I-95/I-395 HOV/HOT Lanes Project

Exhibit C-4

O&M Technical Requirements

Operations, Maintenance and Tolling for the Project

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Table of Contents

PUR	PO	SE	iii
ACF	RON	NYMS	iii
DEF	INI	TIONS	v
1	In	tentionally Left Blank	1
2	In	tentionally Left Blank	1
3	In	tentionally Left Blank	1
4	Oj	perations, Maintenance, and Tolling for the Project	2
4.	1	General	2
4.	2	Inspection Requirements	2
4.	3	Maintenance Requirements	4
4.	4	Operations Requirements	7
4.	5	Performance Requirements	18
4.	6	Maintenance and Handback Requirements	19
4.	7	Tolling Requirements	20

Attachments

- 4.1 Concept of Operations
- 4.3
- Bridge Maintenance Responsibilities Performance Requirements Baseline Tables 4.5
- Maintenance Responsibility Matrix 4.6a
- Maintenance Responsibility Plans 4.6b
- Major Pavement Maintenance Plan 4.6c

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O&M TECHNICAL REQUIREMENTS

PURPOSE

The purpose of these O&M Technical Requirements is to identify the minimum scope and technical requirements to operate and maintain the Project. The O&M Work required by these O&M Technical Requirements will be undertaken by or on behalf of the Concessionaire. The Concessionaire shall be governed by the Agreement, including these O&M Technical Requirements, in the performance of the O&M Work and remains responsible to the Department for its completion.

Acronym	Definition
AACE	American Association of Cost Engineers
AFC	Approved for Construction
AMRL	AASHTO Material Reference Laboratory
BCWP	Budgeted Cost of Work Performed
BCWS	Budgeted Cost of Work Scheduled
BIMS	Bundled Interstate Maintenance Services, or current equivalent
BMS	Building Management System
BPPS	Bridge Pier Protection System
CADD	Computer Aided Drafting and Design
CCI	Critical Condition Index
CRM	Customer Relations Management
CTA	Cement Treated Aggregate
DBE	Disadvantaged Business Enterprise
DDOT	District of Columbia Department of Transportation
DE	Design Exception
DW	Design Waiver
EDMS	Electronic Document Management System
EPA	Environmental Protection Agency
ETTM	Electronic Tolling and Traffic Management
FDC	Field Design Change
F.O.B.	Free on Board
GCS	Gate Control System
GP	General Purpose
HOT-OC	HOT Operations Center
HPC	High Performance Concrete
HPS	High Performance Steel
ICD	Interface Control Document
ID	Asset Identification
IDMS	Incident Detection and Monitoring System
IPPM	Internal Policy and Procedure Memorandum
IRI	International Roughness Index
JOMP	Joint Operating and Maintenance Protocol
LCAMS	Lane Closure Advisory Management System

ACRONYMS

LDR Load-related Distress Rating	
LL Live Load	
LPN License Plate Number	
LRFD Load and Resistance Factor Design	
MATOC Metropolitan Area Transportation Operations Coordination	
MLHCC Modified Latex Hydraulic Cement Concrete	
MOMS Maintenance Online Management System	
MPSTO McConnell Public Safety and Transportation Operations Center	
MRP Maintenance Rating Program	
MSE Mechanically Stabilized Earth	
MUA Master Utility Agreement	
NADR Noise Abatement Design Report	
NATR Noise Analysis Technical Report	
NBIS National Bridge Inspection Standard	
NCR Non-Conformance Report	
NDC Notice of Design Change	
NDR Non-Load Related Distress Rating	
NRO Northern Regional Operation	
NTCIP National Transportation Communications for ITS Protocol	
O&M Operations and Maintenance	
OCR Optical Character Recognition	
ORT Open Road Tolling	
OSPS Operating Speed Performance Standard	
PDM Precedence Diagram Method	
PE Professional Engineer	
PIP Public Information Plan	
PS&E Plans, Specifications, and Estimates	
PVC Polyvinyl Chloride	
RWIS Road Weather Information System	
SPI Schedule Performance Index	
SWaM Small, Women-owned, and Minority-owned Business	
T&DI Toll and Driver Information	
TAC Transit Advisory Committee	
TCP Traffic Control Plan	
TCRO Traffic Control Room Officer	
TOC Traffic Operations Center	
TS&L Type, Size, and Location	
UIT Ultrasonic Impact Testing	
VDEM Virginia Department of Emergency Management	
VECTO Virginia Evacuation Coordination Team for Operational Response	
VES Vehicle Enforcement System	
VOD Vehicle Occupancy Detection	
VOS Volume, Occupancy & Speech	
VSLS Variable Speed Limit Sign	
WBS Work Breakdown Structure	
WMATA Washington Metropolitan Area Transit Authority	

DEFINITIONS

Capitalized terms used but not otherwise defined have the respective meanings set forth in Exhibit A to the Agreement. In addition, the following terms have the meanings specified below:

- **Design Exception** is defined as a document required where it is either impractical or not economical to obtain the AASHTO minimum design criteria as shown in the Geometric Design Tables. In such a case, an exception shall be secured from the State Location and Design Engineer and FHWA (if applicable).
- **Design Waiver** is defined as a document required when deviations from Department's design criteria occur. When design criteria meet or exceed AASHTO minimal design but fall short of Department's minimal design, a Design Waiver shall be required. Design Waivers will be applicable to all projects regardless of functional classification and funding and shall be documented and approved in accordance with the Design Waiver Request form LD-448.
- Federal Degradation Standard is as defined in Section 4 of these O&M Technical Requirements.
- Free Flow means conditions where vehicular traffic can maintain generally consistent speeds without experiencing undue delay or breakdown in flow.
- **In-service Availability** means a percentage of time equivalent to (hours available) / (hours in service) x 100%; in service time excludes scheduled down time and loss of power outside Concessionaire control.
- International Roughness Index (IRI) is the standard measure of ride quality used by the Department.
- **Load-related Distress Rating (LDR)** is a deduct-based index having a value of 100 when the pavement being evaluated has no discernible load-related distress.
- Major Rehabilitation of Existing Bridges is as defined in Exhibit C-1 of the Technical Requirements.
- **Mainline** is the primary roadway in which the traffic sensors for speed and other traffic data operate excluding auxiliary lanes, collector-distributor roads or ramps.
- Noon is 12:00 p.m. Eastern.
- **Non Load-related Distress Rating (NDR)** is a deduct-based index similar to the Load Rated Distress Rating (LDR) except that the distresses assigned to the index are non-load rated.
- **Peak Period** is the period from 5:30 a.m. 9:00 a.m. or 4:00 p.m. 7:00 p.m., Monday through Friday, excluding holidays.
- Percent Degradation is defined in Section 4 of these O&M Technical Requirements.
- **Reporting Segment** is defined as two Mainline segments for both the northbound and southbound directions, one segment commencing at the first/last Mainline sensor station prior to the exit at the southern terminus and ending at the lane drop/lane gain at the Prince William Parkway ramp and the second segment commencing at the lane drop/lane gain at the Prince William Parkway ramp and ending at the first/last Mainline sensor station prior to the exit at the northern terminus.

- **Residual Life** means the calculated duration that any Asset of the Project, subject to the type of routine maintenance of the Asset which is normally included as an annually recurring cost in highway maintenance and repair budgets, will continue to comply with any applicable Performance Requirement or standard after the end of the Term, before Major Maintenance is required, determined through the application of Residual Life methodology and residual life inspections.
- **Standard Documents** means the standards, special provisions and specifications listed in the Technical Requirements current at the time the O&M Work is performed.
- Standard of Care means using logical, rational, and common sensible calculation and precaution in determining whether there is reason to believe that property to be acquired for rights of way may contain concealed or hidden wastes or other materials or hazards requiring remedial action or treatment.
- Station is one or more traffic monitoring sensors at a single location used to collect traffic volume, lane occupancy, and speed data on the HOT Lanes.
- **Substandard Station** is a Station whose weighted average speed over the a.m. or p.m. Peak Period falls below the minimum average operating speed defined for each degradation standard.
- **Substructure** means the part of a structure that is below the bearings of simple and continuous spans, skewbacks of arches, and tops of footings of rigid frames, together with the back walls, wingwalls, and wing protection railings.
- Superstructure means the portion of a structure that is not defined as substructure.
- Timeliness Requirements are as defined in Attachment 4.5 of these O&M Technical Requirements.
- **Trail Blazer Roll Plan** is a scaled signage plan or plans showing proposed, existing, or relocated static signs on highways, feeder roads, and other roadways notifying motorists of the access to the HOT Lanes.
- **Transponder Transaction Performance** means the percentage of vehicles with transponders that are correctly identified by the Tolling System.

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4 **Operations, Maintenance, and Tolling for the Project**

4.1 General

- A. The Concessionaire shall operate and maintain the Project Assets including the ETTM System and ETTM Facilities for the duration of the Operating Period in a manner consistent with the Agreement.
- B. The Concessionaire shall operate and maintain the Project gate system in a manner intended to disallow traffic from entering in the opposite direction of the current traffic flow, excluding any condition beyond the control of the Concessionaire.
- C. The Concessionaire shall utilize an effective operations management framework which may include, among other things: traffic management, monitoring, control and enforcement, facility management and administration, and tolling administration, operations, enforcement, and collection.
- D. The Concessionaire shall utilize an effective Maintenance Management System which may include, among other things, to record inventory, failures, repairs, maintenance activities, inspections performed, and Defects.
- E. The Concessionaire shall meet all operations, maintenance, and tolling Performance Requirements in accordance with the Agreement.
- F. The Concessionaire will record Defects in accordance with the Performance Requirements within its system as described in this section.
- G. The Concessionaire shall operate and maintain the four new traffic signals along Eads Street and on the Pentagon Reservation for the duration of the Operating Period. The Concessionaire shall provide a yearly operations report for these traffic signals and provide recommended adjustments if warranted. The Concessionaire may meet with the representatives of the Pentagon, Arlington County, and the Department to discuss this report. The initial signal timing plan and subsequent modifications must be approved by the Department. The Concessionaire shall operate these traffic signals in accordance with applicable traffic engineering regulations, standards, guidelines and industry practice.

4.2 Inspection Requirements

4.2.1 General Requirements

A. The Concessionaire shall engage or employ or shall cause the O&M Contractor to engage or employ trained and competent personnel to plan and implement a program of inspections of the Project. This program shall achieve the following:

- 1. provide for the continuing safety of the Project for users;
- 2. prioritize Defects requiring immediate and urgent attention because they are likely to create a hazard or serious inconvenience to users;
- 3. identify other Defects to be included for repair within the Concessionaire's annually recurring maintenance and repair program (e.g., Life Cycle Maintenance Plan);
- 4. responsiveness to reports or complaints received from stakeholders;
- 5. take account of Incidents and Emergencies affecting the HOT Lanes;
- 6. monitor the effects of extreme weather conditions; and
- 7. collate data to monitor performance of the HOT Lanes and to establish priorities for future maintenance operations.
- B. The Concessionaire shall require personnel performing inspections of road pavements to be certified as inspectors in accordance with standards and specifications set forth in the Standard Documents.
- C. All structures shall be inspected by the Department in accordance with the National Bridge Inspection Standards (NBIS) of the *Code of Federal Regulations, 23 Highways Part 650* and Department requirements. The Department shall furnish copies of all inspection reports within four (4) weeks of completion of the inspection, unless otherwise mutually agreed.
- D. Defects that are subject to the Performance Requirements and the Timeliness Requirements require prompt attention if the Concessionaire determines that they represent an imminent hazard, or there is a risk of imminent structural deterioration, or there is an imminent risk of damage to a third party's property or equipment, or there is an imminent risk of damage to the environment, all to the extent that the Concessionaire can control.

4.2.2 Inspection Frequency

- A. The Concessionaire shall establish inspection procedures and carry out inspections so that:
 - 1. all Defects that present a hazard are identified, documented, and repaired such that the hazard is mitigated within the time scales set out in the Performance Requirements;
 - 2. all Defects that present a hazard are identified, documented and remedied within the time scales set out in the Performance Requirements; and
 - 3. all other Defects are identified, documented, and repaired within the time scales set out in the Performance Requirements.

- B. The periods stated in Attachment 4.5 shall be deemed to be periods from the time the relevant Defect was first identified by or brought to the attention of the Concessionaire.
- C. The Concessionaire shall investigate reports and complaints on the condition of the HOT Lanes received from all sources. The Concessionaire shall record these as O&M records, together with details of all relevant inspections and actions taken in respect of Defects, including temporary protective measures and repairs. These reports shall be made available to the Department upon request.

4.2.3 Inspection Standards

In performing inspections to identify Defects, the Concessionaire shall at a minimum conform to the inspection standards set forth in the Standard Documents.

4.2.4 Safety Inspections

The record of a safety inspection shall include details of the weather conditions, road surface condition, and any unusual features related to the method of inspection.

4.2.5 General Inspections

The Concessionaire shall perform general inspections in accordance with the O&M Plan so that the repairs of all Defects are included in planned programs of O&M Work.

4.3 Maintenance Requirements

4.3.1 General Obligations

- A. The Concessionaire shall, or shall cause the O&M Contractor to, maintain the HOT Lanes and shall take all necessary action to perform the following:
 - 1. maintain the HOT Lanes pursuant to the Agreement;
 - 2. minimize traffic delay to drivers;
 - 3. respond to all Incidents and Defects as quickly as possible and mitigate adverse effects;
 - 4. provide users with adequate information and forewarning of any events on, or any matters affecting, the smooth operation of the HOT Lanes as will enable them to minimize any associated adverse consequences;
 - 5. protect the safety of users, workers, or other persons on the HOT Lanes or other portions of the Project Right of Way used for HOT Lanes operations;
 - 6. protect the environment by minimizing the risk of adverse effects on the

environment and on the amenities enjoyed by the owners and occupiers of land near the Project Right of Way;

- 7. minimize the risk of damage or disturbance to or destruction of thirdparty property;
- 8. enable the Department and others with statutory duties or functions in relation to the HOT Lanes to perform those duties and functions through agreed protocols; and
- 9. perform inspections in accordance with the Agreement.
- 10. perform O&M Work in accordance with the Standard Documents.
- B. The Concessionaire shall maintain the bridges identified in accordance with the Agreement and Attachment 4.3.
- C. The Department shall maintain the GP Lanes (including structures and overpasses that carry only general purpose traffic and related infrastructure).
- D. The Department shall maintain HOT lane slip ramps that carry traffic to or from the HOT Lanes to the GP Lanes and flyover ramps that carry traffic to or from the HOT Lanes.
- E. The Concessionaire shall maintain the direct connect ramp to or from the Franconia-Springfield Parkway.
- F. In accordance with the Agreement, the Department shall maintain Department Shared Assets, except as noted in subsection (G) below, which may include, but are not limited to, the following:
 - 1. structures (bridges carrying both HOT Lanes and general purpose traffic are identified in Attachment 4.3);
 - 2. drainage that conveys or stores storm water from both HOT Lanes and GP Lanes (the limits of maintenance shall extend to the ultimate outfall and associated maintenance requirements at the outfall);
 - 3. drainage (such as pipes and box culverts) that convey water under both the HOT Lanes and GP Lanes;
 - 4. lighting;
 - 5. signage;
 - 6. signalization;
 - 7. concrete barrier and guardrail;
 - 8. fences;

- 9. retaining walls;
- 10. ITS conduit;
- 11. glare screens; and
- 12. impact attenuators.
- G. For all bridges carrying HOT Lanes, the Concessionaire shall perform all activities necessary to fulfill the Ordinary Maintenance Performance Requirements on bridge deck assets in accordance with the Performance Requirements.

4.3.2 O&M Data Management

- A. The Concessionaire shall utilize a computer- based Maintenance Management System (MMS), which may be comprised of multiple systems and/or tools, to record inventory, failures, repairs, maintenance activities, inspections performance, communications, and notifications of Incidents and Defects. The Concessionaire shall enter all of the assets into the MMS with Asset identifications (IDs) as determined by the Concessionaire and consistent with those descriptions and units of measure used in the Roadway Network System and PONTIS (or equivalent system) for structures and bridges, which are used by the Department. The inventory shall, where appropriate, include separate records for subcomponents of each Asset. All information shall be recorded in a consistent manner and shall be searchable by individual attributes.
- B. The MMS shall include relevant condition information with respect to each Asset, which may include, among other things, location, equipment nomenclature, serial number, name, date of installation, technician, type of failure, date and time of failure, date and time of response to the site and date and time returned to service, preventive maintenance work, schedule work, work repair code, failure and repair history, Asset Residual Life, and statistical data on Mean Time Between Failure (MTBF) and Mean Time to Repair (MTTR). Residual Life means the calculated duration that any Asset of the Project, subject to the type of routine maintenance of the Asset which is normally included as an annually recurring cost in highway maintenance and repair budgets, will continue to comply with any applicable Performance Requirement or standard after the end of the Term, before Major Maintenance is required, determined through the application of Residual Life methodology and residual life inspections. The MMS shall be able to report work by work repair code, asset (or subcomponent), location and unit of measure.
- C. Defects and responses to Defects shall be recorded on the MMS within three days of them coming to the attention of the Concessionaire or action being taken. All other recording requirements shall be recorded on the MMS within 15 days of completion or occurrence of the relevant activity.
- D. The Concessionaire shall ensure that the MMS is capable of generating the information required to demonstrate achievement of the Performance

Requirements for each asset.

- E. In accordance with the Agreement, the Concessionaire shall provide the Department access to the MMS at all times for the purposes of auditing the accuracy of the Concessionaire's O&M records. Such access shall require reasonable advance notice and access shall not be delayed or hindered, nor shall such access impact any operational and/or maintenance activities.
- F. The MMS shall be kept updated and operational throughout the Operating Period.

4.4 **Operations Requirements**

4.4.1 General Obligations

- A. The Concessionaire shall be responsible for, or shall cause the O&M Contractor to be responsible for, in accordance with the Agreement, the following, among other things:
 - 1. employment and training of competent personnel to carry out all operations aspects of the O&M Plan
 - 2. coordination of activities of third parties with interests within the HOT Lanes
 - 3. monitoring the condition and operational performance of the HOT Lanes
 - 4. Incident response, management and reporting
 - 5. traffic operations restrictions, including periods of lane closure restrictions;
 - 6. standard operating and communication procedures for Emergency preparation, response, and recovery
 - 7. planning and coordination with all relevant Governmental Authorities, including Emergency services
 - 8. operate the Electronic Toll and Traffic Management (ETTM) System
 - 9. liaison with the Department's Traffic Operations Center
 - 10. analysis of vehicular accident patterns to identify safety issues
 - 11. investigation of reports or complaints received from all sources
 - 12. toll enforcement and coordination with law enforcement for the HOT Lanes

- B. The Concessionaire shall monitor and observe weather and weather forecasts and deploy resources to minimize delays and safety hazards due to severe weather events, to the extent practical. The Department shall coordinate with the Concessionaire and deploy resources to minimize delays and safety hazards due to snow and/or ice events, in accordance with the Agreement.
- C. The Concessionaire will respond within seven days to customer inquiries and complaints about the HOT Lanes where contact details of customers have been provided no matter whether the complaint is received directly from customers, the customer service center, or from the Department.
- D. The Concessionaire shall maintain and update the following Project Development Plans from the construction phases to serve as management plans for the Operating Period in accordance with requirements set forth below:

Plan	Purpose and Contents	
Concessionaire Management Plan	The Concessionaire Management Plan describes the Concessionaire's overall organization and management approach, strategy, and quality procedures during the Operating Period, including all aspects necessary to effectively operate and maintain the HOT Lanes. The Concessionaire Management Plan shall clearly identify responsibilities and procedures for each Project management activity and demonstrate a thorough understanding of the Agreement and Project requirements. The Concessionaire Management Plan shall include an organization chart outlining the basic structure of the Concessionaire's organization for operations and maintenance; sub- organizations (such as consulting, subcontractors, suppliers) and a description of the roles; relationship with the Department and third parties; organizational chart with responsibilities, and O&M Work to be accomplished by each member of the management team and each sub-organization, including identified subcontractors and suppliers. The Concessionaire Management Plan shall address the process and procedures for submission of any documentation required and describe the Concessionaire's approach for records management and storage	
Quality Management System Plan	The Quality Management System Plan details the Concessionaire's approach to quality assurance during the Operating Period, including: a) roles and responsibilities of key personnel, b) policies and procedures for compliance and auditing, c) document management and records retention, and d) quality requirements for Concessionaire consultants and contractors.	
Health, Safety and Environment Management Plan	The Health, Safety and Environment (HSE) Management Plan describes the approach and framework the Concessionaire will use to manage its HSE responsibilities at the asset level during the Operating Period, including specific policies and procedures to be used to manage risks, reduce hazards, and oversee the HSE performance of Concessionaire consultants and contractors.	

Environmental	The Environmental Management Plan details the approach and
Management Plan	framework the Concessionaire will use to manage environmental
	commitments and incidents during the Operation Period, including
	specific policies and procedures to be used to manage risks, reduce
	hazards, and oversee the performance of its consultants and contractors.
Communications Plan	The Communications Plans describes the Concessionaire's approach and
	framework for management of communications and stakeholder engagement
	during the Operating Period to: a) maximize public awareness of features
	and benefits of the HOT Lanes, and ensure that information regarding the
	HOT Lanes operations (and incidents) are easily and readily accessible to the
DDE/CW-M Dl-	public.
DBE/Swalvi Plan	free DBE/Swaw Plan describes the Concessionaire's approach and free subscription during the Operating
	Deriod including outreach engagement and reporting
	renou, including outreach, engagement, and reporting.
Operations and	The Operations and Maintenance Plan describes the approach and
Maintenance Plan	framework the Concessionaire will use to manage its operations and
	maintenance obligations during the Operating Period, including: a) roles and
	responsibilities of key personnel and contractors, b) applicable policies and
	procedures, c) incident management approach, d) inspection methods, and e)
	maintenance activities scheduling. The Operations and Maintenance Plan is
	intended to address routine and seasonal operation and maintenance planning
	and activities.
	i organization structure including key operations and maintenance
	personnel and their responsibilities and level of authority:
	ii. key suppliers and subcontractors;
	iii. service delivery and operating procedures
	iv. incident management;
	v. inspection methods and inspection schedule;
	vi. Identification and scheduling of routine maintenance;
	viii. environmental compliance:
	ix. site safety;
	x. emergency response;
	xi. tolling operations and maintenance plan;
	xii. documentation and reporting procedures;
	xiii. an internal audit program and recording of findings, conformances,
	xiv, making available documentation for external audits:
	xv. submission of quarterly reports indicating all activities and
	requirements as noted in the Technical
	Requirements Exhibit;
	xvi. submission of annual operations and maintenance report addressing the
	requirements in the Technical Requirements.
	xviii. coordination with other projects
	in Virginia Project; and
	xix. linkage to other Project Development Plans.
Tolling, Enforcement	The Tolling, Enforcement and Customer Management Plan describes the
and Customer	Concessionaire's approach and processes for managing toll collection,
	violation enforcement, and the customer interface during the Operating
	Period.

Management Plan ¹	
Life Cycle Maintenance Plan	The Life Cycle Maintenance Plan, as specified in Section 9.04 of the Agreement, describes the Major Maintenance to be undertaken by the Concessionaire in the specified five-year period, by component, item or discrete project, the estimated costs and timing relating of each. The Life Cycle Maintenance Plan is intended to focus on non- routine maintenance, such as annual or seasonal maintenance, and provide a status of the assets under the control of the Concessionaire. The Life Cycle Maintenance Plan shall provide the procedures in place for successful management of maintenance, operation, and handover of the assets to the Department.

- 1. These management plans shall comply with the requirements of the Agreement including these O&M Technical Requirements, and the Concessionaire shall ensure that when implemented, the O&M Work covered by these management plans will comply with such requirements.
- 2. These management plans, and associated records and logs shall be available for review by the Department on an ongoing basis in accordance with the Agreement.
- 3. Each management plan (and any associated policies or procedures) will be reviewed annually and, if necessary, updated if it:
 - A. does not adequately address the matters it is intended to address;
 - B. does not conform or is otherwise necessary to comply with the Agreement;
 - C. has to be changed because of an audit;
 - D. no longer represents current or appropriate practice; or
 - E. is required by the Agreement to be updated
- E. Reporting During the Operating Period
 - 1. The Concessionaire shall prepare and provide to the Department regular reports during the Operating Period (as more fully described below). All reports prepared by Concessionaire shall include, at a minimum, those items shown below in a format mutually agreed to with the Department and sufficient to allow the Department to meet its regulatory reporting responsibilities.
 - 2. During the Operating Period, the Concessionaire's quarterly O&M report shall be mutually agreed to with the Department and may include the following:

¹ Note: The "Tolling, Enforcement and Customer Management Plan" is not a Project Development Plan during the construction phase.

- A. planning and implementation of operations, including work plans for the future periods;
- B. roadway operations;
- C. incident response;
- D. routine maintenance activities;
- E. customer service log, detailing complaints or requests, and their disposition;
- F. O&M inspections;
- G. Long-term participation SWaM goal;
- H. a summary of issues related to Performance Points during the reporting period;
- I. quality management activities; and
- J. performance timeliness.
- 3. During the Operating Period, the Concessionaire's annual report shall include the following:
 - A. Summary of quarterly issues and trends as required for the Department's reporting to FHWA;
 - B. annual budget(s), as required by the Agreement; and
 - C. a report on the O&M Overhead Costs of the O&M Contractor or its Affiliates.
- 4. The Concessionaire Management Plan shall describe the proposed formats, means of distribution, and recipients of the reports.
- 5. The Concessionaire shall maintain at all times, at its office, a minimum of one hard-copy complete set of all reports shown above for the previous six months only. All reports shall be available to the Department for inspection and audit. Additional reports may be required as future needs dictate, and the reports listed above may be deleted (by mutual consent of the parties).

4.4.2 Data Collection

A. A process of data collection will be established that includes, at a minimum,

traffic data (i.e., in each direction; traffic volume, lane occupancy, and speed data).

- B. The data collection process shall be continuous (not periodic). Notwithstanding the requirements to collect and provide data for the facility the parties recognize that from time-to-time, and in the normal course of business, data for specific locations may not be available due to technical issues, or other issues outside of the Concessionaire's control. In such instances the Concessionaire will endeavor to remedy the issue in accordance with normal business practices.
- C. The Concessionaire shall store all data and make the data accessible to the Department in accordance with the Agreement.

4.4.3 Data Compiling and Reporting

- A. The Concessionaire shall archive all collected traffic data and make the data available for the generation of reports and for audits of data by any persons permitted by the Department for this purpose, in accordance with the Agreement.
- B. The Concessionaire shall commence delivery of the report to the Department after the second full month following the Service Commencement Date. Thereafter, reporting shall occur on a calendar monthly basis.
- C. Data shall be compiled between the northern and southern termini of the Project, based on the Reporting Segments in accordance with the Agreement, or as amended by the Agreement.
- D. Data compilation will include Peak Periods traffic volumes and traffic speeds on HOT Lanes at each Mainline sensor station by lane and hour within the morning and evening weekday time period over a consecutive 180-day period. The time range of the Peak Periods may be adjusted by the Department from time to time to reflect change in travel conditions in accordance with the Agreement.
- E. The report shall include, at a minimum:
 - 1. Degradation section indicating Percent Degradation (as defined in these Technical Requirements) on the mainline of the HOT Lanes for each Reporting Segment for the period under review.
 - 2. Speed exception section showing Substandard Stations, days, and time periods where the Percent Degradation fell below the defined threshold.
 - 3. Documentation of any periods that were impacted by Incidents or activities outside of the control of the Concessionaire where the Percent Degradation fell below the defined threshold.

4.4.4 Degradation Assessment

- A. For the purpose of determining degradation, volume and speed data that is useable and non-corrupt will be analyzed for each HOT Lanes Mainline sensor Station.
- B. Each Station whose weighted average speed over the Peak Period falls below the defined minimum average operating speed for each of the Operating Speed Performance Standard (OSPS) and the Federal Degradation Standard, as applicable, will be identified as Substandard Station for the applicable calculation.
- C. The speed degradation percentage will be calculated for morning Peak Period and evening Peak Period separately. The percentage of degradation for Peak Periods is given by the following formula applied to weekdays:

Percent Degradation =
$$\begin{bmatrix} \sum_{1}^{180} Substandard Stations \\ (Stations x 180 Days) \end{bmatrix}$$
 lx 100

- (a) The numerator equals the summation of all Substandard Stations within the consecutive 180day period for weekdays only.
- (b) The denominator equals the total number of Stations upon which the calculations is based multiplied by the number of weekdays within the consecutive 180-day period.
- (c) For the avoidance of doubt, the degradation assessment will result in at least eight (8) different values being calculated for each reporting cycle for the whole HOT Lanes facility. Each value is based on the Reporting Segments in accordance with the Agreement. This is made up of at least four (4) different values for the Federal Degradation Standard (i.e. two AM NB, two PM SB) and at least four (4) different values for OSPS (i.e. two AM NB, two PM SB).

4.4.5 Federal Degradation Standard

- A. Degradation Standard
 - 1. Per Title 23, United States Code (USC) Section 166. (d) (2), a degraded facility for the purpose of determining which classes of vehicles are permitted to use the HOV lanes, is defined below. For the avoidance of doubt, the Concessionaire shall comply with the provisions of any amendment or supplement to, or replacement or substitution of, the provisions governing "Degraded facility" as defined by federal law:
 - (2) Degraded Facility.--

(A) DEFINITION OF MINIMUM OPERATING SPEED.--In this paragraph, the term "minimum average operating speed" means-

(i) 45 miles per hour, in the case of a HOV facility with a speed limit of 50 miles per hour or greater; and

(ii) not more than 10 miles per hour below the speed

limit, in the case of a HOV facility with a speed limit of less than 50 miles per hour.

(B) STANDARD FOR DETERMINING DEGRADED FACILITY. – For purposes of paragraph (1), the operation of a HOV facility shall be considered to be degraded if vehicles operating on the facility are failing to maintain a minimum average operating speed 90 percent of the time over a consecutive 180-day period during morning or evening weekday peak hour periods (or both).

- 2. The facility is considered degraded by the Federal Degradation Standard when compliance is less than or equal to 90 percent, where:
 - The minimum average operating speed for the Federal Degradation Standard is less than 45 MPH.
 - Compliance means: 100 Percent Percent Degradation is greater than or equal to 90 percent
 - Percent Degradation will be calculated for weekday Peak Periods for the Mainline HOT Lanes Reporting Segments.

4.4.6 **Operating Speed Performance Standard**

- A. The Concessionaire shall meet or exceed the Operating Speed Performance Standard (OSPS). The OSPS is in addition to the federal requirement that the HOT Lanes are not a degraded facility.
- B. The Concessionaire shall provide a minimum average operating speed of 55 MPH to 0.7 miles south of the Route 27 and 45 MPH between 0.7 miles south of the Route 27 to the DC Line on the Mainline HOT Lanes.
- C. For purposes of determining whether or not the facility is degraded, data from time periods corresponding to the following events shall be excluded from the calculations:
 - 1. All periods identified in the Agreement, including periods of toll suspension; when the Department assumes control of the HOT Lanes under the terms of the Agreement; data during Incident conditions as described in the Agreement; and during Major Maintenance periods, when working to agreed programs.
 - 2. Police, military, STRAHNET, and other related activities.
 - 3. Backups due to conditions outside of the control of the Concessionaire.
 - 4. Force Majeure Events.

- D. The Facility is considered degraded by the OSPS Standard when Compliance is less than or equal to 90 percent, where:
 - 1. The minimum average operating speed is less than 55 MPH.
 - 2. Compliance means: 100 percent Percent Degradation is greater than or equal to 90 percent
 - 3. Percent Degradation will be calculated for weekday Peak Periods for the Mainline HOT Lanes Reporting Segments
- E. The impact of the Concessionaire's failure to meet the OSPS in any calendar month shall be governed by the Agreement.
- F. The continued application of the OSPS will be in accordance with the Agreement.

4.4.7 Incident Management

- A. The Concessionaire shall provide equipment and personnel to support Incident and Emergency management operations on the HOT Lanes in accordance with the Operations and Maintenance Plan. The Concessionaire shall take necessary action using appropriate resources to handle any and all traffic control needs to ensure the safety of the Incident scene and traveling public and to minimize the potential for pollution of watercourses or groundwater.
- B. In the event of an Incident, the Concessionaire shall provide traffic management, real time traffic information and video feeds to the Department, as appropriate, depending on the nature of the Incident in accordance with the Interface Control Document and protocols developed.
- C. The Concessionaire shall coordinate and confer with the Department's NRO TOCs and other first responder community stakeholders in developing the Incident management plans and when carrying out Incident management operations.
- D. Where structural damage to a HOT Lanes structure, which poses an imminent risk to the traveling public, is suspected, the extent of damage and condition of the structure shall be evaluated, documented, and reported by a bridge/structural engineer with the following qualifications:
 - 1. is a professional engineer, licensed in the Commonwealth;
 - 2. meets the qualifications to be a "Team Leader" in accordance with the requirements of Article 650.309 of the National Bridge Inspection Standards, 23 CFR 650.3; and
 - 3. has extensive experience with in-service bridge inspection, Emergency bridge inspection, maintenance, repair and rehabilitation of bridges,

structural evaluations, and load ratings.

- E. The Concessionaire shall not reopen any area of the HOT Lanes which has been closed, until all appropriate safety and traffic management measures have been completed and any issues related to Hazardous Substances have been mitigated to a safe level.
- F. The Concessionaire shall ensure that procedures are in place for public/agency notifications, Incident management, ensuring the safety of motorists, handling of hazardous waste, and coordination with the Department, police and other Emergency personnel with respect to Emergencies, Incidents, and occurrences.
- G. The Concessionaire shall identify a management-level, on-call "duty officer" consistent with the Department's duty-officer policy.

4.4.8 Traffic Management – Detection of Incidents

- A. In locations as outlined in the Agreement, an appropriate system shall be deployed that is capable of automatic video-based or equivalent, detection of Incidents within 5 minutes of occurrence, 95% of the time within areas monitored under normal conditions ("AID system").
- B. Incident information (including the character and severity of the Incident) shall be communicated to the Department within five minutes of the Concessionaire determining the Incident classification, in accordance with the Operations and Maintenance Plan.

4.4.9 Driver Information

- A. The Concessionaire shall implement the TMS, including the DMS, to provide road users with relevant information in accordance with the Operations and Maintenance Plan, including the use of DMS to impart information on behalf of the Virginia Department of Emergency Management (VDEM).
- B. Traffic management messages that contribute to the safety of motorists and road workers shall be applied within five minutes of the detection and classification of an Incident or the identification of deteriorated road conditions, in accordance with the Operations and Maintenance Plan.
- C. The ISA for T&DI for DMS (each sign) shall be at least 99.9% excluding the effects of any condition beyond the reasonable control of the Concessionaire. The ISA for traffic management DMS shall be at least 99.9% excluding the effects of any condition beyond the reasonable control of the Concessionaire.

4.4.10 Emergency Evacuation

A. The Project is designated as an Emergency evacuation route for the Washington Metropolitan Area. The Concessionaire shall control access to the Project throughout the corridor under the direction of the Department should an evacuation be directed pursuant to a Governor- declared Emergency. These

requirements will apply during all Governor-declared Emergencies.

B. The Concessionaire shall develop and implement an evacuation plan in coordination and consistent with plans, programs, and requirements of the Commonwealth of Virginia, to include the Department, the Virginia

Evacuation Coordination Team for Operational Response (VECTOR), Virginia State Police (VSP), and the VDEM. The plan shall include a plan for lane reversal, and standard operating procedures that identify all required tasks to be performed, the party that will perform these tasks, and how these tasks will be accomplished. The plan shall include the performance and documentation of one annual drill for evacuation and Emergency procedures, where such drill is deemed necessary and undertaken as part of the review of evacuation plans associated with a Governor- declared Emergency, on similar highways in the State.

- C. The Concessionaire shall provide for the effective implementation of the evacuation plan and the lane reversal plan, in coordination with the Department in a Governor-declared Emergency. This implementation shall include:
 - 1. facilitation of large scale traffic movements during evacuations and reentry;
 - 2. implementation and provision of traffic information and advisories using various traveler information media and systems;
 - 3. providing manpower, equipment, and materials as needed to control traffic during evacuation and lane reversals;
 - 4. monitoring traffic conditions and providing timely Incident response and management during evacuations;
 - 5. providing local access from reversed lanes as applicable; and
 - 6. providing procedures for effective termination of lane reversal at the conclusion of the declared Emergency.
- D. The Concessionaire shall participate in the development and update of future state, regional, and local Emergency evacuation plans with other stakeholders including the Department, VSP, VDEM, and others agencies/organizations. The Concessionaire shall send a representative to participate throughout the Operating Period in any annual statewide coordination meetings for evacuation and Emergency services held during the year.

4.4.11 Waste Disposal and Use of Hazardous Substances

The Concessionaire shall be responsible for the management, treatment, handling, storage, monitoring, remediation, removal, transport, and disposal of any Hazardous Substances that are discovered on, in, under or emanating from the Project Right of Way during the Term, in each case in accordance with

applicable regulatory requirements, the Agreement, and the Environmental Management Plan.

4.5 **Performance Requirements**

- A. Within the Technical Requirements, reference to the Performance Requirements means the Asset Condition Performance Requirements, Ordinary Maintenance Performance Requirements, and the latest approved version of the Northern Virginia BIMS Performance Requirements.
- B. The Asset Condition Performance Requirements are set out in Table 4.5a in Attachment 4.5.
- C. The Ordinary Maintenance Performance Requirements shall be in accordance with Table 4.5b in Attachment 4.5 and the most current Northern Virginia BIMS performance requirements in effect during the maintenance period.
- D. The Concessionaire shall use the program of inspections supplemented by the Maintenance Management System to demonstrate compliance with the Performance Requirements at all times and shall report for each Asset, its performance in meeting all applicable criteria and Timeliness Requirements in the quarterly O&M report in a format to be agreed between the Concessionaire and the Department. Performance also shall be summarized in an end-of-year report, as outlined in the Agreement.
- E. The Concessionaire shall set forth as part of the O&M Plan, reviewed and updated as necessary, a document describing the means by which it intends to demonstrate achievement of the Performance Requirements.
- F. Where the Concessionaire fails to meet the Performance Requirements, Non-Compliance Points may be assessed pursuant to the Agreement.
- G. The Concessionaire shall update the Ordinary Maintenance Performance Requirements as needed to reflect current industry practices and changes as mutually agreed by the Department, consistent with the Northern Virginia BIMS criteria in place on similar highways in Northern Virginia. The Department shall approve the updated tables
- H. Updates shall include improvements to inspection and measurement methods, measurement records, performance minimums, tolerances, and criteria as are necessary to comply with the current Northern Virginia BIMS criteria in place on similar highways in Northern Virginia.
- I. The Project shall be subject to the Department's Maintenance Rating Program (MRP), or subsequent updated or replacement program. The Concessionaire shall use the MRP to verify performance of each Asset against the criteria set out in the Performance Requirements. The Concessionaire shall include in the end of year report outlined in the Agreement, a summary of the results of annual assessments in a format to be agreed between the Concessionaire and

the Department.

4.6 Maintenance and Handback Requirements

4.6.1 Maintenance and Life Cycle Maintenance Plan

- A. The Concessionaire shall perform maintenance in accordance with Attachments 4.6a Maintenance Responsibility Matrix and Attachment 4.6b Maintenance Responsibility Plans and when necessary so that all assets are capable of meeting the appropriate Performance Requirements when subject to ordinary maintenance and so that any Defects which affect the long term performance of the Project are repaired in good time to prevent undue deterioration of any asset.
- B. In order to properly identify and plan for Major Maintenance for pavement throughout the Term, the Agreement describes the requirements for a Life Cycle Maintenance Plan to include a description of all Major Maintenance for pavement to be undertaken as shown in Attachment 4.6c. The major maintenance, repair, reconstruction, rehabilitation, restoration, renewal and replacement activities listed in the Life Cycle Maintenance Plan shall meet the Performance Requirements set forth in the Technical Requirements and other standards and requirements set forth in the Agreement.
- C. The Life Cycle Maintenance Plan updates during the last five years of the Term will be subject to additional oversight by the Department in accordance with the Agreement.

4.6.2 Transition Plan

- A. The purpose of the Transition Plan is to provide the Department with a clear understanding of the Concessionaire's approach to the management, operations and maintenance of the facility so that the Department can ensure a smooth transition from Concessionaire to the Department at the end of the Operating Period.
- B. The Transition Plan shall include a checklist of relevant activities in sufficient detail for a smooth transition from Concessionaire operations to Department operations.
- C. The Transition Plan shall be delivered to the Department in draft form no more than 180 days before the end of the Operating Period. The Department will review the Transition Plan and request any changes within a period of 30 days. The Concessionaire shall submit the final Transition Plan to the Department no more than 30 days after receiving the Department's comments.

In the last 180 days of the Operating Period the Concessionaire shall meet with the Department at least monthly to share information on the management, operations and maintenance of the Facility in a good faith effort to ensure

smooth transition from Concessionaire to Department. The Concessionaire shall endeavor to answer Department questions on any items included in the Transition Plan and any additional questions that may arise.

4.6.3 Handback Obligations

A. Upon the end of the Term, the Concessionaire shall hand-back the Project Assets to the Department, at no charge to the Department, with asset condition having a remaining life of the greater of: (i) five years; or (ii) life within its normal lifecycle (collectively referred to as the "Handback Requirements"). In addition, if requested by the Department, the Concessionaire will dismantle the HOT Lanes toll system as required to convert the HOT Lanes back to HOV lanes; provided that the Department shall notify the Concessionaire at least one year prior to the end of the Term if the HOT Lanes are to be converted back to HOV lanes. Any such dismantling of the HOT Lanes toll system shall be at Concessionaire's sole cost and expense.

4.7 Tolling Requirements

4.7.1 General

- A. The ETC system shall be operated and maintained by the Concessionaire to fulfill its obligations under the Agreement and in a manner such that ensures ETC Performance Requirements, as set out below, are met. Upon the Concessionaire receiving notice of a problem with the dynamic tolling mechanism, the Concessionaire shall submit to the Department, for its approval, a rectification plan.
- B. The ETC system shall be operated and maintained by the Concessionaire to fulfill its obligations under the Electronic Toll Collection Agreement ("ETC Agreement").

4.7.2 ETC Performance Requirements

- A. Roadside equipment shall have an ISA of at least 99%. This shall exclude scheduled downtime and loss of power or any other condition beyond the Concessionaire's control.
- B. The ETC system shall have an ISA of at least 99.9%, excluding scheduled downtime and loss of power.
- C. At least 99.8% of transponder records shall be correct; i.e., the data supplied are complete and relate correctly to the transponder detected for properly fitted and operating transponders, and excluding non-normal operation due to signal attenuation from a metallic wind screen or other similar condition beyond the control of the Concessionaire.
- D. At least 99.8% of payment claim records shall be correct; i.e., the data supplied are complete and relate correctly to the payment due for the trip, the

displayed prices, and the transponder to which it relates, excluding the effects of other conditions beyond the reasonable control of the Concessionaire.

- E. Records shall be transmitted to the Department in the IAG specification format, or as otherwise agreed between the Department and the Concessionaire, except where VES manual quality control checks have not been completed.
- F. Tag status files are to be loaded and distributed through the system and utilized for each transaction to ensure images are recorded for the correct vehicles. This should be completed within one hour of receipt from the Department, (in accordance with the ETC Agreement) 99% of the time, subject to receipt of a confirmed accurate tag status file from the Department, excluding the effects of other conditions beyond the reasonable control of the Concessionaire.
- G. The tag number captured from a tag shall be recorded without error at least 99.99999% of the time (no more than one error in 10 million). In addition, no more than one such error in 10 (one error in 100 million) shall result in the wrong tag number becoming associated with the capture. This is subject to the transponder supplier performance requirements.
- H. In the event the Department receives two or more representations from customers in a calendar month claiming to have been charged a HOT Lane toll from the same toll point while using the GP Lanes, the Concessionaire shall present to the Department a management plan to investigate system performance. The Department and Concessionaire agree that the customer confidence in the tolling system is essential and that misreads from the GP Lanes must be addressed as a matter of urgency.
- I. Accuracy for correctly assigning the transponder to the correct vehicle and therefore license plate, to be 99.9% for properly fitted and operating transponders, and excluding non-normal operation due to signal attenuation from a metallic wind screen or other similar condition beyond the control of the Concessionaire.

4.7.3 Transactions

- A. The Department (in accordance with the Electronic Toll Collection Agreement,) will supply tag status information, which should be loaded and distributed through the system and used for each transaction to ensure images are recorded for the correct vehicles. The Department reserves the right to reject duplicate transactions.
- B. The Concessionaire shall use commercially reasonable efforts to ensure that requests for payment are made only from accounts on the list of current active tags transmitted by the Department.
- C. Upon notification that the Concessionaire has requested payment from an account that the Department has previously informed the Concessionaire is

invalid and/or no longer in good standing, the Concessionaire must reconcile or audit the data transmission within three business days to identify all other instances that may have occurred.

- D. The Concessionaire shall use commercially reasonable efforts to ensure that no duplicate transactions or incorrect toll amounts are transmitted to the customer service center.
- E. Upon notification of a duplicate transaction or an incorrect toll amount on a per transmission basis, the Concessionaire must reconcile or audit the data transmission within three business days to identify any and all other duplicate transactions or incorrect toll charges that may have occurred.
- F. Within five days of identification, the Concessionaire shall transmit the information in accordance with the ETC Agreement.
- G. Following receipt of two or more complaints within 30 days of transponder reads from vehicles traveling in the GP Lanes emanating from a single toll point the Concessionaire shall investigate the complaints. In the event that a cross-read occurred or reasonable doubt exists as to whether a cross-read occurred, the Concessionaire shall, within 15 days of receipt of such second complaint within a 30-day period, prepare correspondence that can be sent to all customers who have made such a complaint regarding the erroneous GP reads. The Concessionaire shall provide information to the public outlining the issue with reads from tags in the GP Lanes within 15 days of the receipt of such second complaint within a 30-day period.
- H. Within seven days of receiving notice that an incorrect toll amount has been charged (and provided that customer information has been provided) and that the incorrect charge has been validated, the Concessionaire shall provide the customer service center with correspondence to be sent to the customer informing the customer that his or her account will be credited for errors in excess of \$0.25 to be determined on a per transmission basis.
- I. Within three days of discovery or notice from the Department that an incorrect toll has been charged, the Concessionaire shall submit a plan to the Department for approval to rectify the billing problem.
- J. The Concessionaire shall ensure that, at all times, dynamic message signs along the HOT Lanes display accurate information about toll rates and other travel information. Upon notification of the display of an incorrect toll amount, the Concessionaire shall reconcile or audit the data transmission within one business day to identify any and all other customer accounts that may have been impacted by the incorrect signage (to be determined on a per transmission basis).
- K. The Concessionaire shall comply with standards applicable to the retention of and use of customer records pursuant to Law, including § 33.1-56.4 of the Code of Virginia.

4.7.4 Roadside ETC Support and Maintenance

The Concessionaire shall support and maintain all roadside ETTM Equipment and infrastructure installed related to HOT Lanes operations.

4.7.5 Information Technology Support and Maintenance

The Concessionaire shall carry out information technology service management in accordance with the Agreement.

4.7.6 Anti–virus Scanning and Protection

- A. The Concessionaire shall maintain an updated anti-virus and protection procedure to protect the ETTM System from viruses and other destructive devices, and to manage the impact of virus attacks including transmission to the NRO ATMS or other Department or third- party systems.
- B. The Concessionaire shall immediately notify the Department of any catastrophic viral outbreak or similar destructive outbreak upon identification.

4.7.7 Interfaces

The Concessionaire shall continuously monitor all interfaces for the ETTM System. The monitoring should include availability, throughput, performance, buffer usage, queue lengths, hardware status, system alarms and warnings, and any other diagnostic data provided by the Concessionaire's implementation of the interfaces.

4.7.8 System Back-up and Recovery

- A. The Concessionaire shall provide data security for the ETTM System. Data security may include the following:
 - 1. backup of all software and configuration following each release of, or change to, the system, including any disaster recovery site;
 - 2. daily back-up of all new/changed data held on the tolling system;
 - 3. removal of the media used for the daily back-up to a secure offsite location within 24 hours (or other agreed timeframe); and
 - 4. storage of one month of the data back-ups in a secure offsite location.
- B. Backups shall not affect the ETC system's ability to capture, store or process detection data.

4.7.9 System Failure

A. The Concessionaire shall notify the Department without delay on becoming aware of any event or the likely event of any system failure that results in a critical element of the ETTM System not functioning, or that results in or is

likely to result in a catastrophic impact on the public, the Department, or a third party.

- B. The Department will notify the Concessionaire without delay on becoming aware of any event or the likely event of any system failure that results in a critical element of the NRO ATMS or the Department's customer service center not functioning, or that results in or is likely to result in a catastrophic impact on the public, the Concessionaire, or a third party.
- C. Where the relevant system failure affects or may affect a third party, the Department, or its agents, the Concessionaire shall provide the Department with all necessary available assistance in resolving the relevant system failure by cooperating fully and expeditiously with the third party, the Department, or its agents, as appropriate.
- D. Where the relevant system failure was caused by the Department or its agents, the Department will provide the Concessionaire with all necessary assistance co-operation in resolving the relevant system failure, by cooperating fully and expeditiously with the third party or Concessionaire, as appropriate.

4.7.10 Reporting

The Concessionaire shall report on the performance achieved against each of the Performance Requirements in each reporting period, in accordance with the Agreement.