Bridges (FHWA-HIF-18-055)
- FHWA - Geotechnical Engineering Circular No. 2 - Earth Retaining Systems (FHWA-SA-96-038)
- FHWA - Geotechnical Engineering Circular No. 3 - Earthquake Engineering for Highways, Design Principles
- FHWA - Geotechnical Engineering Circular No. 4 - Ground Anchors and Anchored Systems (FHWA-IF-99-015)
- FHWA - Geotechnical Engineering Circular No. 5 - Geotechnical Site Characterization (FHWA-NHI-16-072)
- FHWA - Geotechnical Engineering Circular No. 6 - Shallow Foundations (FHWA-IF-02-054)
- FHWA - Geotechnical Engineering Circular No. 7 - Soil Nail Walls (FHWA-NHI-14-007)
- FHWA - Geotechnical Engineering Circular No. 8 - Design and Construction of Continuous Flight Auger Piles (FHWA-HIF-07-039)
- FHWA - Geotechnical Engineering Circular No. 9 - Design, Analysis, and Testing of Laterally Loaded Deep Foundations that Support Transportation Facilities
- FHWA - Geotechnical Engineering Circular No. 10 - Drilled Shafts: Construction Procedures and Design Methods (NHI 18-024)
- FHWA - Geotechnical Engineering Circular No. 11 - Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes, Vol. I and Design and Construction of

Mechanically Stabilized Earth Walls and Reinforced Soil Slopes, Vol. II (FHWA-NHI-10-024 and FHWA-NHI-10-025)

- FHWA - Geotechnical Engineering Circular No. 12 – Design and Construction of Driven Pile Foundations, Vol. I and Design and Construction of Driven Pile Foundations, Vol. II (FHWA-NHI-16-009 and FHWA-NHI-16-010)
- FHWA Geotechnical Engineering Circular No. 13 – Ground Modification Methods Reference Manual, Vol. I and Ground Modification Methods Reference Manual, Vol. II (FHWA-NHI-16-027 and FHWA-NHI-16-028)
- FHWA - Geotechnical Engineering Circular No. 14 – Assuring Quality in Geotechnical Reporting Documents (FHWA-HIF-17-016)
- FHWA - Geotechnical Instrumentation (FHWA-HI-98-034)
- FHWA - Ground Anchors and Anchored Systems
- FHWA - Guidance on NEPA and Planning Requirements, February 9, 2011
- FHWA - Guidelines for the Visual Impact Assessment of Highway Projects
- FHWA - Highway Traffic Noise: Analysis and Abatement Guidance
- FHWA - HOP-07-001 Developing and Using a Concept of Operations in Transportation Management Systems
- FHWA - HOP-15-023 Use of Freeway Shoulders for Travel - Guide for Planning, Evaluating, and Designing Part-Time Shoulder Use as a Traffic Management Strategy
- FHWA - HRT-13-092 Distress Identification Manual for Long-Term Pavement Performance Program
- FHWA - Manuals Hydraulic Engineering Circular Number 18 (HEC-18) Evaluating Scour at Bridges
- FHWA - Hydraulic Engineering Circular Number 20 (HEC-20) Stream Stability at Highways, 4th Edition, 2012
- FHWA - Hydraulic Engineering Circular Number 23 (HEC-23), Bridge Scour and Stream Instability Countermeasures – Experience, Selection and Design Guidance, Third Edition, Volumes 1 and 2, 2009
- FHWA - Interstate Access System Informational Guide
- FHWA - Lateral Support Systems and Underpinnings, Volumes 1, 2, and 3
- FHWA - Manual for Assessing Safety Hardware
- FHWA - Manual for Design & Construction of Soil Nail Walls
- FHWA - Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD)
- FHWA - Mechanically Stabilized Earth Walls and Reinforced Soil Slopes - Design and Construction Guidelines
- FHWA - Memo HIBT-10 “Clarification of Requirements for Fracture Critical Members”
- FHWA - Memo “Revisions to Controlling Criteria for Design and Documentation for Design Exceptions”
- FHWA - Micropile Design and Construction Reference Manual (FHWA-NHI-05-039)
- FHWA - Mitigation Strategies for Design Exceptions
- FHWA - National Bridge Inspection Standards

- FHWA - NCHRP 07-20 Guidance for Implementation of Traffic Incident Management Performance Measures
- FHWA - NCHRP Report 672, Roundabouts: An Information Guide
- FHWA - NHI-05-037 Geotechnical Aspects of Pavements
- FHWA - NJ-2008-004 Evaluation of Poisson's Ratio for Use in the Mechanistic Empirical Pavement Design Guide (MEPDG)
- FHWA - Noise Barrier Design Handbook
- FHWA - Policy on Access to Interstate System
- FHWA - RD-01-050 Tech Brief Durability of Geosynthetics for Highway Applications
- FHWA - RD-03-031 Pavement Distress Identification Manual
- FHWA - RD-78-022 Analysis of N-Layered Viscoelastic Pavement Systems
- FHWA - Real Estate Acquisition Guide for Local Public Agencies
- FHWA - Recommendations for Bridge and Tunnel Security
- FHWA - SA-95-003 Background of SUPERPAVE Asphalt Mixture Design & Analysis
- FHWA - SC-06-003 Investigation of Graded Aggregate Base Courses
- FHWA - Section 4(f) Policy Paper, July 20, 2012
- FHWA - Soil Nailing Field Inspectors Manual
- FHWA - Soil Nailing for Stabilization of Highway Slopes and Excavations
- FHWA - Soils and Foundations Reference Manual, Volumes I and Soils and Foundations Reference Manual, Vol II (FHWA-NHI-06-088 and FHWA-NHI-06-089)
- FHWA - Standard Highway Signs
- FHWA - Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects
- FHWA - Subsurface Investigations - Geotechnical Site Characterization Reference Manual for NHI 123031
- FHWA - Systems Engineering for Intelligent Transportation Systems
- FHWA - Tiebacks
- FHWA - Traffic Noise Model, Version 2.5
- FHWA - TS-80-224 Highway Subdrainage Design
- FHWA - Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents October 18, 2016
- FHWA - Your Rights and Benefits as a Displaced Person under the Federal Relocation Assistance Program
- Fixing America's Surface Transportation Act- Integrated vegetation management practices and habitat development to protect pollinators
- National Transportation Communications for ITS (Intelligent Transportation Systems) Protocol
- NCHRP Report 663, Design of Roadside Barrier Systems Placed on MSE Retaining Walls
- NCHRP 350 F Shape Temporary Concrete Barrier Policy.pdf

- NCHRP 835, Guidelines for Implementing Managed Lanes
- NCHRP Report 350, Recommended Procedures for the Safety Performance Evaluation of Highway Features
- NCHRP Report 523 Pavement Preventive Maintenance
- NCHRP Report 529 - Guideline and Recommended Standard for Geofoam Applications in Highway Embankments
- NCHRP Report 553 – Crashworthy Work Zone Traffic Control Devices
- NCHRP Report 597 - Development of a Recommended Practice for Use of Controlled Low-Strength Material in Highway Construction
- NCHRP Report 673: A Manual for Design of Hot Mix Asphalt with Commentary
- NCHRP Report 796, Development and Calibration of AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals
- NCHRP Synthesis 382: Stiffness of subgrade for pavement design.
- NCHRP Web Document 65 (Project 24-11) - Geofoam Applications in the Design and Construction of Highway Embankments
- NCHRP Web-Only Document 144: Stabilization of Subgrade Soils and Base Material
- NCHRP Web-Only Document 159: Supporting Materials for NCHRP Report 673
- NCHRP Web-Only Document: 035 Rehabilitation Strategies for Highway Pavements
- Occupational Safety and Health Act (OSHA)
- Occupational Safety and Health Administration (OSHA) Standards
- Public Law 106-224 - Agriculture Risk Protection Act, 2000
- Public Law 88-577 - Wilderness Act of 1964
- Public Law 93-205 – Endangered Species Act, 1973
- Public Law 94-588– National Forest Management Act of 1976
- Title 23 - Code of Federal Regulations, Subchapter K - Intelligent Transportation Systems (Federal Rule 940)
- Transportation Research Board Accessible Pedestrian Signals: Synthesis and Guide to Best Practices
- Transportation Research Board Highway Capacity Manual
- USACE - 1987 Corps of Engineers Wetlands Delineation Manual
- USACE - 2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0)
- USACE - 2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountain and Piedmont Region (Version 2.0)
- USACE - 33 USC 408 (Chapter 9.1), Navigation and Navigable Waters
- USACE - Clean Water Act (33 USC 1251 et seq.) Section 404 (33 USC 1344)
- USACE - Clean Water Act Section 401, Water Quality Certification
- USACE - Clean Water Act Section 404 Permit Application and Authorization
- USACE - EM 385-1-1, Safety and Health Requirements Manual

- USACE - EM 385-1-97, Explosives - Safety and Health Requirements Manual
- USACE - ETL No. 1110-2-307 Flotation Stability Criteria for Concrete Hydraulic Structures
- USACE - Maryland State Programmatic General Permit-5 guidelines
- USACE - Regulatory Guidance Letter - Minimum Monitoring Requirements for Compensatory Mitigation Projects Involving Restoration, Establishment, and/or Enhancement of Aquatic Resources
- USACE - River Analysis System (HEC RAS), Version 5.0
- USACE - Rivers and Harbors Act of 1899 (33 USC 401 et seq.) Section 10 (33 USC 403)
- USACE/EPA - Compensatory Mitigation for Losses of Aquatic Resources; Final Rule (USACE 33 CFR Part 332 and 325; EPA 40 CFR Part 230)
- USACE/EPA- Final Rule: Navigable Waters Protection Rule (USACE 33 CFR 328 and EPA 40 CFR Parts 110, 112, 116, 117, 120, 122, 230, 232, 300, 302, 401)
- USDA - State of MARYLAND 2014 Wetland Plant List
- USDA - The PLANTS Database
- US Department of the Interior - Native American Graves Protection Act
- USDOT - 49 CFR 171-179 – Hazardous Material Regulations
- USDOT - ADA Accessibility Guidelines for Buildings and Facilities
- USDOT - Americans with Disabilities Act (ADA) Accessible Transportation Facilities
- USDOT - National ITS Architecture
- USDOT/FHWA - Foundation Reuse for Highway Bridges (FHWA-HIF-18-055)
- US EPA - 40 CFR 239-259 – Non-Hazardous Waste
- US EPA - 40 CFR 260-273 – Hazardous Waste
- US EPA - Clean Water Act Section 404 Compensatory Mitigation Requirements
- US EPA - National Ambient Air Quality Standards for Particulate Matter, January 15, 2013
- US Fish and Wildlife Service (USFWS) - Endangered Species Act (16 USC 1531- 1544) Focus on ESA Section 7(a)(2), ESA Section 9, and ESA Section 7(a)(1)
- USFWS - Fish and Wildlife Coordination Act 16 U.S.C. 661-667e
- USFWS - Migratory Bird Treaty Act of 1918 (16 USC 703-712; Ch. 128; July 13, 1918; 40 Stat. 755)
- USFWS - National Bald Eagle Management Guidelines
- USFWS - Native Plants for Wildlife Habitat and Conservation, Chesapeake Bay Watershed

AASHTO:

- A Guide for Protective Screening of Overpass Structures
- A Guide for Transportation Landscape and Environmental Design
- A Policy on Design Standards – Interstate System
- A Policy on Geometric Design of Highways and Streets

- AASHTOWare Pavement ME Design v2.5
- Bridge Aesthetics Sourcebook
- DARWin Pavement Software
- Guide Design Specification for Bridge Temporary Works
- Guide for Design of Pavement Structures
- Guide for the Development of Bicycle Facilities
- Guide for the Planning, Design, and Operation of Pedestrian Facilities.
- Guide Specifications and Commentary for Vessel Collision Design of Highway Bridges
- Guide Specifications for Design and Construction of Segmental Concrete Bridges
- Guide Specifications for Seismic Isolation Design
- Guide Specifications for Wind Loads on Bridges During Construction.
- Highway Safety Design and Operations Guide
- Highway Safety Manual
- LRFD Bridge Design Specifications, Customary U.S. Units
- LRFD Guide Specifications for the Design of Pedestrian Bridges
- LRFD Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals
- M288 - Geotextile Specification for Highway
- M320 - Performance-Graded Asphalt Binder
- M323 - Superpave Volumetric Mix Design
- Manual for Assessing Safety Hardware (MASH)
- Manual for Bridge Element Inspection
- Manual for Bridge Evaluation
- Manual on Subsurface Investigations
- Mechanical Empirical Pavement Design Guide
- R 8-96, Standard Recommended Practice for Evaluation of Transportation-Related Earthborn Vibrations
- R25 - Superpave Volumetric Design for Hot-Mix Asphalt
- Roadside Design Guide
- Roadway Lighting Design Guide
- Standard Specifications for Highway Bridges
- Standard Specifications for Structural Supports of Highway Signs, Luminaires and Traffic Signals
- LRFD Bridge Construction Specifications

Maryland:

- Code of Maryland Regulations (COMAR)
- COMAR 08.07.02 - Roadside Tree Care
- COMAR 15.01 through 15.22 – Nutrient Management
- COMAR 15.20.07 - Agricultural Operation Nutrient Management Plan Requirements, 2000 County Roadway Standards
- COMAR 26.08.02 - Water Quality
- COMAR 26.08.02.10 - Water Quality Certification
- COMAR 26.11 - Air Quality
- COMAR 26.13 – Disposal of Controlled Hazardous Substances
- COMAR 26.16 - Lead
- COMAR 26.17 - Water Management
- COMAR 26.17.04 - Construction on Nontidal Waters and Floodplains
- COMAR 26.23 - Nontidal Wetlands
- COMAR MD Forest Conservation Act
- COMAR Title 08 Department of Natural Resources, Subtitle 19, Forest Conservation
- COMAR Title 9 Dept. of Labor, Licensing, and Regulation; Subtitle 13, Board for Professional Land Surveyors; Chapter 6 Minimum Standards of practice
- COMAR Title 27 Critical Area Commission for the Chesapeake and Atlantic Coastal Bays
- COMAR TR 25-104 Maryland Vehicle Law
- DNR - Maryland Reforestation Law (Annotated Code of Maryland 5-103)
- ITS Maryland - Maryland Statewide ITS Architecture
- Maryland DNR – Maryland’s Invasive and Exotic Species
- Maryland High Voltage Line Act.
- Maryland Reforestation Law – Natural Resources Title 5, Forest and Parks, Subtitle 1, Forest and Parks
- Maryland State Reforestation Law
- Maryland Roadside Tree Law
- Maryland Stormwater Management Law – Water Management Title 26, Department of the Environment, Subtitle 17 Water Management, Chapter 26 Stormwater Management-
- Maryland Threatened and Endangered Species Law – Natural Resources Title 08, Wildlife Subtitle 03, Threatened and Endangered Species
- MDA (Maryland Department of Agriculture) – Maryland Pollinator Protection Plan
- MDA – Maryland Seed Law & Maryland Turfgrass Law
- MDE – 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control
- MDE - Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permits
- MDE – Fill Material and Soil Management

- MDE - Maryland's Waterway Construction Guidelines
- MDE (MD Department of the Environment) – 2000 Maryland Stormwater Design Manual, Volumes I & II
- MDE Policy and Technical Memorandums and Guidelines
- MDOT SHA - Accessibility Policy and Guidelines for Pedestrian Facilities Along State Highways
- MDOT SHA - Bicycle Policy and Design Guidelines
- MDOT SHA - Book of Standards for Highways, Incidental Structures and Traffic Control Applications
- MDOT SHA - CAD Standards
- MDOT SHA - CAD Standards Manual
- MDOT SHA - Environmental Guidelines for Construction
- MDOT SHA - Existing Signal Plans
- MDOT SHA - Guidelines for Traffic Barrier Placement and End Treatment Design
- MDOT SHA - Highway Drainage Manual
- MDOT SHA - Highway Noise Policy
- MDOT SHA - Integrated Vegetation Management Manual for MD Highways
- MDOT SHA - Landscape Design Guide
- MDOT SHA - Lane Closure Permit Form
- MDOT SHA - Manual for Hydrologic and Hydraulic Design
- MDOT SHA - Maryland Manual on Uniform Traffic Control Devices (MD MUTCD)
- MDOT SHA - Maryland State Police InterAgency Work Zone Service Agreement
- MDOT SHA - OED Environmental Assets Viewer
- MDOT SHA - OMT Materials Quality Assurance Processes Manual
- MDOT SHA - OOC Construction Manual
- MDOT SHA - ORE Internal Manuals and Internal Operating Procedures
- MDOT SHA - OOS Aesthetic Bridges Users Guide
- MDOT SHA - OOS Guidelines and Procedures Memorandums
- MDOT SHA - OOS PONTIS Element Data Collection Manual
- MDOT SHA - OOS Standards Manual, Volumes I and II
- MDOT SHA - OOTS Accessible Pedestrian Signals Design Guidelines
- MDOT SHA - OOTS Advance Street Name Sign Policy and Guidelines
- MDOT SHA - OOTS Approved Product List for Temporary Traffic Control Devices and Miscellaneous Items
- MDOT SHA - OOTS Alternate Merge Guidelines
- MDOT SHA - OOTS Cantilever Input Sheet
- MDOT SHA - OOTS Capacity and Queuing Analysis Procedures

- MDOT SHA - OOTS Design Checklist
- MDOT SHA - OOTS Design Request Form Instructions and Guidelines
- MDOT SHA - OOTS DMS Sign Face Layouts
- MDOT SHA - OOTS Flagger Policy at Signalized Intersections
- MDOT SHA - OOTS Ground Mounted Post Selection
- MDOT SHA - OOTS Guidance for the Use of Portable Changeable Message Signs (PCMS) in Work Zones
- MDOT SHA - OOTS Guidance on Maintenance of Traffic Alternatives Analysis (MOTAA)
- MDOT SHA - OOTS Guidelines for Application of Rumble Strips & Rumble Stripes
- MDOT SHA - OOTS Guidelines for Late Lane Merge Concept
- MDOT SHA - OOTS Guidelines for the Use of Dynamic Lane Merging Strategies
- MDOT SHA - OOTS Guidelines for Using Edge Line Extensions & Yield Lines
- MDOT SHA - OOTS Intelligent Transportation Systems (ITS) Design Manual
- MDOT SHA - OOTS ITS Details
- MDOT SHA - OOTS Lighting Guidelines
- MDOT SHA - OOTS Line Striping Material Selection Policy
- MDOT SHA - OOTS Maryland State Police Criteria for Use in Work Zones
- MDOT SHA - OOTS Overhead Double Span Input Sheet
- MDOT SHA - OOTS Overhead Input Sheet
- MDOT SHA - OOTS Operations and Maintenance Standards
- MDOT SHA - OOTS Pavement Marking Policy and Guidelines
- MDOT SHA - OOTS Policy for Determining Yellow Timing at Intersections
- MDOT SHA - OOTS Roadway Delineation Policy
- MDOT SHA - OOTS Shelf Specifications
- MDOT SHA - OOTS Shelf Typical
- MDOT SHA - OOTS Sign Structure Verification Sheet
- MDOT SHA - OOTS Standard Signing Plan Sheet format
- MDOT SHA - OOTS Street Name Sign Policy, Procedures and Guidelines
- MDOT SHA - OOTS Temporary Traffic Barrier Policy
- MDOT SHA - OOTS Traffic Control Devices Design Manual
- MDOT SHA - OOTS Traffic Signal Timing Guidelines and Training Manual
- MDOT SHA - OOTS Transportation Management Plans: Guidelines for Development, Implementation and Evaluation
- MDOT SHA - OOTS Work Zones on 65/60 mph Roadways
- MDOT SHA - Pavement and Geotechnical Design Guide
- MDOT SHA - Policy for the Use of Temporary Traffic Barrier in Work Zones

- MDOT SHA - Pollinator Habitat Plan
- MDOT SHA - PRD Sediment and Stormwater Guidelines and Procedures
- MDOT SHA - Preferred Plant List
- MDOT SHA - Qualified Producers and Products List
- MDOT SHA - Roundabout Design Guidelines
- MDOT SHA - Roundabout Traffic Design Guidelines
- MDOT SHA - Standard and Supplemental Specifications for Construction and Materials, including all Special Provision Inserts
- MDOT SHA - Standard Sign Book
- MDOT SHA - State Highway Access Manual
- MDOT SHA - Turfgrass Management Guidelines
- MDOT SHA - Utility Policy
- MDOT SHA - Vegetation Management Policy
- MDOT SHA - VISSIM Modeling Guidance
- MDOT SHA - Work Zone Lane Closure Analysis Guidelines
- MDOT SHA - Work Zone Safety and Mobility Policy
- MDOT SHA - Work Zone Safety Tool Box

Virginia:

- VDOT - CADD Manual
- VDOT - Construction Manual
- VDOT - Highway Traffic noise Impact Analysis Guidance Manual
- VDOT - Instructional and Informational Memorandum on Bridge Safety Inspections, No. IM-S&B-27.9
- VDOT - Instructional and Informational Memorandum on Load Rating and Posting of Structures (Bridges and Culverts), No. IIIM-S&B-86.2
- VDOT - Instructional and Informational Memorandums
- VDOT - Manual of Instruction for Material Division
- VDOT - Manual of Instructions
- VDOT - Materials Approval List
- VDOT - Noise Report Development and Guidance Document
- VDOT - Pavement Design Guide for Subdivision and Secondary Roads
- VDOT - Road and Bridge Specifications
- VDOT - Road and Bridge Standards, Vol. 1 and Vol. 2
- VDOT - Road Design Manual
- VDOT - State Noise Abatement Policy

- VDOT - Survey Manual issued 2009 Rev. March 2019 and Right of Way Manual of Instructions
- VDOT - Traffic Engineering Design Manual
- VDOT - Utility Manual of Instructions: Utility Relocation Policies and Procedures
- VDOT - Virginia Test Methods Manual
- VDOT - Virginia Work Area Protection Manual
- VDOT Manual of the Structure and Bridge Division
- Virginia - MUTCD Supplement
- Virginia Administrative Code Title 18. Professional and Occupational Licensing Agency 10. Board for Architects, Professional Engineers, Land Surveyors, Certified Interior Designers, and Landscape Architects and Chapter 20. Board for Architects, Professional Engineers, Land Surveyors, Certified Interior Designers and Landscape Architects Regulations
- VDEQ - E&S Control Field Manual
- VDEQ - E&S Handbook Drawing of Standards & Specifications in AutoCAD
- VDEQ - Erosion and Sediment Control Handbook
- VDEQ - Stormwater Management Handbook, Volumes I & II
- VDEQ - Technical Bulletins and Guidance Documents
- VDEQ - Virginia Water Permit
- Virginia Preservation of the Forest Law
- Virginia Seed Tree Law
- Virginia Standard Highway Signs Book
- Virginia Sustainable Forestry Initiative

Local Jurisdictions:

- Maryland-National Capital Park and Planning Commission (M-NCPPC) - Montgomery County Trees Approved Technical Manual
- Montgomery County Design Standards
- Montgomery County DOT Division of Transportation Engineering Design Standards
- Montgomery County DOT Drainage Design Criteria
- Montgomery County DOT Planning Division Road Code
- Montgomery County Forest Conservation Law – Chapter 22A
- Montgomery County Fabricated Pedestrian Bridges Specification
- Montgomery County Roadside Tree Law – Chapter 49, Streets and Roads
- Montgomery County Tree Canopy Conservation Law – Chapter 55 Tree Canopy

Other:

- American Association of Cost Engineering (AACE), Total Cost Management (TCM) Framework
- AACE International Recommended Practice No. 29R-03 Forensic Schedule Analysis (Rev. April 25, 2011)
- AACE International Recommended Practice No. 45R-08 (Rev. June 1, 2009) Scheduling Claims Protection Methods
- AACE International Recommended Practice No. 52R-06 (Rev. May 4, 2017) Prospective Time Impact Analysis – As Applied in Construction
- AACE Recommended Practice No. 53R-06 Schedule Update Review
- American Concrete Institute (ACI), ACI 207, Guide to Mass Concrete
- ACI 318, Building Code Requirements for Reinforced Concrete
- ACI 350, Environmental Engineering Concrete Structures
- ACI 358, 1R-92, Analysis and Design of Reinforced Concrete Guideway Structures, 1992
- ACI 506R – Guide to Shotcrete
- ACI 530, Building Code Requirements and Specification for Masonry Structures and Related Commentaries
- American Institute of Steel Construction (AISC) - Seismic Design Manual
- AISC - Steel Construction Manual
- AISC - Steel Construction Manual, Specification for Structural Steel Buildings
- American National Standards Institute (ANSI) A300 – Pruning Standards
- ANSI Z133.1 – Safety Requirements for Pruning, Trimming, Repair, Maintaining and Removing Trees and Cutting Brush
- ANSI Z60.1 – American Standard for Nursery Stock
- Application of Hydrologic Methods in Maryland, Panel Report
- American Society of Civil Engineers / Structural Engineering Institute (SEI) Standard 7, Minimum Design Loads for Buildings and Other Structures
- American Traffic Safety Services Association Standards
- American Welding Society Standards
- American Water Works Associations Standards
- AREMA Manual for Railway Engineering
- ASTM D 4694 - Standard Test Method for Deflections with a Falling- Weight-Type Impulse Load Device
- ASTM D 6433 - Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys
- ASTM E 274 - Standard Test Method for Skid Resistance of Paved Surfaces Using a Full-Scale Tire

- ASTM E 501 - Standard Specification for Standard Rib Tire for Pavement Skid-Resistance Tests
- ASTM E 950 - Standard Test Method for Measuring the Longitudinal Profile of Traveled Surfaces within an Accelerometer Established Inertial Profiling Reference
- Caltrans Transportation Equipment Specifications (TEES)
- Chesapeake Executive Council Riparian Buffer Directive
- CI/ASCE 38-02 Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data
- Electronic Industries Association (EIA) standards for interface and intercommunication
- Institute of Electrical and Electronic Engineers (IEEE) Guide for Concept of Operations Document
- IEEE Guide for Developing System Requirements Specifications
- IEEE Independent Verification and Validation
- IEEE National Electrical Safety Code (NESC)
- IESNA DG-5-94 Recommended Lighting for Walkways and Class 1 Bikeways
- IESNA RP-8-00, American National Standard Practice for Roadway Lighting
- IESNA RP-19-01 Roadway Sign Lighting
- IESNA RP-20-98 Lighting for Parking Facilities
- IESNA RP-22-11 American National Standard for Tunnel Lighting
- Institute of Transportation Engineers (ITE) Manual of Transportation Engineering Studies, 2nd Edition
- ITE Traffic Engineering Handbook
- International Code Council (ICC), International Building Code (IBC)
- International Telegraph Union Telecommunications Standardization Sector (ITU-T) Recommendations (ITU-T Recs).
- International Standards Organization - ISO 14000 – Environmental Management Systems – Requirements with Guidance for Use
- National Electrical Contractors Association (NECA) Standards
- National Electrical Manufacturers Association (NEMA) TS 2
- National Electrical Safety Code (NESC)
- National Fire Protection Association (NFPA) 70: National Electrical Code
- Portland Cement Association (PCA), Engineering Mass Concrete Structures
- Post Tensioning Institute (PTI), Recommendations for Prestressed Soil and Rock Anchors
- Precast Concrete Institute (PCI), PCI Design Handbook: Precast and Prestressed Concrete
- PTV's VISSIM (Version 10.09)
- Telecommunications Industry Association (TIA) TIA/EIA-455 Cable Flexing for Fiber Optic Interconnecting Devices
- TIA/EIA-598 Optical Fiber Cable Color Coding

- TIA-568 Cabling for Telecommunications Products and Services
- TIA-570 Residential Telecommunications Infrastructure Standard
- TIA-758 Customer-Owned Outside Plant Telecommunications Infrastructure
- Trafficware's Synchro/SimTraffic
- Underwriters Laboratories (UL) Standards
- University of Maryland Extension, Native Plants of Maryland

Literature:

- Barton, Nick. (1978). Suggested Methods for the Quantitative Description of Discontinuities in Rock Masses: International Society for Rock Mechanics (ISRM)
- Hortus Third: A Concise Dictionary of Plant Cultivated in the United States and Canada (L.H. Bailey Hortorium, 1976)
- John Mills Parrish: Native Woody Plants of Montgomery County