Roadside Tolling for the I-10 Mobile River Bridge and Bayway Project

Proposed Technical Provisions

Alabama Department of Transportation

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TECHNICAL PROVISIONS
PROJECT INFORMATION AND PROPOSED SCOPE OF WORK

1.0 Project Background and Description

1.1 I-10 Mobile River Bridge and Bayway Project

The I-10 Mobile River Bridge and Bayway Project will involve the design and construction of a new six-lane I-10 bridge with a minimum of 215 feet of air draft clearance across the Mobile River channel (the "**Mobile River Bridge Project**"), and the replacement of the two existing two-lane I-10 bridges across the Mobile Bay with two three-lane bridges built above the 100-year storm event maximum wave height (the "**Bayway Project**").

The purpose of the project is to address acute and growing congestion issues by increasing the capacity of I-10, providing a direct interstate route for hazardous material transport, and minimizing adverse impacts to the maritime industries. The Project will also improve geometrics, enhance access to major industrial and freight destinations in the Mobile area, and facilitate economic growth. The overall Project extends approximately eleven miles through Mobile and Baldwin Counties, Alabama.

The Project's location makes it susceptible to extreme coastal weather conditions, and accordingly a governing criterion for the reconstruction of the Bayway is to reduce its vulnerability to storm surge and climate-related risks. The I-10 corridor, in addition to being one of the most significant commercial transportation corridors in the Southeast, is also a designated hurricane evacuation route.

The Project site occasionally experiences heavy downpours and fog, both of which can severely limit visibility and clear sight distance. The Project site also experiences significant wind velocities and is a high-chloride environment, which has implications for long term durability of infrastructure elements. Responders are encouraged to familiarize themselves with weather and environmental conditions in the Project area.

Additional Project Information can be obtained from the project website: https://mobileriverbridge.com/.

1.2 Roadside Tolling

This project will consist of the design and construction of a complete toll system to capture motorists traveling on I-10 Mobile River Bridge and Bayway. ALDOT envisions toll collection to take place at the Mid-Bay interchange. The objective is to toll all vehicles on I-10 that use either or both the Mobile River Bridge and Bayway. In addition to gantries on mainline I-10, ramps at the Mid-Bay interchange shall have toll gantries as needed to ensure all vehicles are tolled. The exact locations and number of gantries required will be determined during the design phase.

ALDOT's tolling plan identifies two classes of tolled vehicles – low height and tall height. The low height vehicle class will encompass all vehicles with heights under 7.5 ft., including passenger cars, SUVs, pickup trucks, minivans, and motorcycles. Vehicles in this class will pay a base toll rate for two

axles, and a higher rate for 1- through 4-axle trailers. The tall height vehicle class includes all vehicles with heights greater than 7.5 ft. The exact toll rates, including any discounts, will be set by ALDOT.

The tolling system shall scan the frequent user pass (ALGO Pass) transponders and that the All-Electronic Tolling gantries will have the capability to capture license plate images.

Back-office coordination and support will be performed under a separate contract.

2.0 General Requirements

ALDOT's desire is to procure an essentially "off-the-shelf" Toll System that has been proven in toll environments. ALDOT understands that no two systems are identical, but ALDOT will work with the successful **Toll System Designer-Operator-Maintainer (TSDOM)** to keep customization to an absolute minimum. It is anticipated that qualified proposers will have systems that can be implemented efficiently with minimal change. A detailed list of the toll system requirements can be found in Appendix I and Appendix IV.

2.1 Responsibilities Matrix

A Responsibilities Matrix shall document the roles and responsibilities of all parties involved with the design, construction, installation, testing, commissioning, operation, and maintenance of the Toll System being procured under this RFP. ALDOT's approval of the Responsibility Matrix is a precondition to payment of the mobilization milestone. The primary parties involved with this project include, but are not limited to, ALDOT, ALDOT representatives, Mobile River Bridge Design-Builder, Bayway Design-Builder, and TSDOM, and its subcontractors and vendors.

2.2 Quality Assurance Program and Statement

The TSDOM shall establish and maintain an effective Quality Assurance (QA) program to ensure compliance with all of the contract requirements and submittal of a Quality Plan for ALDOT approval. The QA Program shall ensure adequate quality throughout all areas of this Project, including design, procurement, development, fabrication, processing, assembly, inspection, testing, maintenance, reporting, repair, packaging, shipping, storage, site preparation, installation, and cleaning.

All supplies and services under this Contract, whether manufactured or performed within the TSDOM's plant or at any other source, shall be controlled at all points necessary to ensure conformance to the specifications of the technical requirements. Manufacturing, fabrication, and assembly work conducted within the TSDOM's facility shall be controlled completely by the TSDOM. The TSDOM shall maintain records or data essential to providing objective evidence of quality until the expiration of the contract and they shall be made available to ALDOT upon request.

The QA Program shall include a requirement that the TSDOM's identified QA Manager shall sign off on all submissions. By signing off on a submission, the TSDOM verifies that all work related to that submission adheres to the TSDOM's QA Program. ALDOT may conduct independent QA reviews of all proposer work and submissions. The proposer shall address all issues identified by ALDOT during QA reviews, including correcting errors and resubmitting documentation. All Services to address ALDOT QA comments shall be at no additional cost.

2.3 Roles and Responsibilities

RFQ/RFPs for the MRBBP (Mobile River Bridge Project and Bayway Project) have been advertised by ALDOT and will be awarded prior to the award of this Project. The Design-Operator will coordinate with the Design-Builders of those projects as needed to ensure the proposed infrastructure is built to support the Toll System. A summary of the responsibilities is shown in the table below. Note that this table is not an exhaustive list of responsibilities.

Table 2.3 – Responsibilities

	Activity	Responsibility
1.	Designs tolls sites, static signs, toll rate DMS, toll gantry facilities, power, and fiber optic communication network for AET system.	AET Designer
2.	Installs/constructs toll gantries, signs (static only with AET responder installing and integrating toll rate DMS?), maintenance areas with access for roadside tolling devices, cabinets, lightning protection, grounding, conduits, junction/pull boxes, power cables, and fiber optic communications cables from source to cabinets	**Design-Builder**
3.	Installs/constructs power and communications conduits from cabinets to devices	**Design-Builder**
4.	Installs/constructs power and communications cables from cabinets to devices	AET Designer Operator Maintainer
5.	Installs AET system devices	AET Designer Operator Maintainer
6.	Installs AET system cabinets	**Design-Builder**
7.	Integrates roadside technology for AET system	AET Designer Operator Maintainer
8.	Integrates AET system to back office.	AET Designer Operator Maintainer
9.	Tests the AET system	AET Designer Operator Maintainer
10.	Operates roadside technology for AET system	AET Designer Operator Maintainer (Phase 2)
11.	Maintains roadside technology for AET system	AET Designer Operator Maintainer (Phase 2)
12.	Operates and maintains back office for AET system	Separate RFQ
13.	Operates and maintains violation enforcement for AET system	Separate RFQ
14.	Provides customer service functions and staffing including education/marketing	ALDOT

TSDOM should have the ability to adapt to changing technologies over the Term and must offer customers choices in toll payment methods consistent with evolving industry standards and practice. At a minimum, transponder and toll-by-plate must be accepted as payment.

2.3.1 Support for the Design-Build Contractor: Civil Design and Construction

Under separate contracts, ALDOT will contract with Design-Builder(s) for the Mobile River Bridge Project and the Bayway Project. ALDOT will contract with these Design-Builder(s) to construct overhead sign structures and other elements related to the installation of the Toll System upon which the TSDOM shall mount the appropriate tolling hardware. The Design-Builder(s) will also prepare the roadway for any required embedded sensors.

The TSDOM shall work with ALDOT on requirements for all civil construction work to be performed on the project, including, but not limited to, overhead platforms, shelters, roadway/pavement, and conduit relative to the aspects that integrate with the design and installation of the Toll System. During civil design, the TSDOM support is anticipated to include responses to information requests for clarification on proposed designs. The TSDOM shall coordinate with the Design-Builder during construction.

During construction, the TSDOM shall provide review and approval of civil contractor shop drawings or similar within the context of the toll system functional and performance requirements. Upon approval of shop drawings or similar design elements by the TSDOM within the context of the Toll System function and performance, the TSDOM shall assume responsibility for those elements to the extent that if the civil work is installed as designed and does not meet the performance requirements of this scope of services, the TSDOM shall be responsible for the costs of redesign, civil rework, and additional Equipment costs as further set forth in the contract.

TSDOM shall also coordinate and be available onsite as needed during the installation of the civil elements related to the Toll System to ensure that the civil work is performed in accordance with the TSDOM's requirements. The TSDOM shall provide in-lane equipment design, installation specifications, structural requirements, and drawings for mounting the equipment to the overhead platforms at each gantry to the civil contractor, including but not limited to:

1. Equipment mounting, locations, and installation instructions
2. Mounting structure and mounting arms
3. Conduit, junction boxes, and electrical requirements
4. Wind loading calculations
5. Equipment load and power calculations
6. Electrical grounding

The TSDOM shall review and approve all aspects of overhead platform design drawings submitted by the Design-Builder that are related to the Toll System equipment. The TSDOM shall be responsible for all equipment installations, terminations, and connections of equipment located on the overhead platforms and for connecting such equipment to the electronics in the equipment cabinets.

During the Design phase, the TSDOM shall provide any in-pavement sensor requirements to the civil contractor. Additionally, the TSDOM shall review and approve the pavement design, including roadway material to be utilized and construction methods to be used in the construction of the pavement. The TSDOM is responsible for the design and installation of all elements of the Toll System that are embedded into the pavement.

The TSDOM shall coordinate with the Design-Builder for the installation of the sensors in the lanes and identify the pull boxes and conduits. The location and design of the pull boxes shall minimize the impact of maintenance activities on the effected lane. The TSDOM shall provide the cabinet space requirements to the Design-Builder.

The TDSO shall adhere to all specifications of the latest ALDOT Standard Specifications at time of construction unless the TSDOM receives written notification by the ALDOT which overrides the Standard Specifications.

The TSDOM shall procure, furnish, and install any conduit required from the controller cabinet to the equipment and between the various components on the toll overhead platform. The TSDOM shall procure, furnish, and install the cables necessary for terminating and connecting the Toll System equipment on the gantry to the electronics in the controller cabinet.

The Design-Builder will provide, terminate, and test the fiber connection from the nearest fiber backbone hub to the controller cabinet. The TSDOM is responsible for all LAN communications related to the Toll System.

3.0 AET System Design and Construction

3.1 Administrative Requirements

3.1.1 Standards

The TSDOM shall perform all work in accordance with the standards listed in the table below.

Table 3.1–1 - Standards

No.	Organization	Name
1	Code of Alabama	Code of Alabama, Title 23, Chapter 2. Also known as the "Toll Road, Bridge and Tunnel Authority Act"
2	AL Dept. of Revenue	Alabama Department of Revenue License Plate and Registration Information[1]
3	NFPA	NFPA 70; National Electrical Code (NEC); 2017
4	ANSI	ANSI Standard C2; National Electrical Safety Code (NESC); 2017
5	ALDOT	Special Provisions including: Special Provision No. 12-0943; Amendment to Standard Specifications 2012 Edition, Section 734 Fiber Optic Systems, Section 746 ITS Acceptance Testing, Burn-In and Training; Effective Date August 1, 2014.
6	FHWA	Manual of Uniform Traffic Control Devices (MUTCD); 2009
7	AASHTO	Roadside Design Guide, 4th Edition; 2011 and July 2015 Errata.
8	AASHTO	Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 2015.

3.1.2 Toll Agreement

3.1.2.1 Interoperability

"Interoperability" between tolling facilities and agencies is the sharing of electronic toll transaction and financial data to facilitate the collection of tolls and exchange of revenue due from Users with Toll Accounts with different Toll Account Providers. The Authority is also exploring opportunities for interoperability with other states and agencies and is soliciting input from responders on effective strategies for enabling interoperability. No final decision has currently been made, but it is anticipated that the Authority will join either the Central United States Interoperability Hub (CUSIOP) or the Southeast Interoperability Hub (SEIOP).

3.1.2.2 Back Office Functions

The Authority will contract with a third party to perform back-office tolling functions, Customer Service Center (CSC), and Walk-In CSC. The BOS third party will be selected via a separate contract. This may include other services, including collections agencies, mail printing, aggregators, and others as determined by the Authority.

The TSDOM shall coordinate with the BOS operator to ensure the systems are compatible. The TSDOM shall prepare an interface specification between the RTCS and BOS which will enable the Toll System to be integrated with the future back office.

3.2 Tolling Plan

3.2.1 Conceptual Tolling Plan

TSDOM shall prepare a Conceptual Tolling Plan that discusses the conceptual approach to tolling and policies. The Conceptual Tolling Plan must include:

1. Tolling approach:
    A. Toll points (gantry locations), Toll Segments, and how tolls will be charged to Users as individual transactions or trips.
    B. TSDOM's transponder distribution (retail) and pricing plan.
    C. Toll System conceptual design:
        a. How TSDOM will meet Toll System Performance Requirements.
        b. How TSDOM will meet infrastructure requirements.
        c. Backup system and redundancy policies and procedures.
    D. Approach to interoperability.
2. Tolling layout (including drawings that illustrate toll gantry locations).
3. Tolling policies:
    A. Account types offered to Users.
    B. Transaction types.
    C. Price schedule including tolls, fees, and other charges.
    D. Terms of Service and Agreements with Users.
    E. Non-revenue transaction/account approach.
    F. Discount Plans and eligibility.
    G. Escalation and enforcement approach.
    H. Transaction and violation contesting and appeals process with any limiting timeframes.

3.2.2 Tolling Operations Plan

TSDOM shall prepare a Tolling Operations Plan that implements the Conceptual Tolling Plan and discusses the policies, procedures, staffing, and approach that TSDOM will follow during toll operations and collection. The Tolling Operations Plan must also discuss how each of the components discussed within will be affected during the period of time just prior to and after Tolling Commencement (ramp-up period) when customer service levels may be higher than average.

The Tolling Operations Plan must include the following:

1. Final tolling approach:
    A. Toll gantry locations and how tolls will be charged to Users as individual transactions or trips.
    B. How toll rates will be determined, including User Classification methods.
    C. Toll System final design.
    D. Toll operations facility locations
    E. Interoperability Agreements and plans.
2. Final tolling layout (including drawings that illustrate toll gantry locations).

3. Tolling policies:
    A. Account types offered to Users.
    B. Transaction types.
    C. Price schedule including tolls, fees, and other charges.
    D. Final Terms of Service and Agreements with Users.
    E. Non-revenue transaction/account approach.
    F. Discount Plans and eligibility.
    G. Pay-by-Mail (PBM) Transaction certification process.
4. Staffing plan.

TSDOM shall submit Tolling Operations Plan to ALDOT not later than 90 days prior to Service Commencement.

3.3 Design Requirements

The Toll System requirements are set forth in this section and in Appendix IV.

3.3.1 Toll System Infrastructure Requirements

TSDOM shall design the Toll System infrastructure to collect Users' tolls. The Toll System must be an all-electronic open-road tolling system that records toll transactions at highway speeds without requiring Users to slow down to pay the toll.

The TSDOM shall coordinate with the Design-Builders to construct the Toll System. The TSDOM is responsible for the following design aspects:

- Toll locations
- Static signs related to the Toll System
- Toll gantry design and facilities
- Power and fiber optic communications

The Design-Builders are responsible for constructing and installing the following:

- Toll gantries
- Static signs related to the Toll System
- Maintenance work areas and pull-offs
- Cabinet installation
- Lightning protection
- Grounding
- Conduits
- Junction boxes and pull boxes
- Power and fiber optic communication cables from source to cabinets (including testing)

The Toll System shall include all aspects of system design, testing, installation/implementation, integration, training, documentation, operation, and maintenance for the new Toll System. Equipment includes, but not limited to:

- Transponder Antennas
- Overhead Sensors/Scanners
- Pavement Loops/Detectors
- LPR Cameras/Lighting
- Video cameras
- Toll Site Controllers

- Servers/Data Storage
- UPS
- Generators
- Cabinets
- Junction boxes
- Conduits
- Lighting
- Cables

3.3.1.1 Toll Locations

The TDSO shall refine locations for the installation of the toll gantries. All traffic on I-10 using either the Mobile River Bridge or Bayway shall be tolled, whether they are using the entire bridge span or entering from Route US 90/98 (Battleship Parkway/Causeway).

The Toll Zone shall encompass all contiguous travel lanes and shoulders at each designated location.

3.3.1.2 Toll Gantry

The TSDOM shall provide a toll gantry system as per the requirements set forth in this section and Appendix I.

The design of the toll gantry system shall be determined by the TSDOM but shall include costs for a dual gantry system spanning a variety of roadway cross sections based on installation locations ranging from 30' (single lane on ramps) up to 108' (three lane each direction mainline with shoulders). The TSDOM shall include the number of gantries needed, the layout of the toll equipment (antenna, scanners, cameras, etc.) and framing needed to hold the equipment, the weight (loading) of the toll equipment the vibration requirements, and the number and size of conduits.

The controller cabinet(s) shall be located on or near the gantry with easy and safe access for maintenance crews. Maintenance crews shall be provided a safe pull-off area at each gantry location so that any maintenance work to be performed can be undertaken without the need to close a travel lane or shoulder. Coordinate with the Design-Builder during construction to ensure the system is installed as designed.

3.3.1.2 Power

The TSDOM shall design the power needs for the gantry locations per requirements set forth in this section and Appendix I.

Power requirements shall meet ALDOT and NEC requirements. The TSDOM shall coordinate with the Design-Builder to install conduits and service cables from the load source to the controller cabinets. Coordinate with the Design-Builder to acquire metered service from local utilities if power is not available from ALDOT facilities. Design for a main disconnect and breaker panel at the controller cabinet sites to provide complete or partial de-energization as needed during maintenance.

Design all required equipment including on-site transformers. Design external backup generators (combustion and/or solar powered) with an automatic transfer switch to provide continuous power to the Toll System. The external generators shall be located within close proximity to the toll facility so that separate lane closures are not required when refueling is required. These generators shall be permanent facilities either ground mounted or structure mounted. The generators shall be installed above the 100-year flood elevation.

The System shall monitor the status (e.g., on battery, online, etc.) and estimated battery time remaining of the UPS. The Toll System shall issue an appropriate alert whenever the UPS indicates that line power has been interrupted for more than a configurable number of seconds. Coordinate with the Design-Builder during construction to ensure the system is installed as designed.

All AET equipment shall be hardened to resist the corrosive nature of the salty air/water and resist a minimum of 100 mph hurricane-force winds.

3.3.1.3 Communications

The TSDOM shall design for fiber optic communication from the toll facilities to ensure secure and uninterrupted service. Coordinate with the Design-Builders to provide separate conduit and junction boxes so that the Toll System communications run separately from any ITS or bridge surveillance communications duct bank. Coordinate with the Design-Builder during construction to ensure the system is installed as designed.

3.3.1.4 Security Systems

The TSDOM shall provide electronic security per the requirements in Appendix I. Coordinate with the Design-Builder during construction to ensure the system is installed as designed.

3.3.1.5 Miscellaneous Structures

The TSDOM shall design all miscellaneous structures needed to support the Toll System. Structures must comply with vibration and deflection requirements for individual tolling devices, ALDOT *Standard and Special Drawings for Highway Construction*, ALDOT *Standard Specifications for Highway Construction.* Structures over travel lanes or shoulders shall conform to clearance requirements. Coordinate with the Design-Builder during construction to ensure the system is installed as designed.

3.3.1.6 Toll Information Signs

The TSDOM shall design appropriate static signage at and in advance of the toll gantries. Sign design and location shall be in accordance with the current *Manual on Uniform Traffic Control Devices (MUTCD)*. Toll prices will be set by ALDOT during design and exact classification breakdown may change. At a minimum, messaging shall include advance warning of an AET and the toll rate for:

- Passenger Vehicles with ALDOT issued transponder
- Passenger Vehicles without ALDOT issued transponder
- Trucks over 7.5’ in Height

- Monthly Discounts Available

Design lighting for the signs in accordance with ALDOT standards. TSDOM shall coordinate with the Design-Builder to ensure the bridge structure can accommodate sign structures. TSDOM shall coordinate with the Design-Builder during construction to ensure the system is installed as designed.

3.3.1.7 ITS Support

3.3.1.7.1 CCTV Cameras

The TSDOM shall provide CCTV surveillance per the requirements in Appendix I.

3.3.1.7.2 RWIS

The TSDOM shall provide a RWIS station at each toll gantry location. The RWIS shall include a rain gauge, barometer, anemometer and director sensors, temperature and humidity sensor, and visibility sensor. If other gantries are within ¼ mile of another, only one RWIS station is required.

3.3.2 Toll System Functional Requirements

The Toll System shall have functional requirements as set forth in this section and Appendix I and Appendix III.

3.3.2.1 General

The Toll System shall be designed to identify the classification of each vehicle in each lane that passes through the toll collection location(s) and assign the toll due for each vehicle based on the User Classification and the toll rate determined according to the toll rate policy. The Toll System must (i) detect all vehicles that pass through each Toll Segment either on the traffic lanes or on the shoulder and (ii) generate a transaction for each vehicle.
The Toll System must capture images of back and front (when applicable) license plate(s) of each vehicle that passes through the Toll Segment. The Toll System shall be capable of reading all US license plates.

The devices shall be hardened to be able to function in weather typical for this location. This includes device visibility of least 175' in fog conditions, heavy downpours, and winds up to 100 mph. The system shall be designed to be resistant to the corrosive nature of the salty air/water and resist hurricane-force winds up to 100 mph.

3.3.2.2 User Classification Sub-system

The User Classification Sub-system must detect whether a vehicle is present, determine the User Classification as required by the approved Tolling Operations Plan, and have the ability to accurately distinguish individual vehicles.

3.3.2.2.1 Automatic Vehicle Classification System

The Toll System shall support the three major AVI protocols: TDM, SeGo, and 6C. The TSDOM shall furnish, install, and configure an Automatic Vehicle Classification (AVC) system to detect and classify all vehicles.

3.3.2.3 Image Based Tolling Sub-system

Digitized text from the captured images must include both plate number and jurisdiction of issue for all license plates of all users, including motorcycles.

3.3.2.3.2 Digital Video Audit System

The Toll System will incorporate a Digital Video Audit System (DVAS) comprised of cameras and networked Digital Video Recorders (DVR) Equipment to monitor the Toll Zones and audit the accuracy of the System. The DVR will display Transaction data on or alongside the displayed footage and allow Users to search for captured footage based on various parameters. The final content of the data overlay and the location of all associated cameras shall be developed during Project Design.

Additional Audit requirements can be found in Appendix IV.

3.3.2.3.3 Image Capture System

The Image Capture System (ICS) encompasses the components of the System which enables Image-based tolling and violation enforcement. The ICS is comprised of the hardware and Software that are used to perform Image Capture, Automated License Plate Recognition (ALPR), Fingerprinting and/or any other such techniques that can assist in automating the toll collection and Image review processes.

3.3.2.3.3.1 Automated Image Review

To aid the System in automatically identifying license plates, an Automated Image Review (AIR) process will be employed.

AIR will employ vehicle Fingerprinting or other similar methods. Fingerprinting is the process of extracting non-license plate information (the Fingerprint) from license plate/vehicle Images that can be used to uniquely identify a vehicle. This Fingerprint can assist the System in maximizing automation and the accuracy of the Image Review process.

In addition to, or in place of, Fingerprinting the System could support other techniques that would enable the Trip Building process to be automated and reduce the need for Manual Image Review.

3.3.2.3.3.2 Manual Image Review

The Toll System will provide a Manual Image Review function that will allow review of Images and confirmation/entry of Plate Data from captured Images or assignment of

the proper reject code if the Plate Data cannot be ascertained. This information will be transferred to the back-office for review and processing.

Once a license plate has been successfully recorded by the Toll System, Manual Image Review will only be required if future Images of the license plate fall below the confidence threshold and/or could not be identified via Fingerprinting or other such means. The Toll System will enable the confidence threshold, Fingerprinting algorithm and/or any other automated plate processing parameters to be Configured so that it can be adapted to changing conditions and improvements in the System.

All vehicles, both with and without valid transponders, will have images captured by the ICS and automatically processed to generate associated Plate Data. While the Toll System will utilize various techniques to allow for the automatic extraction of plate data and will attempt to limit the amount of human intervention required to process Images (i.e., Manual Image Review), there will still be instances in which Manual Image Review is required. Manual Image Review may be at the Transaction level to allow for Trip Building to take place or at the trip level to confirm Automated Plate Data. The Host will provide Manual Image Review functionality for inspecting, editing, and confirming Plate Data from captured Images. This functionality will be provided on two levels:

- Image Reviewer – Image Reviewers are responsible for reviewing all Images (either at the Transaction or Trip level). The Manual Image Review functionality must support the required number of simultaneous Image Reviewers and allow them to process images rapidly so as to meet the Performance Requirements set forth in this SOW.
- Supervisor/QA Staff – These staff are responsible for spot checking Image Reviewers and/or resolving questionable Plate Data.

Requirements:

- The System shall be furnished with a comprehensive and Configurable Manual Image Review function allowing review (including confirming, editing and/or rejecting) of Plate Data as necessary to ensure that accurate Plate Data or reject code are utilized throughout all System processes.
- The System shall track Manual Image Review statistics to allow for a comprehensive Quality Assurance process to analyze and refine the Manual Image Review process, to track individual Image Review User productivity and accuracy and to determine trends and anomalies in ICS performance.
- The Manual Image Review function shall be fully auditable, generating audit trails of all activity and providing comprehensive audit trail search and review capability.
- The Manual Image Review function shall allow for review of Images and associated Plate Data at the Trip level as required by the Requirements stipulated in this SOW.
- The Manual Image Review function shall allow for review of Images and associated Plate Data for Trips reconciled back from the CSC as Registered Vehicle Owner Source (RVOS) rejects, no hits, or other such codes (essentially, a re-review function). This shall allow the Image Reviewer to verify the original Plate Data sent to the CSC and adjust the Plate Data as necessary.

- The Manual Image Review function shall provide Image Reviewers a screen or screens for rapid review of Transactions and/or Trips.
- The sequence of Images presented to Image Reviewers shall be such that they will help expedite the Trip Building process. As such, Images shall be presented in ascending date/time sequence by calendar date so as to allow Trip Building for the given direction to complete to the best/fastest extent possible.
- The Manual Image Review function shall be configurable to allow for a double-blind review process
- The Toll System shall route Images to a supervisor for resolution when the Plate Data differs during the double-blind review process.
- The Manual Image Review function shall allow performance of full Transaction and Trip based searches and review of associated Images and Plate Data.
- Image Review screens shall allow for confirmation of Toll System generated Plate Data.
- Image Review screens shall allow editing Toll System generated Plate Data including issuing jurisdiction, plate characters and plate type. Plate type shall be a required field for any jurisdiction for which it is applicable.
- The Toll System shall track any edits to Plate Data and maintain a full history of such edits including the ID of the User making the edit the date/time of the edit and the edited Plate Data. The Toll System shall track any edits to Plate Data and maintain a full history of such edits including the ID of the User making the edits, the date/time of the edits, and the before/after data of the edited Plate Data.
- The Toll System shall allow for the rejection of the Images with a Trip if none of the Images are human readable.
- The Toll System shall support a configurable list of potential reject reasons/codes to be used when Images associated with the Transaction or Trip is rejected.
- The Toll System shall be furnished with a rule-based process to determine when Manual Image Review is required.
- The Toll System shall utilize a configurable parameter (or parameters if they are jurisdiction specific or specific to other criteria) to set the Confidence Threshold which is defined as the value at or above which a Confidence Level must be to bypass Manual Image Review.
- The Toll System shall be configurable as to whether or not “first time” Plate Data (data that has not previously been seen in the System) shall require Manual Image Review.
- The Toll System shall be configurable as to the number of times Plate Data must be seen until it is no longer considered “first time” data.
- All Trips with Plate Data matches to the ALPR Exception List shall require Manual Image Review unless other techniques such as Fingerprinting are utilized to allow such Plate Data to bypass Manual Image Review.
- The Manual Image Review function shall provide tools for Image enhancement including, but not limited to zooming, contrast adjustment,

and brightness adjustment. These tools will not alter the original Image but shall only apply these adjustments for viewing purposes.

3.3.3 AVI Accuracy

AVI Read Accuracy is defined as the ability of the Toll System to read transponders traversing the Toll Zone. The System shall read 99.9% of all Transponders mounted per their manufacturer's mounting instructions (AVI Read Accuracy).

AVI Read Accuracy shall be calculated on a monthly basis as follows:

- Number of Transponders read / Number of actual Transponders that traversed the Toll Zone

3.5.4 Availability

Availability is defined as the ability of the Toll System to function as per the requirements set forth in Appendix III.

3.3.5 Transaction and Trip Processing Performance

Requirements for Transaction and Trip Processing Performance are set forth in Appendix III.

To facilitate invoicing of customers and posting of Trips to customer accounts the Toll System's processing of Transaction data, construction of Trips, and transferring the Trip data to the CSC is of a critical and time sensitive nature.

3.3.6 Performance and Availability Verification

The TSDOM will provide a detailed process allowing the performance and availability Requirements to be verified using tools resident in the Toll System, including screens and reports, which will be finalized during design phase.

- The TSDOM will provide a detailed process allowing the performance and availability Requirements to be verified using tools resident in the Toll System, including screens and reports, which will be finalized during design.
- Performance and availability measurement methodologies shall be finalized during design.
- The Toll System shall capture the data necessary and provide for the generation of on demand system generated reports documenting the System's actual performance and availability and comparing that to the Performance and availability requirements documented in this SOW.
- The Toll System shall include, but is not limited to, monitoring of vehicles, and Trip errors (Plate Data changes, classification changes, etc.) identified through the Transaction / Trip Research and Correction function in determination of Correct Trip performance.
- The Toll System shall provide a GUI function to provide the ability to review Transactions flagged as class mismatch for the sole purpose of verifying AVC accuracy. The Toll System shall utilize the results of such a review to generate reports on AVC Accuracy.

3.4 System Dashboard

The TSDOM shall provide a System Dashboard as per the requirements set forth in this section and Appendix I.

The monitoring of the Toll System in real-time is a critical function that will allow ALDOT to ensure correct operations of the Toll System. The Toll System will be furnished with a Dashboard function that provides a graphical, map-based representation of the System and its Toll Zones.

The detailed appearance, content and functionality of the Dashboard will be developed during Project Design.

3.5 System Administrative Configuration

The System Administrative Configuration shall be as per the requirements set forth in this section and Appendix I.

The Toll System will be highly configurable and will have appropriate GUI screens to allow management of the various Configuration parameters required for proper System operation. Access to all GUI screens and functions shall be determined by user role as discussed elsewhere.

3.6 System Reporting

System Reporting shall be as per the requirements set forth in this section and Appendix I.

Reporting is a major functional component of the Toll System and aids in managing System Operations and Maintenance, determining Toll System performance, auditing the Toll System, and extracting traffic and revenue information. The detailed contents and layout of all Toll System reports and report selection screens will be developed during Project Design.

3.7 System Testing

The TSDOM shall provide their overall approach to testing services to support the implementation of the Toll System.

3.7.1 General Requirements

Proposer's approach to testing *generally* should be provided, including the following factors:

- Test planning and management (including proposers test team roles and responsibilities)
- The required coordination with third Parties either involved or potentially affected by test activity on live roads
- The System Requirement Verification Test Strategy
- Internal testing including the stages of software testing, unit testing, and pre-and post-release testing
- Formal testing, for both Back Office and Roadside, including system performance against Key Performance Indicators (KPIs)
- Software development testing
- Installation and testing with live traffic, in addition to any foreseen constraints
- Testing for failure mode effects and recovery
- Disaster Recovery Testing
- Test Documentation
- Test Reporting

3.7.2 Master Test Plan

The TSDOM shall include the approach to a Master Test Plan (MTP) including the overall management and control of testing across each of the differing test requirements including, but not limited to:

- Test resources and management, including which tests will be witnessed by ALDOT and Alabama Toll Road, Bridge, and Tunnel Authority (ATRBTA) versus internal integrator testing
- Test Criteria, including system performance, Pass/Fail criteria, test restart on failure of any test element
- Typical test cases
- Entrance and Exit Criteria from tests
- Recording Test results

Include the approach to non-conformances detected during test and subsequent regression testing. Present a traceability matrix documenting how each test case traces back to a system requirement.

3.7.3 Test Reports

After the completion of each formal test, the TSDOM shall submit a test report to ALDOT for review and approval. The test report shall provide the results of the test, a listing of all defects identified together with the severity level of each, a plan for resolving those defects, and a recommendation for retests (if appropriate).

The TSDOM shall be responsible for completing all corrective actions identified within a time frame approved by ALDOT. ALDOT may withhold approval of any test until the required corrective actions have been satisfactorily completed. ALDOT will review and approve formal test plans and schedules proposed by the TSDOM and will witness and determine the acceptability of the test results.

The TSDOM shall provide all test and support personnel, test vehicles, test equipment and test sites in accordance with the approved master test plan. The TSDOM shall provide both development and test equipment configurations necessary to conduct their internal test activities.

The TSDOM shall conduct all tests in accordance with the master project schedule and the approved test plans and procedures. During the development of the Toll System software, the TSDOM's test personnel shall conduct a comprehensive program of internal testing and walk-through sessions to ensure that the Toll System meets the functional specifications set forth in this RFP and that defects are detected and resolved or identified prior to formal demonstration testing witnessed by ALDOT and ALDOT-designated representatives. Progress on these tests shall be reported during project meeting.

3.7.3 Formal Tests Phases

In addition to the internal testing conducted by the TSDOM to verify that the system meets project requirements, the TSDOM shall demonstrate to ALDOT and ALDOT-designated representatives that all portions of the Toll System meet functional, technical, operational, and performance requirements by executing the following formal tests, which are further described in the subsections that follow.

3.7.3.1 Factory Acceptance Test

The TSDOM shall conduct a Factory Acceptance Test (FAT) at a test facility that is representative of the Project with two adjacent tolling lanes. The FAT shall include representative roadside equipment and all external interfaces. The FAT shall be designed to demonstrate the full functionality of Toll System, in a factory environment with hardware and software identical to the final system, including all graphic user interfaces, and simulated transaction volumes to represent the expected real-world load on the system.

3.7.3.2 FAT Site Tests

FAT Site Tests shall be demonstrated at a closed course test site with real vehicles (approved by ALDOT) and applicable equipment, simulating real-world traffic patterns driving through the test site. The test site shall accommodate at least two lanes. The test site shall accommodate speeds ranging from stop-and-go up to 100 mph.

3.7.3.3 FAT Plan

The TSDOM shall develop a FAT Plan including test procedures (scripts) designed to demonstrate Toll System functionality in an integrated configuration, and to stress the Toll System. The FAT plan shall include the conditions to be tested together with the expected results and a description of the grading that will be used for classifying and recording any defects noted during the FAT (e.g. critical, major, minor, depending on the severity of the defect).

3.7.3.4 FAT Scope

Interfaces will be correctly tested in integration testing after the FAT. The FAT shall include all external interfaces. Reports shall be generated to verify correctness and completeness. Internal and external interfaces shall be verified for accuracy. The FAT shall also include test procedures for stress testing in order to verify that the system shall be able to handle the estimated transactional volumes for all payment types. Normal and exception scenarios shall be demonstrated.

The TSDOM shall provide simulated transaction data that shall mimic ALDOT's expected actual data. The simulated data shall be used to run the Toll System continuously over a two (2) day period (continuous 48 hours) to ensure the data files are correctly created, the data are processed accurately through each lane, and the data are transferred to the Central Subsystem correctly. All screens and reports shall also be tested. The full range of required reports shall be tested using simulated data or data collected over a sufficient test period that spans multiple consecutive months.

Various failure conditions shall be generated to test the MMS alarm and maintenance requirements. The DVAS shall also be operational during the FAT and shall be fully exercised and used to validate test action where applicable. During FAT, ALDOT may require an additional calendar day of testing, above and beyond the test period scheduled for performing/validating the scripted testing, to perform "ad-hoc" ALDOT defined tests. The Proposer shall support this testing utilizing the same test facilities/personnel/data available for the scripted test procedures.

3.7.3.5 FAT Report and Approval

Following the FAT, the TSDOM shall submit a detailed FAT report to ALDOT that describes the testing results, including the severity levels of any defects found. FAT approval is dependent on successful demonstration of the complete Toll System as functionally compliant and meeting the exit criteria identified in the FAT Plan.

3.7.4 Site Integration Test

Upon completion of installation activities at each site, the TSDOM shall perform a Site Integration Test to ensure the individual components, equipment, and software are performing correctly. Correct performance includes meeting all KPIs. At ALDOT's discretion, the test will be witnessed by ALDOT in accordance with approved test procedures and the test schedule.

3.7.5 Site Commissioning Test

Upon completion of the Site Integration Test, the TSDOM shall test the equipment, software, and communications following a Site Commissioning Test Plan. At ALDOT's discretion, the test will be witnessed by ALDOT in accordance with approved test procedures and the test schedule.

Site installation may not be considered complete until the site installation and commissioning testing has been witnessed and approved by the ALDOT. After successful completion of the commissioning testing in all the lanes, the full facility can be placed into revenue collection.

3.7.6 System Acceptance Test

The objective of the System Acceptance Test (SAT) is to ensure that the System (software and hardware) functions in a production (including revenue collection) environment over a period of time with the required functionality, availability, accuracy, and performance. A precondition for the commencement of SAT is that the System is meeting or exceeding the contract requirements and all applicable project KPIs including any changes that ALDOT has approved. The TSDOM shall submit KPI reporting demonstrating conformance prior to scheduling the SAT. The SAT shall last 60 consecutive days.

The TSDOM shall notify ALDOT in writing when the system acceptance period shall begin. The TSDOM is solely responsible for executing SAT. The overall system shall be observed in live operations by the proposer and ALDOT for the required consecutive days. During this period, system accuracy, performance, reliability, and auditability shall be measured and verified with respect to the requirements of this RFP and any approved changes. All alarms displayed by the MMS shall be analyzed.

If testing results in a failure or requires a restart, the TSDOM may be held accountable for any costs incurred by ALDOT to support the additional system acceptance period(s). Anomalies shall be categorized by criticality, and the timing of resolution of all anomalies shall be agreed upon by ALDOT and the TSDOM.

The TSDOM shall develop a plan for correcting the anomalies and testing the fixes prior to requesting authorization from ALDOT to install the fixes in the production system and verification through the use of regression testing that they are working properly and have not caused any new problems. These tests shall be repeated until the Toll System has met SAT requirements for the required consecutive days and ALDOT is satisfied that the Toll System meets the requirements as defined in the design documents and this RFP.

The TSDOM will be granted acceptance upon the successful completion of SAT, closure of all punch-list items, completion and submission of all required documents and meeting of other conditions as specified in the contract.

3.7.7 Security and Penetration System

The TSDOM shall contract with a PCI-certified, neutral third-party testing entity and have the testing entity conduct a comprehensive penetration test of the Toll System after installation. The testing shall include:

1. Application Security
2. Network Security
3. Cloud Security
4. Social Engineering
5. IoT Security, if applicable

4.0 AET System Operation and Maintenance

After the Toll System is fully built, tested, declared operational and accepted by ALDOT, the Design and Construct phase will terminate and the Operation and Maintenance phase of the contract will commence. The TSDOM shall be responsible for operating and maintaining the Toll System on behalf of ALDOT.

4.1 Contract Term

Upon acceptance of the Toll System by ALDOT, the contract term for Operating and maintaining the Toll System shall begin. The initial contract duration shall be for a period of five (5) years, with ALDOT having two (2) two-year extension options. Twelve (12) months prior to the end of the contract period, ALDOT shall inform the TSDOM whether it will select the option for the renewal period or not.

4.2 AET System Operation

The TSDOM shall operate the Toll System on behalf of ALDOT. The Toll System shall operate at to prescribed performance standards outlined in Section 3.0.

4.3 Warranty

The Warranty Period shall end 12 months after the Toll System begins revenue operation. During the Warranty Period, any work beyond routine maintenance or device replacement or service shall be considered under Warranty and will be performed at the TSDOM's expense.

4.3.1 Equipment Warranty

The TSDOM shall be obligated to replace or repair at the TSDOM's sole cost and expense for the period specified in the scope of services, for any unit of equipment, part, or component thereof which the ALDOT deems defective or insufficient or which the ALDOT deems to have failed to comply with the requirements of the scope of services.

All defective equipment replaced by the TSDOM will become the property of the TSDOM.

The TSDOM shall bear all costs of return of equipment under warranty.

The provisions of this section shall survive the expiration, cancellation, or termination of this agreement for the length of the warranty period specified in this agreement.

4.3.2 Software Warranty

4.3.2.1 General

The software needed to operate the Toll System shall include, but not be limited to, all licensed internal code and firmware. ALDOT's acceptance of the software shall occur in accordance with the provisions of the scope of services upon system acceptance. The TSDOM warrants that, upon ALDOT's acceptance of and for the applicable warranty period, the software and each module, or component and function thereof shall:

1. Be free from defects in materials and workmanship under normal use
2. Remain in good working order, be free from viruses, trap doors, disabling devices, or any other technology or means which has the ability to interfere with the use of the Toll System by ALDOT or its designees, or permit access to ALDOT's computing systems without its knowledge, or contrary to its system connectivity policies or procedures
3. Not interfere with electronic toll collection
4. Operate and function fully, properly, and in conformity with the warranties in this Agreement

The TSDOM shall provide ALDOT the most current release of all software available on the date of delivery to maintain optimum performance pursuant to this Agreement.

The TSDOM shall promptly provide notice to ALDOT in writing of any defects or malfunctions in the software provided hereunder regardless of the source of information. The Contractor shall promptly correct all defects or malfunctions in the software or documentation discovered during the applicable warranty period and shall promptly provide ALDOT with corrected copies of same, without additional charge. If software can only be corrected in conjunction with additional or revised hardware, the contractor shall provide such hardware to ALDOT and the cost of such Hardware shall be borne solely by the TSDOM.

No updates or enhancements shall adversely affect the performance of the Toll System, in whole or in part, or result in any failure to meet any requirements of the Scope of Services.

The TSDOM shall ensure continued satisfactory performance by the current operating system of the software in accordance with all provisions of this section.

With regard to software, the TSDOM shall provide software services in accordance with the scope of services.

The TSDOM shall obtain for the ALDOT Maintenance agreements for third party software. The TSDOM shall secure such maintenance agreements for the same duration and upon the same terms and conditions as the maintenance provisions between the Contractor and ALDOT. All third-party contracts and licenses shall be assignable to ALDOT.

In the event that, during the applicable warranty period, the software does not satisfy the conditions of performance set forth in the project scope, the TSDOM is obligated to promptly repair or replace such software at the TSDOM's sole cost and expense or, if expressly agreed

to in writing by ALDOT, provide different equipment or software, and perform services required to attain the performance requirements set forth in the project scope.

In the event of any defect in the media upon which any tangible portions of the software is provided, the contractor shall provide ALDOT with a new copy of the software.

Without releasing the TSDOM from its obligations for warranty (during an applicable warranty period), support, or maintenance of the software, ALDOT shall have the right to use and maintain versions of the software provided by the TSDOM which are one or more levels behind the most current version of such software and to refuse to install any updates or enhancements if, in ALDOT's discretion, installation of such updates or enhancements would interfere with its operations. The TSDOM shall not, however, be responsible or liable for the effect of any error or defect in the version of the software then in use by ALDOT that occurs after the TSDOM has both (i) offered, by written notice to ALDOT, a suitable correction (by way of update, enhancement or otherwise) of such error or defect and (ii) provided ALDOT a reasonable opportunity to implement such existing correction, provided that the Contractor establishes that neither the implementation nor the use of such correction would limit, interfere with, adversely affect, or materially alter the interoperability, functionality or quality of the Toll System.

All provisions of this section referring or relating to obligations to be performed pursuant to an applicable warranty period that extends beyond the term hereof shall survive the expiration, cancellation, or termination of this agreement.

4.3.2.2 Software Operation Warranty

The software will:

1. Operate fully and correctly in the operating environment identified in the scope of services, including by means of the full and correct performance of the software, and all updates, enhancements, or new releases of the software, on or in connection with the equipment, any updates, enhancements, or new releases to such equipment, and any other software used by or in connection with any such equipment
2. Be fully compatible and interface completely and effectively with the equipment, including each other software program provided to ALDOT hereunder, such that the software and other equipment combined will perform and continuously attain the standards identified in the scope of services
3. Accurately direct the operation of the Toll System, all as required by the scope of services, and the descriptions, specifications, and documentation set forth therein and herein.

4.3.2.3 Software and Technical Support

The TSDOM shall provide technical support and shall remedy any failure, malfunction, defect, or non-conformity in software in accordance with the scope of services, but in any event not later than the deadline(s) in maintenance coverage response times, at its own cost and expense.

4.3.2.4 Warranty and Maintenance

During this phase, the TSDOM shall provide full maintenance and system support, correct all problems identified during live operations, and fully report on performance requirements each month. During this period, under the warranty, the TSDOM shall provide all required parts needed to support maintenance of the system and maintain the agreed upon spares inventory. All spares used during this phase shall be replenished by the TSDOM at no cost to ALDOT.

The TSDOM shall ensure all software (both proprietary and third party) is current and will install updates and patches regularly to ensure the software continues to run smoothly and securely.

4.4 AET System Maintenance

The TSDOM shall maintain the Toll System on behalf of ALDOT. The Toll System shall be maintained in order to achieve prescribed performance standards outlined in Section 3.0.

4.4.1 Maintenance Activity Levels

Maintenance activities shall be categorized in the following three levels:

1. Level 1: This level of maintenance includes onsite basic lane equipment preventive maintenance such as cleaning, inspection, or similar base level activities. Level 1 maintenance would also include any quick connect replacement of modular components that can be handled either solely by a technician or at the direction of remote TSDOM support.
2. Level 2: This level of maintenance includes any activities that can be executed and completed remotely by the TSDOM. Examples include the monitoring of the Toll System and remote resetting of a controller or process. The TSDOM shall notify ALDOT prior to performing any Level 2 maintenance corrective activities or any activities that are outside of normal monitoring, such as System resets or reboots.
3. Level 3: This level of Maintenance includes any activities requiring TSDOM personnel to be onsite to perform corrective and/or emergency maintenance that cannot be resolved remotely.

4.4.1.1 Level 1 Maintenance

TSDOM shall maintain a sufficient supply of spare equipment to maintain the System.

TSDOM staff will monitor the real-time Toll Systems Operations Dashboard 24/7/365 and contact ALDOT in the event failures are identified by the Toll System. Alarms will also generate an audible alarm on the Dashboard to alert monitoring staff of failures.

If necessary, ALDOT staff shall have the capability of creating a work order and assigning it to the TSDOM technician for maintenance action or troubleshooting.

Work orders shall require acknowledgement and be closed in a timely fashion.
The TSDOM will perform all daily, weekly, and scheduled preventive maintenance on all Toll System hardware.

After the warranty period, the TSDOM will maintain the spare parts inventory and update accurate Toll System equipment inventory status. ALDOT will have the option to purchase the necessary spares for low levels of inventory as recommended by the TSDOM.

The TSDOM will inspect and maintain equipment cabinets in full operational condition free of debris and dirt.

The TSDOM will inspect and maintain all equipment mounting hardware, mounting arms, and overhead structures and conduits.

The TSDOM will inspect and test cables, wiring and terminations to detect problems and degradation. Any item not in compliance with Contract requirements will be replaced by the TSDOM at no cost to ALDOT.

TSDOM technicians will retrieve data manually from the zone controllers and download transponder status list in the event there is an extended communications failure.

4.4.1.2 Level 2 Maintenance

4.4.1.2.1 Toll System Monitoring and Maintenance Services

Level 2 maintenance services for the Toll System shall include monitoring and troubleshooting the following:

1. Zone controllers
2. AVI System
3. AVC system
4. ICPS components and controllers
5. OCR/ALPR software
6. Host servers and software
7. MMS server
8. Electronics and controllers

All Toll System administrative functions, if not automated, shall be performed by the TSDOM daily as part of the Toll System preventive maintenance services according to the Approved Maintenance Plan to ensure Toll System performance is optimized.

Continuous monitoring of Toll System operations shall be performed by the TSDOM to verify that the Toll System is functional, processes are being executed as scheduled, files are transmitted as specified, and the Toll System is operating to Contract performance requirements.

Continuous monitoring by the TSDOM shall include but not be limited to:

1. Confirming and verifying receipt of all the MMS messages and alerts
2. Verifying the MMS is receiving and processing System events and reporting the correct status
3. Evaluating sample transactions data for exception
4. Confirming data transmission to the central system

5. Confirming image transmission to the central system image server
6. Performing routine diagnostics on all in-lane subsystems
7. Verifying processes, programs and scheduled jobs are successful
8. Reviewing comparative reports to identify system degradation
9. Confirming successful transfer of transponder status list to the lanes
10. Reviewing OCR/ALPR results and poor quality images
11. Reviewing sample images
12. Contact ALDOT monitoring staff for unacknowledged issues after a defined period of time
13. Correcting performance issues identified
14. Evaluating storage requirements and reviewing error logs and alerts.
15. Monitor notifications work order assigned to the Toll System and with ALDOT approval initiate remote corrective actions on Toll System to meet requirements
16. Perform disaster recovery procedures as needed and return lanes to fully operational condition for Level 2 support and report support to MMS
17. Perform Pervasive Maintenance
18. Perform OCR/ALPR updates as required to support license plate changes

The TSDOM shall analyze daily and weekly trends to identify problems and report these trends and problems to ALDOT. Problems to be reported include but not limited to:

1. Any error or failure that causes loss of revenue
2. High number of transactions without transponder
3. High number of class mismatch transactions
4. Abnormal changes in traffic counts and class
5. High number of invalid transponder transactions
6. Abnormal changes in transponder counts and status changes
7. High number of rejected images

4.4.1.2.2 System Administration Services and Software Support Services

The requirements in this section describe the services to be provided under the Maintenance and Software Support Service for the Toll System. All Toll System Administration and Software Support Services are the responsibility of the TSDOM.

The TSDOM shall provide maintenance and software support service for all elements of the Toll System in all environments required in the Contract, including, but not limited to:

1. Operating systems
2. Databases
3. Application software third party software
4. Software configuration
5. Software version control

The TSDOM shall provide continuous (24/7/365) system administration and on-call services on the Toll System to ensure that it is performing and shall continue to perform at a satisfactory level. The support staff shall be available during ALDOT's normal workday and be on-call for afterhours issues. Toll System administration services shall include monitoring and corrective action to ensure Toll System performance is in accordance with requirements of this Scope of Services. This shall include but is not limited to:

1. Any daily, weekly, or periodic maintenance required to maintain the Toll System at required performance levels (i.e., indexing and tuning databases, archiving, and purging in accordance with the ALDOT's retention policy)
2. Third party software or firmware upgrades, as required and to be compliant to security requirements, including, but not limited to performing security software upgrades, database upgrades and operating system upgrades
3. Approved manual actions, adjustments, and updates to the Toll System data based to correct issues and as authorized by the ALDOT
4. Re-establishment or re-installation of Toll System files, programs, and parameters, as required, following a failure or damage to the Toll System
5. Monitoring of error logs and Toll System logs
6. Maintenance of backup software
7. Installation of new software and confirmation of successful installation
8. Verify time synchronization is occurring as configured and Toll System clocks are not drifting beyond acceptable threshold
9. Assisting ALDOT system monitoring and field maintenance staff as requested by ALDOT
10. Troubleshooting Toll System issues
11. Confirm all scheduled reports are successfully generated and available to Authorized Users
12. Creation of ad-hoc reports requested by ALDOT
13. Generation of queries as requested by ALDOT
14. Analysis of data as requested by ALDOT

4.4.1.3 Level 3 Maintenance

Once Authorized by ALDOT to commence corrective maintenance, the TSDOM shall provide qualified staff who shall come onsite and perform corrective maintenance. All onsite services shall be coordinated with ALDOT. All corrective information shall be recorded.

All services performed by the TSDOM to correct problems to meet the requirements of the contract or software defects shall be considered as corrective maintenance. Such problems include but are not limited to:

1. Failure of system functions
2. Failure of processes and programs
3. Report issues
4. Application failures
5. Network issues
6. System or component performance
7. Non-conforming availability or MTBF.

4.4.2 Upgrades and Enhancements

Upgrades and enhancements required for reasons such as to meet major changes to standards, statutes, or interoperability equipment changes, or the addition of new functionality; or that provide ALDOT with a demonstrable benefit in performance, costs, or productivity, shall be proposed by the TSDOM in accordance with the requirements of a Change Order.

Software modifications that are required to maintain and support the Toll System as a part of the normal course of business such as version changes, configuration or parameter changes, or minor changes to software or code such as changes to the existing ICDs; or software modifications required to ensure Toll System is compliant to specified standard or changes that improve the TSDOM's ability to maintain and support the Toll System, shall not be considered upgrades or enhancements that shall be paid for by the ALDOT.

4.4.3 Maintenance Coverage Response Times

The TSDOM shall provide continuous (24/7/365) remote coverage for all maintenance related activities. Support staff availability and coverage shall be the same as the normal ALDOT working day. On-call services shall be provided during non-working hours.

Response to calls and repair times shall be determined by priority as described below. TSDOM failure to meet the response and repair time criteria shall result in liquidated damages.

Regardless of Level 1, Level 2, or Level 3 service, acknowledgement of receipt of notification of a maintenance issue shall not exceed thirty (30) minutes after the failure notification was recorded by the Toll System or problem was reported to the TSDOM by ALDOT.

Time to respond and repair as determined by priority is defined as follows:

Priority 1: Defined as any malfunction or fault that will result in the immediate loss of revenue, security breach, closure of a lane, hazard to personnel or driving public, loss of audit data, loss of redundancy in any redundant Toll System components, or that negatively impacts AET operations.

1. For Level 2 maintenance this priority shall have a two (2) hour time to respond and repair.
2. For Level 3 maintenance this priority shall have a six (6) hour time to repair once maintenance personnel is onsite and ready to perform the repair. The TSDOM shall make every effort to be onsite within twenty-four (24) hours of approval to commence services.

Priority 2: Defined as any malfunction or fault that will degrade the Toll System performance but not the operational ability of the Toll System. It includes, but is not limited to inaccurate reporting, inability to reconcile revenue, and loss of functionality that impacts road users. All response and repair times apply to normal business hours. As approved by ALDOT any issue that requires an immediate response and repair outside of normal hours can be performed at hourly rates set forth in Exhibit E Price Proposal attached to the contract.

1. For Level 2 maintenance this priority shall have a four (4) hour time to respond and repair.
2. For Level 3 maintenance this priority shall have two (2) hour time to repair once maintenance personnel is onsite and ready to perform the repair. The TSDOM shall make every effort to be onsite within forty-eight to seventy-two (48-72) hours of approval to commence services.

Priority 3: Defined as any action or event that has the potential to result in a malfunction or degrading of the Toll System performance but has not impacted performance and is not anticipated to immediately impact performance. All response and repair times apply to normal business hours. As approved by ALDOT any issue that requires an immediate response and repair outside of normal hours can be performed at time and material rates.

1. For Level 2 maintenance this priority shall have a twenty-four (24) hour time to respond and repair.

2. For Level 3 maintenance the TSDOM and ALDOT shall agree on the time period for onsite correction but time to respond and repair shall be no longer than one week.

4.4.4 Recording of Maintenance Activities

In all cases, it shall be the TSDOM's responsibility to log all reported maintenance activities into the MMS Server. This includes time of notification, time on site, time repairs were completed, etc. The TSDOM shall also be responsible for documenting all information and issues related to a failure condition, including all actions taken to complete the correction into the MMS server.

Work orders shall contain as much information as possible for persons other than the technician or his supervisor to reasonably determine the fault, when it was worked on, the corrective action and any other information pertaining to the individual maintenance event, including replacement of parts.

It is the TSDOM's responsibility to ensure that its maintenance staff has real time access to the MMS server and that all the required connections are established and ongoing to ensure that the Maintenance staff has remote access. Maintenance staff shall be trained in the use of the MMS server data.

4.5 Maintenance Management System

The TSDOM shall provide a Maintenance Management System (MMS) as per the requirements set forth in this section and Appendix II.

Provide a Maintenance Management System (MMS) server that supports the Toll System maintenance activities and maintenance operations. The server shall provide at least thirty (30) days of storage locally with cloud-based backup.

The MSS shall monitor on all networked subsystem, equipment, and component statuses continually 24 hours a day, 7 days a week, 365 (366) days a year. The MMS functionality shall be accessible to authorized users assigned the proper role and permissions allowing access from networked workstations.

4.5.1 Monitor and Alerts

The MMS shall support a performance monitoring function that allows a user to select and observe the status and or performance of pre-defined portions of the Toll System from a networked workstation. A MMS dashboard shall be provided and be capable of providing current color-coded status of Toll System equipment, diagnostic status of all plaza and lane subsystem applications, toll zone operational status (operational, degraded) and open work order details, plaza facility Equipment operational status (operational, degraded) and open work order details, central subsystem operational status (operational, degraded) and open work order details, central subsystem data storage utilization status, and Toll System backup status.

The MMS shall be capable of sensing and reporting alert and alarm states of the equipment comprising the Toll System. Simple network management protocol (SNMP) shall be used when supported by integrated equipment to communicate status based on traps unique to the item being monitored. The MMS shall use routines to measure instances of an undesirable state and report an alert when an established threshold is reached (e.g., No events are received from a sensor for 3 (configurable) consecutive vehicles).

4.5.2 Maintenance Work Orders

The MMS shall be capable of identifying state changes requiring the automatic generation of a work order and dispatch of a technician on a schedule consistent with the initially assessed severity of the detection and the assigned priority level.

The MMS shall support changes to an automatically assigned priority level by an authorized representative having the proper access role and permissions. The MMS shall support both manual and automatic generation of work orders to perform preventive, warranty, corrective and emergency maintenance activities. A MMS graphical user interphase (GUI) shall be provided to manually enter requested information needed to create a work order for dispatch to technician(s) for resolution and closing. The MMS shall allow the user to schedule one-time or recurring maintenance work for a specified duration. The MMS shall allow for adjustments to the automatic scheduling for preventive maintenance activities. The MMS shall log all dispatch notification messages with their time and date and the list of recipients of the notification.

Depending on the initially assessed severity of an identified problem or issue, the MMS shall assign a Priority level relating a minimum of three (3) categories of response. An assigned Priority 1 event shall require a near immediate technician. The MMS shall contain a lookup table of the allowed response times for each assigned priority. The MMS shall log all dispatch notice acknowledgements with the time acknowledged and the staff who acknowledged the notice. The MMS shall be capable of escalation of an assigned dispatch to a non-responding technician within a configurable time period of the initial notification.

The MMS shall contain a table storing IDs of technicians and supervisors for defining the escalation order when a notification response is not received for a Priority 1 event. For lower priority maintenance events the MMS shall issue multiple (configurable) notifications to the same technician at configurable time intervals. The MMS shall support entering a technician's actual arrival time into the work order record along with the time the work is completed. The MMS shall

enter the time of the change in status to restored following the entry of information by the technician describing the event, work performed and materials used.

The MMS work order generation function shall be integrated with a spare parts inventory control subsystem to automatically update the spare parts inventory based on the technician's entry of coded parts used to restore a defective item. The MMS shall allow the assigned and responding technician to close-out the work order when a status change indicating the item was restored is received by the subsystem. The MMS shall support entry of a description of the action taken by the technician including diagnosis, tests and results, parts replaced and repaired, settings adjusted and configuration changes on the Work Order.

The MMS shall be capable of generating work order status reports providing details on open and closed work orders, response, and repair time performance (actual vs. required), work order frequency by Equipment and component, updated subsystem availability and equipment MTBF performance (actual vs. required) for selectable time periods.

4.5.3 Warranty Alerts

The MMS shall support entering required maintenance activities to comply with warranty stipulations. Based on the entered information the MMS shall issue an alert a selectable number of days before recommended servicing and expiration of each warranty entered into the subsystem.

4.5.4 Reports

ALDOT shall have direct access to the MMS database through approved scheduled reports and ad hoc reports. Scheduled reports will be collaboratively developed and finalized during the design phase.

4.5.5 Spare Parts

The MMS shall include an automated spare parts inventory control system for entering, tracking, and controlling the movement of spare parts used to maintain the Toll System. The MMS GUI shall support efficient entry of each equipment item, device, part, or component.

The MMS shall support entry of a recommended quantity of spare parts for each part. The MMS Spare Parts Inventory Control system shall be integrated with the work order process to track usage of spare parts, which works in conjunction with the GUI entries to remove spare parts from inventory. The MMS shall be capable of calculating and tracking the current value of the spare parts inventory based on most recent purchase price.

The MMS shall generate reports on current inventory list and value, changes in inventory and value for selected time period, spare part items less than recommended inventory, and spare parts aging (in descending chronological order). The MMS shall be capable of determining spare parts reorder points based on calculated usage patterns and inventory algorithms. The reorder point calculation shall include the latest entered lead time for delivery of the quantity of items ordered.

The MMS shall generate reorder history reports for spare parts items for use in determining the appropriate quantity to order. The MMS spare parts inventory control shall include an asset management functionality to initially assign and store a location code to all installed equipment, devices and parts having a value greater than a configurable dollar amount.

The MMS spare parts inventory and vendor returned items for repair shall have a common location code. The MMS shall support automatically changing the location code of spare parts using entered work order information or information gathered when items are removed from inventory using the MMS GUI.

The MMS shall support entry of RMA information associated with returning defective items to a vendor. The MMS spare parts inventory control subsystem shall report status of parts shipped for repair and generate a report for all items past due based on an entered estimated date of arrival.

4.6 Data Retention

All data shall be retained for a period of at least two (2) years, unless otherwise specified by Alabama law. This includes all information toll transactions, reports, logs, photos, videos, etc. At the conclusion of the two year period, transfer to the Authority all stored data related to any disputed transactions.

All data shall be stored on a server physically located within the United States. No data is permitted to be transmitted outside the country.

5.0 Software

5.1 Software Operation

During the applicable warranty period, the TSDOM shall provide services to maintain the software provided hereunder in good working order, keeping it free from defects such that the Toll System shall perform in accordance with this agreement, the technical requirements of the scope of services, and the warranties set forth herein at its own expense and cost.

5.2 Software and Technical Support

The TSDOM shall provide technical support and shall remedy any failure, malfunction, defect, or non-conformity in software in accordance with the scope of services, but in any event not later than the deadline(s) in maintenance coverage response times, at its own cost and expense.

As part of the software support services, the TSDOM shall develop and test software as required to accommodate corrective action, changes to business rules, or lane configurations. Scope shall include provision of evidence packages detailing changes for ALDOT's review and approval, installation of new software, and confirmation of successful installation. Maintain up-to-date software backups (all Toll System software and data) and perform security software upgrades, virus protection updates, database upgrades, and operating system upgrades in accordance with the approved maintenance plan.

Software support services shall include monitoring and corrective action to ensure Toll System performance is in accordance with requirements of this scope of services, to include database management and operation. This shall include but is not limited to:

1. Investigation and analysis of errors and exceptions and taking corrective action, including correcting the problem and reprocessing the data
2. Monitoring of notifications and initiating corrective actions on application programs to meet requirements
3. Updates to Toll System and application to support upgrades to hardware or third-party software
4. Updates to Toll System and application to support all changes to business rules and Toll System configurable parameters and deploy changes in production
5. Updates to Toll System and application to support changes to IAG ICD, including the addition of new IAG and Interoperable Agencies

6.0 Documentation

6.1 Maintenance Work Plan

The TSDOM shall submit to ALDOT a detailed Maintenance Plan which shall include maintenance staffing and administration, dispatch procedures, communication requirements, support from outside maintenance services (for example, equipment manufacturers), final maintenance equipment list, and other details as may be appropriate.

The Maintenance Plan shall include all processes and procedures used to successfully manage, staff, and conduct Toll System maintenance in accordance with all of the requirements set forth in this RFP. The Plan shall address the following:

1. Descriptive language detailing the maintenance methodology approach
2. Tools (specialized and standard)
3. MMS use and processes
4. Emergency/corrective maintenance procedures
5. Contracted computer maintenance companies
6. Personnel
7. Staff location
8. Qualifications
9. Training
10. Maintenance facilities/workshop(s)
11. Maintenance records
12. Failure tracking and corrective action
13. Reliability and maintainability analysis and calculation
14. Maintenance activity report

The TSDOM shall ensure all software (both proprietary and third party) is current and will install updates and patches regularly to ensure the software continues to run smoothly and securely.

6.2 Manuals

Several training and operating manuals shall be provided under this Contract. These manuals are described below. All manuals shall be submitted to ALDOT for review and acceptance and shall be accepted by ALDOT in writing. Two electronic versions of all approved manuals shall be uploaded to the project data management server: one version shall be in Microsoft Word format and one version in Adobe PDF format. When possible, manuals shall be printable on letter size sheets. Maximum use of simple diagrams and other graphic aids is strongly encouraged.

Manuals shall be updated to address any changes to system functions or operations.

6.2.1 Toll System Reports Manual

This manual shall illustrate the report format and describe each report the Toll System produces. The description shall include the use of the report, any parameters that can be used in order to specify the content of the report (for instance a range of dates/times for which data is to be reported), the options for subtotal breaks, and the meaning or method of computation of the various fields in the report.

6.2.2 Maintenance and Service Manual

This document shall provide complete detailed technical descriptions of maintenance operations including the following:

1. Preventive maintenance schedule
2. Trouble-shooting techniques
3. Corrective measures, both temporary and permanent
4. Maintenance techniques (routine, preventive, and remedial)
5. Location and availability of support services for all major components
6. Point-to-point component wiring schematics and logic signal flows
7. Assembly and disassembly drawings, including exploded view drawings
8. All COTS products manuals (links to online COTS manuals are acceptable) and cut sheets

This manual shall be prepared for technical personnel assigned to the maintenance of the Toll System. This manual shall include a general description, theory of operation, operator instructions, detailed electrical/electronic logic circuit analysis, mechanical functions, and installation and procedures. The manual shall also contain diagrams, schematics, layouts, and parts lists required to service each component and circuit board utilized in the Toll System.

Standard service manuals for unmodified commercial products used in the Toll System shall be acceptable if they contain details and accurate information in order to properly service the specific Toll System supplied under this contract. Large size diagrams and mechanical assembly diagrams do not have to be reduced or incorporated into the manuals if these drawings are provided with the manuals.

6.2.3 Auditor Manual

This manual shall be provided for assisting auditors in the daily use of the audit functions of the Toll System. Complete diagrams, illustrations, and instructions shall be provided for ease of understanding the Toll System operation, including the formats of audit screens and the

implications of the data on the reconciliation of all toll revenue. All operator commands, data status indicators and error messages shall be explained in detail. The audit process shall include use of DVAS data, images, and video, the use of which shall be fully covered in this manual.

6.3 Shop Drawings

The TSDOM shall prepare accurate and complete Shop Drawings for all fabricated components. Shop Drawings shall clearly, and in detail, show the design of all components. The shop drawings shall be submitted not less than thirty (30) days before the TSDOM commences equipment fabrication. Shop drawings shall be formatted per ALDOT standards.

ALDOT will provide an acceptance or rejection of each individual Shop Drawing. Review of shop drawings by ALDOT is for general adequacy and overall consistency with Toll System requirements. Shop Drawings will be required for all components and housings to be fabricated or assembled by the TSDOM. For items procured in a complete package by the TSDOM from another manufacturer, the TSDOM shall submit detailed drawings, service manuals, and other documentation prepared by the original manufacturer in lieu of shop drawings.

This documentation shall be complete and sufficiently detailed to show all critical dimensions and technical and functional characteristics of each component.

Shop drawings prepared by the TSDOM shall include views of component housings, module placement, internal architecture of terminals, interface cabinets, etc. All connection points between components shall also be indicated in the shop drawings.

Once the shop drawings have been approved by ALDOT, the TSDOM shall prepare and submit an updated detailed design document that includes the approved shop drawings.

6.4 Parts Lists and Catalogs

The TSDOM shall provide a complete parts list for each component included in the Toll System. Parts shall be numerically encoded, with all spare parts permanently encoded with the parts lists number for inventory purposes. Parts lists shall be categorized and related to particular Toll System components (major subassemblies) and toll equipment.

Parts lists with component part numbers without descriptive information will not be accepted. The parts lists shall contain the source vendor's name, identification numbers and codes or other means to identify the manufacturer of each component.

If a submitted part becomes unavailable for any reason, the TSDOM shall, within sixty (60) calendar days, identify a suitable replacement part and submit a revised catalog cutsheet and parts list. Once the detailed design has been approved by ALDOT, the TSDOM shall prepare and submit an updated detailed design document that includes the parts lists and catalogs.

6.4.1 Bill of Materials

The TSDOM shall include the bill of materials (BOM), for all equipment and hardware supplied for the Toll System. Each component shall also include the second manufacturer source and any exceptions shall be noted and explained. During the design phase the BOM shall be finalized and all changes shall be subject to the approval of the ALDOT.

Prior to purchase of any equipment and as part of its design the TSDOM shall submit the final BOM to the ALDOT for approval. All hardware and software procured under this scope of services shall be confirmed to be the latest model/version at the time of purchase with the required warranty, maintenance, and support services.

Updates to the BOM shall be provided by the TSDOM whenever changes occur and at a minimum on a semi-annual basis over the term of this contract.

6.5 As-Built Drawings

The TSDOM shall provide two (2) complete electronic sets of as-built drawings for the Toll System in PDF format. The sets shall include Toll System architecture, all schematics, logic diagrams, layouts, wiring diagrams, assembly drawings, parts detail drawings for mechanical parts designed or modified under this contract, including installation details so as to provide a complete record of the as-built status of the Toll System.

The TSDOM shall incorporate into the as-built drawings all design modifications, change orders and field installation changes. At the time of submittal, the TSDOM shall certify in writing that the above has been accomplished.

Drawings contained in standard catalogues and manuals for unmodified commercial products do not have to be reproduced as part of the as-built drawing set. All revisions to standard commercial assemblies or components of the AET System shall be included in the as-built drawings.

The set of as-built drawings shall consist of a title sheet, an index sheet, and the various as-built drawings. The index sheets shall include a listing of all drawings with headings for drawing number, drawing title, and the type of drawing, such as assembly, schematic, material list, wiring diagram, wire list, or similar categories.

ALDOT will review the as-built drawings for content and will accept the drawings only when the TSDOM has complied with requirements set forth herein. The TSDOM shall deliver all required as-built drawings prior to Toll System acceptance. At any time during the operations of the AET System, should physical construction or installation be modified for any reason, the TSDOM shall submit updated as-built drawings within 6 months of completion of said modification.

7.0 Other Services

7.1 Audits

The TSDOM shall completely support ALDOT in any audit activity relating to the Toll System. The TSDOM shall conduct audits in accordance with the TSDOM's Quality Assurance Program. All

deficiencies identified through the audit process shall be successfully corrected by the TSDOM. These audits may include, but are not limited to the following:

1. Internal control procedures
2. Revenue/transaction reporting
3. Facility inspections
4. Toll System processing and performance.

The TSDOM shall arrange for an annual SSAE 16 (SOC 2) Type II audit for submittal to ALDOT, which shall be considered part of the work involving no additional cost. The audit shall focus on security, availability, processing integrity, confidentiality, and privacy. The TSDOM shall address and correct any deficiencies discovered during the audit.

7.2 Emergency Response Management

The TSDOM shall immediately respond to any emergency situation as notified by ALDOT that may arise that has already or could potentially damage the Toll System. The TSDOM shall be prepared to put forth all necessary resources to divert or correct an emergency condition.

Such emergency conditions shall be handled in accordance with policies and procedures established and approved by ALDOT. The following are a few examples of emergency conditions:

1. Weather related
2. Vehicle accident
3. Conditions that invoke the disaster recovery plan
4. Third party (power outage or communication failure)
5. Vandalism that causes parts of the Toll System to be inoperable

7.3 Incident and Revenue Loss Reporting

The TSDOM shall immediately notify ALDOT of any incident or event whereby the potential or actual loss of revenue occurred or could potentially occur. The TSDOM shall take immediate action to rectify the condition and return the Toll System to normal functioning.

A monthly incident report shall be provided that provides a breakdown of lost electronic data and revenue by ALDOT for each incident. If the condition is determined to be due to the fault of the TSDOM, damages shall be assessed in accordance with the terms of the Contract.

8.0 Succession Plan

The TSDOM shall be responsible for services in support of transitioning the responsibilities of the TSDOM under this contract to ALDOT and/or another entity whenever the Contract terminates. The TSDOM shall be responsible for the following activities in support of succession:

1. Update all Toll System documentation to include any previously undocumented changes, additions, alterations, and configurations for delivery to ALDOT and any succeeding entity, including:
    a. Detailed Design Document
    b. Detailed Reports Document
    c. Business Rules
    d. Data Dictionaries
    e. As-Built Drawings

2. Provide all service contracts, agreements, licenses, manuals, standard operating procedures, correspondence, outstanding invoices, manuals, and training materials to ALDOT and any succeeding entity
3. Provide equipment maintenance history
4. Provide spare parts inventory and history
5. Participate in meetings with ALDOT and any succeeding entity to plan for transition of the system

9.0 Software Licenses

1. The TSDOM hereby grants to ALDOT, for purposes of operating the Tolling System, an unlimited, fully-paid-up, royalty-free, perpetual, universal, irrevocable, non-exclusive license:
    i. To use, maintain, disclose, adapt, and improve any and all Software and Equipment
    ii. To use all resulting versions, modifications, adaptations, and improvements of any and all Software and Equipment
    iii. To make, have made, use, and display copies, and reproductions of any and all Software and documentation
    iv. To permit any other person or entity providing Services to ALDOT to do any and all of the foregoing (i) through (iii); provided that ALDOT's consulting agreements for persons or entities to be permitted such rights under this subsection will include provisions requiring such consultants to be bound by the restrictions applicable to ALDOT's use of such rights.

   The foregoing license includes the right to use any systems, processes, methods, applications, technical data specifications and other documentation (including those provided by the Contractor, any third party or currently used by ALDOT) comprised or practiced by the Equipment or that are necessary or useful to operate the System. ALDOT shall not re-sell, supply, or give the Software (source or executable code) to other parties except in accordance with this Section. ALDOT shall not reverse compile, reverse engineer, modify, disassemble, translate, or in any way duplicate the licensed software, in whole or in part. ALDOT shall not sell, lease, assign, sublicense, or otherwise transfer to any third party, directly or indirectly, the software or any license or right granted hereunder, in whole or in part.

2. The license hereby granted (i) shall encompass use by ALDOT of the equipment and all other elements of the Toll System, in whole or in part, including use of any and all individual components thereof, that have directly or indirectly been purchased or obtained by ALDOT from the TSDOM, in each case alone, or in configuration, combination or conjunction with, or as part of the System, in whole or in part, or any other systems, processes or methods, in whole or in part; or (ii) the TSDOM shall procure for ALDOT from all such third-party and other sources from whom or which the procurement of such rights, licenses and privileges may be required to ensure ALDOT's free exercise of its rights, licenses and privileges hereunder (including from third- party

providers of the equipment and any other elements of the System, in whole or in part), all such rights, licenses and privileges as may be required to ensure ALDOT's ability to freely and lawfully exercise all the rights, licenses, and privileges granted to it and shall ensure that all such rights, licenses and privileges so procured are transferable to and assignable by ALDOT. The TSDOM shall perform all obligations stated in the preceding sentence at the TSDOM's own expense and without requirement of ALDOT's payment or provision of any additional royalty, fee, or other consideration.

3. The license provided hereunder shall cover, without limitation, the full definition of software, including programs directly owned and/or developed by the TSDOM, programs owned and/or developed by any subcontractors, and programs of any third parties (whether provided by the AET Contractor, any third party or currently used by ALDOT) which the TSDOM integrates, bundles, or provides as part of the System. In furtherance, and not limitation, of the obligations set forth, the Contractor shall, at its own expense and without requirement of ALDOT's payment or provision of any additional royalty, fee, or other consideration, secure all required licenses from any third-party providers of software, and ensure that such licenses are transferable to and assignable by ALDOT. The TSDOM shall maintain copies of the license agreements it obtains from such third-party providers of software. The TSDOM shall also maintain the computer programs, disks, and documentation for all software it obtains from third parties.
4. The TSDOM hereby grants to ALDOT an unlimited, fully-paid-up, royalty free, perpetual, universal, irrevocable license to use all commands and protocols originated, conceived, discovered, invented, created, developed, or made by any of the TSDOM Parties that are useful for the System, including the right to provide the commands and protocols to third party contractors as needed for the System to function. The foregoing license shall be exclusive to ALDOT with respect to all such commands and protocols as are originated, conceived, discovered, invented, created, developed, or made by any of the TSDOM parties specifically for ALDOT's System under this Agreement, and shall be otherwise non-exclusive.
5. The license provided hereunder shall encompass any and all documents and materials comprising or containing information relating to any of the equipment or any component, aspect or feature thereof or of the system, whether with respect to design, structure, content, expression, composition, performance, function, operation, use, or otherwise, and including, to the extent the same may exist: specifications; technical data; operator's manuals; user's manuals; training materials; guides; commentaries; listings; design documents; flow charts; data flow diagrams; control files and scripts used to compile, link load or make applications or other system features or components; test scripts, test plans and test data; and other documents or materials that explain the performance, function, operation or use of individual Software or the interface or interaction of software within the Toll System.
6. All rights and licenses granted by the TSDOM to ALDOT under or pursuant to the license agreement are, and shall otherwise be deemed to be, licenses for rights to "intellectual property" for purposes of the United States Bankruptcy Code (the "Code"). The parties

hereto agree that ALDOT, as a licensee of such rights under the license agreement, shall retain and may fully exercise all of its rights and elections under the Code. The parties hereto further agree that, in the event of the commencement of bankruptcy proceedings by or against the TSDOM under the Code, ALDOT shall be entitled to retain all of its rights under this agreement, subject to ALDOT's compliance with the terms of the license agreement. The license agreement shall contain an express provision confirming the foregoing.

Appendix I – Toll System Requirements

Item No	Requirement	Requirement Type	Verification Method
General			
RTCS-1	The Toll System Design Operator (TSDOM) Contractor shall provide an “off the shelf” Toll system that reflects minimum customization.	General	
RTCS-2	The Toll System must be easily configurable system to adapt to changing technologies	General	
RTCS-3	The Toll System shall enable the TSDOM to record up to 100,000 toll transactions daily	General	
RTCS-4	The Toll System shall be capable of processing ALGO pass and Toll by plate schedules to be developed during the design development.	General	
RTCS-5	All Toll System equipment mounted over the roadway shall maintain a minimum vertical clearance of 17’-3”.	General	
Gantry Design			
RTCS-6	The toll gantry shall be designed to support all components needed to capture vehicular information to process tolling and include maintenance walkways for the mainline gantries	Gantry Design	
RTCS-7	All overhead equipment shall be tethered and/or safely supported for removal as necessary over live traffic.		
RTCS-8	The System shall employ methods to prevent anything falling on roadway during maintenance including but not limited to captive fasteners, tethered tools, and tool less replacement.	Gantry Design	
RTCS-9	The gantry shall be hardened to resist the corrosive nature of the salty air/water	Gantry Design	
RTCS-10	The gantry shall be designed to resist hurricane-force winds up to 100 mph.	Gantry Design	
Interoperability			
RTCS-11	The Toll System shall be designed to meet any interoperability agreement entered by ALDOT to support the reading of ALDOT issued tags. The tags will be issued by ALDOT or its back-office vendor.	Interoperability	
RTCS-12	The Toll System must be interoperable with all transponders issued by Toll Account Providers approved by the State and in agreement with interoperability terms.	Interoperability	
RTCS-13	The design shall comply with national interoperability standards, laws, and regulations.	Interoperability	
Power			
RTCS-14	External generators shall have the ability to run at least twenty-four hours without the need to refuel.	Power	
RTCS-15	Generator status shall be capable of being remotely monitored and shall generate an alert when power switches to or from the generator	Power	
RTCS-16	The loss of external power shall not prohibit the continuous collection of toll data.	Power	
RTCS-17	Each of the redundant UPS systems shall be sized such that the Toll System operating and collecting tolls under normal conditions will place no more than 57% load on the UPS	Power	
RTCS-18	All UPS units shall include TCP/IP connectivity	Power	
Cabinets			

RTCS-19	The toll system equipment and UPS shall be installed within the shelters in accordance with applicable ALDOT codes and design standards	Cabinets	
RTCS-20	All equipment installed in an outside environment shall be enclosed in an outdoor, watertight NEMA 4X cabinet.	Cabinets	
RTCS-21	All cabinet shall be resistant to corrosive effect of salt water/air.	Cabinets	
RTCS-22	All equipment installed in an outside environmental shall be capable of operating in sealed, non-environmentally controlled cabinets with no degradation in performance.	Cabinets	
RTCS-23	All Equipment installed in an outside environment shall be rated to operate in a temperature range of -22° F to 158° F.	Cabinets	
RTCS-24	All Equipment installed in an outside environment shall be rated to operate in a relative humidity range of 5% to 100%.	Cabinets	
RTCS-25	All cabinets, housings, mounting hardware, fasteners, and exposed connectors shall be fabricated from corrosion and rust-resistant Materials, or properly coated or plated to achieve corrosion and rust resistance.	Cabinets	
RTCS-26	Controller cabinets shall be secured from tampering and vandalism.	Cabinets	
RTCS-27	If controller cabinets are located at ground level, they shall be installed above the 100- year flood elevation.	Cabinets	
Cabling			
RTCS-28	All field wiring shall be terminated with standard COTS connectors, rated for outdoor installation, with self-locking connectors to prevent accidental disconnection.	Wiring	
RTCS-29	All field wiring, and equipment receptacles or connectors which accept field wiring, shall be labeled.	Wiring	
RTCS-30	All field wiring shall be secured with strain relief and provided with sufficient slack so as not to interfere with adjustment, repositioning, or replacement of hardware.	Wiring	
RTCS-31	The Design and installation of the Toll System shall conform to all applicable state and local electrical and mechanical codes.	Wiring	
CCTV			
RTCS-32	At least two CCTV cameras at each toll gantry location for surveillance of roadway and weather conditions.	CCTV	
RTCS-33	The cameras shall be dome cameras which provide 360° view of the area.	CCTV	
RTCS-34	The cameras shall meet standard ALDOT requirements.	CCTV	
RTCS-35	The cameras must be tied into the ALDOT ITS fiber network	CCTV	
RTCS-36	The cameras shall be operated by ALDOT Traffic Management Center.	CCTV	
Security			
RTCS-37	The electronic security systems shall include access control systems	Security	
RTCS-38	The electronic security system shall video surveillance systems	Security	
RTCS-39	The electronic security system shall include 24/7/365 alarm monitoring.	Security	
Signage			

RTCS-40	Sign design and location shall be in accordance with the current *Manual on Uniform Traffic Control Devices (MUTCD)*.	Signage	
AVC			
RTCS-41	The User Classification Sub-system must classify each vehicle passing through the Toll Segment according to FHWA vehicle classification	AVC	
RTCS-42	The AVC system shall properly identify and separate vehicles traveling side by side, straddling lanes, in bumper to bumper and stop-and-go conditions, sharing part of the same lane, changing lanes, or traveling in a reverse direction	AVC	
RTCS-43	The AVC system shall not report vehicles towing trailers as separate vehicles.	AVC	
RTCS-44	The AVC system shall provide full coverage of the Toll Zone.	AVC	
RTCS-45	If the AVC system is unable to determine the classification of a vehicle, a configurable default vehicle class shall be assigned to the vehicle and the transaction shall be flagged to indicate the AVC failure.	AVC	
RTCS-46	The Toll System shall monitor and log the state of the AVC system and its various components and generate Alerts for any Equipment failures or degradation.	AVC	
RTCS-47	If the AVC system includes in-pavement sensors, the TSDOM shall coordinate with the Design-Builder for milling and repaving the Toll Zone prior to installation of the AVC sensors.	AVC	
RTCS-48	The Toll System shall support a table of Transponder and/or Plate Data, and associated correct vehicle classification, for an AVC Exception List.	AVC	
RTCS-49	When a vehicle is detected with Transponder or Plate Data that is found in the AVC Exception List, the Vehicle Class assigned shall be based on the AVC Exception List and not the actual AVC class.	AVC	
RTCS-50	The Toll System shall flag Transactions for vehicles in the AVC Exception List to indicate an AVC Exception was applied.	AVC	
AVI			
RTCS-51	The Toll System shall incorporate a tri-protocol reader supporting the TDM, SeGo, and 6C protocols.	AVI	
RTCS-52	The Toll System shall properly read and interpret 6C Transponder data utilizing the formats currently in use in the United States.	AVI	
RTCS-53	The AVI system shall meet the AVI Performance Requirements set forth in this SOW with all three of the required AVI protocols.	AVI	
RTCS-54	The AVI system shall be certified by OmniAir for 6C Tolling Interoperability.	AVI	
RTCS-55	If the proposed AVI system has not previously been certified by OmniAir for 6C Tolling Interoperability, the TSDOM shall undertake interoperable technology testing and obtain certification by OmniAir prior to the start of Detailed Design.	AVI	
RTCS-56	Accommodate any site conditions (including electromagnetic interference) that may potentially degrade the performance of the AVI system at all Toll Zones.	AVI	
RTCS-57	The AVI system and all other elements of the Toll System shall comply with all applicable Federal Communications Commission (FCC) regulations.	AVI	

RTCS-58	FCC license approvals shall be obtained on behalf of ALDOT. The TSDOM shall be responsible for updating existing FCC licenses to incorporate all AVI Equipment installed under this Contract in cooperation with ALDOT.	AVI	
RTCS-59	A radio frequency plan for all AVI Equipment installed under this Contract shall be provided.	AVI	
RTCS-60	The TSDOM shall support addressing any actions concerning radio frequency interference or comments related to compliance and submission of applications for applicable federal, state, and local licensing and regulations for all AVI Equipment installed under this Contract.	AVI	
DVAS			
RTCS-61	A DVAS shall be furnished, installed, and configured such that the system shall capture and store all video footage of Toll Zone activity at the lane level and associated Transaction and event data.	DVAS	
RTCS-62	A DVAS shall consist of one or more industrial grade DVR and all associated high-resolution cameras and illumination.	DVAS	
RTCS-63	Each Toll Zone System shall be equipped with its own DVAS DVR for local storage and viewing of video footage.	DVAS	
RTCS-64	The DVAS shall be capable of recording and playing back footage at a minimum frame rate of 30 frames per second per camera.	DVAS	
RTCS-65	Each travel lane and instrumented shoulder shall be equipped with one or more high-resolution cameras and any necessary illumination to address the Requirements in this SOW.	DVAS	
RTCS-66	DVAS camera illumination shall not pose a distraction or obstruct the visibility of drivers in the Toll Zone.	DVAS	
RTCS-67	DVAS cameras shall capture clear and usable footage regardless of lighting conditions present at the Toll Zone.	DVAS	
RTCS-68	The DVAS cameras shall be situated to provide a view of the vehicle in the lane sufficient to determine the Vehicle Classification.	DVAS	
RTCS-69	The DVAS shall store a minimum of 180 Calendar Days of video footage per Toll Zone.	DVAS	
RTCS-70	The DVAS shall monitor and log the state of its various components, including but not limited to DVRs, available disk space, and cameras, and generate alerts for any Equipment failures or degradation	DVAS	
RTCS-71	The DVAS shall associate video footage with vehicle activity, and allow searches for footage using parameters including, but not limited to: o License Plate Data (i.e., plate number, jurisdiction, and plate type) o Transponder ID o Toll Zone ID o Lane ID o Vehicle Class o Image confidence levels o Date and time ranges	DVAS	

RTCS-72	The DVAS shall display Transaction data alongside or overlaid on the video footage, including but not limited to: o License Plate Data (i.e., plate number, jurisdiction, and plate type) o Transponder ID o Toll Zone ID o Lane ID o Vehicle Class o Image confidence levels o Date and time ranges	DVAS	
RTCS-73	The DVAS shall allow local and remote viewers to view and export video footage and Transaction data in a format that can be copied to and viewed on any workstation without the need for special codecs or drivers.	DVAS	
RTCS-74	The System shall log all DVAS video footage viewed using the System. This log shall be indexed by Transaction number, by Transaction time, by User, and by the time of viewing.	DVAS	
RTCS-75	The System shall securely create and store a log of all DVAS video exported from the System. This log shall be indexed by Transaction number, by Transaction time, by the User performing the export, and by the time of export.	DVAS	
RTCS-76	The System shall provide for Users to search and view the DVAS usage and export logs.	DVAS	
Image Capture System			
RTCS-77	The TSDOM shall furnish, install, and configure An ICS which captures front and rear Images of all vehicles and associates them with Transactions shall be furnished, installed, and configured.	ICS	
RTCS-78	The ICS shall also perform ALPR processing of Images, generate fingerprints and/or other such data that can assist in automating the image review.	ICS	
RTCS-79	The ICS shall capture at least one front and one rear Image of every vehicle traveling through the Toll Zone.	ICS	
RTCS-80	The ICS shall capture images of vehicles equipped with Transponders	ICS	
RTCS-81	The ICS shall provide full coverage of the Toll Zone.	ICS	
RTCS-82	The ICS cameras shall be installed and adjusted to minimize the potential for license plate Image obstruction from closely following vehicles, while also minimizing potential Image obstructions caused by the subject vehicle, such as overhanging appurtenances above a license plate.	ICS	
RTCS-83	The ICS shall operate in all weather conditions and at all hours of the day and night regardless of ambient lighting conditions, without degradation.	ICS	
RTCS-84	The ICS illumination shall not present a distraction to or obstruct the visibility of drivers in the Toll Zone.	ICS	
RTCS-85	The ICS shall be Designed to minimize single points of failure. If a single camera, trigger sensor, Image capture computer, or other critical component fails, the ICS shall continue to be able to capture Images on the remaining camera(s) covering that lane.	ICS	
RTCS-86	The ICS shall be synchronized with and exchange data with the Zone Controller to ensure that vehicle Images are properly associated with the correct vehicle and its Transaction data.	ICS	

RTCS-87	ICS Images shall be stored in an industry-standard, compressible image format (e.g., JPEG, PNG) with a configurable compression/quality factor. Images should be in color at least 5 megapixels.	ICS	
RTCS-88	The portion of the ICS located at the Toll Zone shall have sufficient disk and processor capacity to buffer all Images normally transmitted to the Host for a period of 180 Calendar Days in the event of a communications failure with the Host.	ICS	
RTCS-89	The ICS shall encode in the header or comment block of each Image uniquely identifying Transaction data including but not limited to Toll Zone identifier, Lane number, Transaction date/time, Transaction number, and an indicator of whether the image came from a front or rear license plate camera.	ICS	
RTCS-90	The Toll System shall take into consideration both the need for human review as well as the network bandwidth usage when determining the quantity, sizes, and compression factor of ICS Images.	ICS	
RTCS-91	The Toll System shall monitor and log the state of ICS components, including but not limited to processors, available disk space, light sensors, cameras, network devices, and illuminators, and generate Alerts for any Equipment failures or degradation.	ICS	
RTCS-92	The Toll System shall incorporate a configurable (on/off) process that excludes faces or renders faces unrecognizable in ICS Images.	ICS	
RTCS-93	The Toll System shall be capable of reading all US license plates.	ICS	
Automatic License Plate Reading			
RTCS-94	The ALPR process will automatically locate and extract the license plate numbers, plate type and issuing jurisdiction from the license plate Images	AIR	
RTCS-95	The ALPR process will store ALPR results in computer readable format along with confidence information.	AIR	
RTCS-96	The ALPR process results shall be used to determine whether or not Manual Image Review is required.	AIR	
RTCS-97	The Toll System shall provide ALPR techniques allowing it to extract license plate information (issuing jurisdiction, plate numbers/letters and plate type, i.e. Plate Data) from captured Images and associate these results with Transactions. Plate Data shall include stacked characters and any required plate character prefixes, suffixes, or special characters.	AIR	
RTCS-98	The Toll System shall assign to each license plate/vehicle Image captured a Confidence Level. The Confidence Level is a figure of merit for each Image and the various elements comprising Plate Data representing the likelihood that the Plate Data produced by the Toll System is correct.	AIR	
RTCS-99	The Toll System shall report ALPR data within timeframes necessary to support interface requirements to the BOS as well as Hot List notification Requirements.	AIR	
RTCS-100	The Toll System shall correctly handle vertically, horizontally, and diagonally stacked characters.	AIR	
RTCS-101	The ALPR results shall include the plate characters, issuing jurisdiction and plate type for both the front and rear of the vehicle.	AIR	
RTCS-102	The ALPR results shall include separate Confidence Levels for the front and rear Image.	AIR	

RTCS-103	The Toll System shall support a Configurable Confidence Threshold. The Confidence Threshold is a number within the range of Confidence Levels determined and established by the Performance Requirements to optimize Image processing.	AIR	
RTCS-104	The ALPR shall incorporate Fingerprinting or similar technologies which would assist in reducing the need for Manual Image Review.	AIR	
Dashboard			
RTCS-105	The Toll System shall provide a real-time Dashboard to allow monitoring of all aspects of the Toll System including the Host, Toll Zone Systems, and any external interfaces.	Dashboard	
RTCS-106	The Dashboard shall provide a graphical, geographic overview of the Toll System including all Toll Zone Systems with drill down capability to a specific region (collection of Toll Zones), a single Toll Zone and further to a specific Lane within a Toll Zone.	Dashboard	
RTCS-107	The Dashboard shall utilize color coding at each viewing level to indicate the operational status of the System including the Host, the Toll Zone Systems, components, and any external interfaces. Typically, green shall indicate full normal functioning, yellow shall indicate degraded functionality and red shall indicate failure (including an off-line component or Toll Zone System). The color coding associated with components of the System shall be Configurable based on generated alerts and/or equipment status messages.	Dashboard	
RTCS-108	The Dashboard shall display alerts in real-time based on the selected viewing level. Only alerts for components shown at the selected viewing level shall be displayed.	Dashboard	
RTCS-109	The Dashboard shall display Hot List notifications in real-time based on the selected viewing level.	Dashboard	
RTCS-110	The Dashboard shall allow the user to toggle the real-time display of specific alerts and/or Hot List notifications to filter these messages only to those of interest.	Dashboard	
RTCS-111	The definition of which specific alerts are displayed on the Dashboard and their appearance (e.g., color, font, size, etc.) shall be configurable.	Dashboard	
RTCS-112	The Dashboard shall allow for the display of all open alerts and associated work orders (including all work order data elements if requested) for components flagged as being degraded or failed.	Dashboard	
RTCS-113	The Dashboard shall allow manual initiation of a work order if none already exists for components flagged as degraded or failed.	Dashboard	
RTCS-114	The Dashboard shall display current statistics at each viewing level. Statistics provided shall include, but not be limited to: o Past 24-hour transaction volume and transponder read status breakdown. o Past 1-hour transaction volume and transponder read status breakdown. o Past 15-minute transaction volume and transponder read status breakdown.	Dashboard	
RTCS-115	The Dashboard shall indicate any Toll Zone currently in Toll Waive mode.	Dashboard	
RTCS-116	The Dashboard shall allow for the viewing, in real-time, of transactions (including Plate Data and any associated Images), transponder reads and alerts as they are generated along with associated live DVAS video footage.	Dashboard	
System Administration			

RTCS-117	The Toll System shall provide GUI screens to manage all the configurable parameters described in this SOW.	Sys Admin	
RTCS-118	The Toll System shall provide GUI screens to manage system users including addition of new Users, modification to existing users and their access rights/roles and inactivation of users.	Sys Admin	
RTCS-119	The Toll System shall provide GUI screens to allow for Toll Zone system configurations and associated Toll Zone system configuration files to be centrally managed.	Sys Admin	
RTCS-120	The Toll System shall provide GUI screens to allow a Toll Zone or group of Toll Zones to be associated as a facility for processing and reporting purposes.	Sys Admin	
RTCS-121	The Toll System shall provide GUI screens to allow the management of Toll Waive mode	Sys Admin	
RTCS-122	The Toll System shall provide for configurable parameters, including but not limited to a toll rate schedule which can be scheduled to take effect immediately or at a scheduled time as determined by the user.	Sys Admin	
Reports			
RTCS-123	The Toll System shall be furnished with a robust and comprehensive reporting capability allowing a minimum of ten (10) simultaneous users to generate reports as necessary.	Reports	
RTCS-124	The Toll System shall be furnished with a report Data Warehouse (DW) whose purpose is to support the reporting requirements defined in this SOW without impacting other Toll System processes or functions.	Reports	
RTCS-125	The DW shall be a separate and distinct database from the operational database.	Reports	
RTCS-126	The data contained in the DW shall be refreshed regularly and shall not be more than two (2) hours out of date at any given point in time.	Reports	
RTCS-127	The data contained in the DW shall include all data elements used in the operational database so as not to restrict the types of reports that can be generated.	Reports	
RTCS-128	The DW shall support ad-hoc User queries via a standard ODBC interface and native database client SQL access.	Reports	
RTCS-129	The Toll System shall be furnished with a report generation and execution tool that shall allow development of custom reports (capable of showing text and/or graphics) and queries and adding such reports to the standard report menu.	Reports	
RTCS-130	All reports shall be exportable to MS Excel, Adobe PDF, and CSV formats.	Reports	
RTCS-131	Wherever possible, exported reports shall be formatted for their destination format. For example, reports exported to Excel or CSV should not have their header information repeated on multiple pages.	Reports	
RTCS-132	The Toll System shall allow configuration of reports to be automatically generated on a scheduled basis for a predefined time period relative to the report generation time and sent via e-mail to a predefined distribution list.	Reports	
RTCS-133	All reports shall contain a standard report header and/or footer that shall contain, but not be limited to: o The ID of the user executing the report o The date/time the report was executed o The name of the report o The page number in the format “Page X of Y” o The selection criteria used to generate the report o The ALDOT logo	Reports	

	o An indicator if System data is not up to date, e.g., a Toll Zone is offline o The date and time of the data most recently loaded into the DW		
RTCS-134	All reports shall be producible for varying User selectable timeframes including, but not limited to: o Hourly o Daily o Weekly o Monthly o Quarterly o Yearly o User specified date/time and time range	Reports	
RTCS-135	Reports shall allow for various User selection criteria, depending on the report, including, but not limited to: o Toll Zone or Toll Zones o Revenue Date/Transaction Date/Time range o Payment Type (AVI and/or IBT) o Vehicle Class or Classes o Reconciliation Data o Unusual occurrence codes o Hot List matches o Plate Data including Wild Card searches for issuing jurisdiction, plate number and/or plate type o ALPR Exception list matches o Wildcard searches on Plate Data	Reports	
RTCS-136	Reports shall, whenever applicable, support the generation of summary and/or detailed data based on User selection.	Reports	

Appendix II – System Requirements Specifications

Item No	Requirement	Requirement Type	Verification Method
MMS-1	A computer based Maintenance Management System shall be implemented	MMS	
MMS-2	The MMS shall provide a system maintenance database	MMS	
MMS-3	The MMS shall provide a perpetual inventory and status of system equipment in operation	MMS	
MMS-4	Maintenance Management System (MMS) shall record the following 1. Inventory 2. Failures 3. Repairs 4. Maintenance activities 5. Inspections 6. Performance 7. Communications 8. Notifications of incidents and defects.	MMS	
MMS-5	All assets related to the tolling system shall be entered into the MMS	MMS	
MMS-6	All assets recorded in MMS shall have Identifications (IDs) consistent with those descriptions and units of measure used by ALDOT.	MMS	
MMS-7	The MMS shall include relevant condition information with respect to each asset, comprising OEM and alternate 1. Location of the asset 2. Equipment nomenclature 3. Serial number of the asset 4. Name of the asset 5. Date of installation of the asset 6. Technician ID 7. Date and time of failure of the asset 8. Date and time of response to the site 9. Time asset was returned to service 10. Preventative maintenance work 11. Schedule work 12. Work repair code 13. Failure and repair history of each asset 14. Asset Residual Life 15. Mean Time Between Failure 16. Mean Time to Repair 17. Supply Lead times (ability to store in system)	MMS	
MMS-8	Residual Life shall mean the calculated duration that any asset subject to the type of routine maintenance of asset which is normally included as an annual recurring cost in highway maintenance and repair budgets, will	MMS	

	continue to comply with any applicable performance requirement or standard after the end of the term before major maintenance is required.		
MMS-9	The MMS shall be configured to report work by function code, asset or subcomponent , reference marker, crew and unit of measure	MMS	
MMS-10	Defects and responses to defects shall be recorded on the MMS within 2 days of them coming to attention of ALDOT, or action being taken	MMS	
MMS-11	All recording requirements other than those specified at MMS-12 shall be recorded on the MMS within 7 days of completion or occurrence of the activity	MMS	
MMS-12	MMS shall be capable of generating the information required to demonstrate achievement of performance requirement of each asset.	MMS	
MMS-13	ALDOT access shall be for the purposes of auditing the accuracy of the O&M Records only	MMS	
MMS-14	The MMS shall be capable of supplementing the program of inspections to demonstrate compliance with the Performance Requirements Baseline Tables.	MMS	
MMS-15	The MMS shall be kept updated and operational at all times.	MMS	
MMS-16	The components of the MMS shall be configurable to allow for greater flexibility and adaptability in using the system and in defining reporting requirements	MMS	
MMS-17	The Contractor must be able to utilize the configurable alarms, Priorities, templates, work orders and work authorizations that are provided with the MMS	MMS	
MMS-18	ALDOT shall have direct access to the MMS database	MMS	
MMS-19	The MMS must track alarms, assign priorities and provide reporting and analysis	MMS	
MMS-20	The MMS shall provide a work order processing and tracking component,	MMS	
MMS-21	The MMS shall provide a spare parts inventory control functionality	MMS	
MMS-22	The MMS shall initiate and provide work orders from: 1. Selectable alarms 2. Manual initiation 3. Preventative maintenance scheduled activities 4. Predictive maintenance scheduled activities	MMS	
MMS-23	MMS shall have the functionality to allow tracking of all work orders	MMS	
MMS-24	The MMS shall provide a status report of all work orders	MMS	
MMS-25	The MMS must identify and track maintenance activities.	MMS	
MMS-26	The MMS must identify and track parts usage	MMS	
MMS-27	For Corrective Maintenance the MMS must track Response Times and Repair Times.	MMS	
MMS-28	The MMS shall track Preventive Maintenance activities	MMS	
MMS-29	The MMS shall be used as a Predictive Maintenance Analysis tool.	MMS	
MMS-30	Once notification has been made from the System, the Operations Contractor or from ALDOT, the clock for response and repair time has officially commenced	MMS	
MMS-31	The Contractor shall enter all maintenance activity data into MMS within a reasonable time after the maintenance activities occur	MMS	

MMS-32	The System shall be able to generate MMS operations, management, and performance reports to include at a minimum: a. Alarm history b. Work order status and tracking c. Equipment and spares inventory d. Corrective and predictive maintenance e. Equipment repair history f. MTBF for equipment g. Lane or toll zone outage times	MMS	
MMS-33	The MMS should provide inventory control for spare parts	MMS	
MMS-34	The MMS shall provide ALDOT an inventory listing of all spare parts and components in inventory on a monthly basis	MMS	
MMS-35	The MMS shall provide a spare parts usage report on a monthly basis.	MMS	
MMS-36	As part of the tracking process all parts shall be bar coded with a parts list number	MMS	
MMS-37	The MMS shall keep track of warranty information for parts used.	MMS	
MMS-38	The MMS shall provide the information needed to receive warranty reimbursements when appropriate	MMS	
MMS-39	Reports generated by MMS shall include: 1. Alarm History Summary – total number of events per day during a specified date range, broken down by location (plaza/lane) and equipment type 2. Alarm History Detail – full description of each event over a specified date range 3. Maintenance Paging and Response History – each event over a specified date range, the staff notified, time of notification, method of notification, work order opened, and time the work order was acknowledged 4. Work Order Summary – number of outstanding work orders 5. Work Order Detail – all data about a single work order or range of work orders 6. Equipment Inventory – all parts in the system 7. Equipment Availability – based on calculated downtime 8. Preventive Maintenance – installed devices due for PM over an upcoming date range 9. Corrective Maintenance – work orders involving corrective maintenance 10. Response and Repair Times – average, min, max response and repair times by equipment type 11. Tolling Location Operational Status – snapshot of current status of existing lane equipment 12. Equipment Use History 13. Equipment Repair History – number of repairs by equipment type over a specified date range 14. Toll System Availability – availability over time for the entire system 15. Subsystem Availability – availability over time by subsystem 16. Equipment versions, software versions, firmware versions – existing software/firmware versions running on each lane controller, server, etc.	MMS	
MMS-40	The MMS shall provide the information needed to receive warranty reimbursements when appropriate	MMS	
MMS-41	MMS shall be used to monitor and analyze the system	MMS	
MMS-42	MMS shall be used to track the maintenance activities of the technicians.	MMS	

Appendix III – Roadside Toll Collection System Requirements

Item No	Requirement Derived from RFP	Requirement Type	Verification Method
RTC-1	The Toll System shall operate 24/7/365 in an unattended mode.	Availability	
RTC-2	Each Lane in the Toll System shall have an availability of at least 99.95% (approximately 22 minutes of downtime per 30-day month) (Lane Availability).	Availability	
RTC-3	Scheduled Preventive Maintenance that does not exceed three (3) total hours per quarter per Lane will not be counted toward Lane Availability downtime.	Availability	
RTC-4	Lane Availability shall be calculated by the total number of minutes in which all components in the Lane are functioning properly / (Total number of minutes in the reporting period – Scheduled preventive maintenance minutes)	Availability	
RTC-5	Each DVAS (including cameras and DVR) in the Toll System shall have an availability of at least 99% (approximately 432 minutes of downtime per 30-day month) (DVAS Availability).	Availability	
RTC-6	Scheduled Preventive Maintenance that does not exceed three (3) total hours per quarter (per Toll Zone) for DVAS will not be counted toward downtime.	Availability	
RTC-7	DVAS Availability shall be calculated by the total number of minutes in which the DVAS is capable of performing its normal functions / (Total number of minutes in the reporting period – Scheduled Preventive Maintenance minutes).	Availability	
RTC-8	Each Toll Zone System's connectivity to the ALDOT network shall have an availability of at least 99.9% (approximately 43 minutes of downtime per 30-day month) (Toll Zone Network Availability).	Availability	
RTC-9	Scheduled Preventive Maintenance that does not exceed three (3) total hours per quarter for the Toll Zone Network will not be counted toward downtime.	Availability	
RTC-10	Toll Zone Network Availability shall be calculated by the total number of minutes in which the Toll Zone System is capable of communicating with the ALDOT network / (Total number of minutes in the reporting period – Scheduled preventive maintenance minutes)	Availability	
RTC-11	The Host shall have an availability of at least 99.9% (approximately 43 minutes of downtime per 30-day month) (Host Availability).	Availability	
RTC-12	Scheduled Host Preventive Maintenance that does not exceed two (2) total hours per month will not be counted toward downtime.	Availability	
RTC-13	Host Availability shall be calculated by the total number of minutes in which the Host is capable of performing its normal functions / (Total number of minutes in the reporting period – Schedule preventive maintenance minutes).	Availability	
RTC-14	The Toll System shall create a Transaction for each vehicle passage through each Toll Zone. (Transaction Creation).	Transaction Accuracy	
RTC-15	The Toll System shall transfer 99% of Transactions to the CSC no later than 3 AM of the Calendar Day following the Revenue Date.	Transaction Accuracy	
RTC-16	The Toll System shall transfer 100% of the Transactions to the CSC no later than 1 Calendar Day following the Revenue Date.	Transaction Accuracy	

RTC-17	The TSDOM shall assign the correct Image Reject Code to 99% of rejected Image	Transaction Accuracy	
RTC-18	The ALPR process will be required to recognize ≥ 99.5% percentage of all license plates with a confidence high enough to warrant bypass of Manual Image Review	Image Recognition	
RTC-19	The System shall read 99.9% of all Transponders mounted per their manufacturer's mounting instructions	Read Accuracy	

Appendix IV – Additional System Requirements

Item No	Requirement	Requirement Type	Verification Method
General			
Gen – 1	RTCS is to accurately detect, classify, and identify every vehicle passing through toll zones.		
Gen - 2	The entire toll system shall be designed such that the Project system could be expanded to double the current size, measured in toll zone locations, effective lanes, and transactions without changing the basic hardware infrastructure and maintaining the same basic lane design		
Gen - 3	The Contractor shall provide the system and major components with a minimum service lifecycle of 10 years.		
Gen - 4	All equipment shall be designed, installed, and tested to operate without significant degradation for a minimum of 10 years.		
Gen - 5	All components for all equipment and assemblies shall be modular in nature for maintenance and testing purposes		
Gen - 6	All components shall be designed such that they are easily accessible with hand tools and by maintenance technicians as needed		
Gen - 7	The roadside addition of any equipment for the new toll collection system shall not adversely impact the operation of any other existing legally operating equipment or devices or introduce any EMI or harmonic distortion to the facility's electrical system		
Gen - 8	The system shall monitor environmental conditions (utility power, UPS, ATS, Air Conditioning Status, Generator, Fuel Level, temperature and humidity) in all cabinets and technical shelters except for ALDOT facilities and any facilities the contractor does not have a footprint but may be operated by Subcontractors external to the RTCS .		
Gen - 9	The entire toll system shall employ hardware and software (where possible) which is non-proprietary Commercial-off-the-Shelf (COTS), and which has a second source of supply.		
Gen - 10	The system shall be able to function without any ETC, as a video-only toll facility		
Gen - 11	The Host shall be able to support 'Hot-List' detection of 'Vehicles of Interest' for chronic / egregious toll violators, Amber Alerts or other police or official business.		
Gen - 12	The Hot List system shall be capable of routing the alerts to configurable lists and groups based on the nature of the identification of the Hot List Vehicle		
Gen - 13	All RTCS subsystems shall synchronize to a Primary Network Time Server.		
Gen - 14	Synchronization shall be, at a minimum, to the nearest 1/100 of a second		
Gen - 15	The System shall provide near real-time notification of infrastructure failures or issues		
Gen - 16	All data gathered by the toll system must be retained and processed in US.		

Audit			
Aud - 01	Every vehicle passing through any lane of the toll zone creates a uniform and unique toll transaction	Audit	
Aud - 02	The RTCS system shall ensure that no transactions are lost.	Audit	
Aud - 03	The RTCS shall provide reports and the capability to check transaction sequence numbers for purposes of audit and review	Audit	
Aud - 04	Transaction sequence number gaps shall be flagged by the Host and reported on alarm	Audit	
Access Control Requirements			
Sys Acc - 01	The system shall support remote access and administrative controls through any authorized network connected workstation with browser via the TZC Web services interface		
Sys Acc - 02	Open unsecured network shall not be permitted		
Sys Acc - 03	The system shall report to the System Administrator each time the system is accessed remotely for any purpose, and identify from where and by whom the remote access is generated.		
Electrical Compliance			
EL–C - 01	The Contractor-provided equipment shall be in compliance with the latest accepted version National Electrical Code (NEC) defined in the applicable codes and standards.		
EL–C - 02	The electrical equipment and components be certified by Underwriters Laboratory (UL).		
Tolling Point Requirements			
TP-01	The Toll Zone System shall employ dual redundant toll zone servers		
TP-02	The Toll Zone system shall run independently of the Host system		
TP-03	Toll Zone system shall continue to build transactions if communications are disrupted		
TP-04	The Toll Zone system shall immediately build the toll transaction with the information available,		
TP-05	The Toll Zone System shall be capable of operating in a degraded mode if some subsystems or components are not functioning		
TP-06	The TZC shall send the transactions to the Host immediately and without batching, i.e., in near-real-time		
TP-07	The TZC shall store all transaction and video data, serving as backup for communications outages with the Host		
TP-08	The TZC shall provide video transaction images upon query from the Host, and before purging as allowed by the functional requirements		
TP-09	The TZC shall ensure that all messages and transactions it creates are transmitted to the Host.		
TP-10	The TZC shall build ~~p~~ and cache transactions if communications are lost with the Host system		
TP-11	The TZC shall support remote maintenance via the TZC Web Services interface.		
TP-12	All tolling point equipment shall be modular		
TP-13	Hot swapable functionality shall be provided for all toll zone equipment		

TP-14	Plug and play operations with minimum field changes or tuning required shall be supported.		
TP-15	All replacement units within the Tolling Point servers shall be physically and electrically interchangeable with other units of the same function with no adjustments other than normal alignment and configuration settings		
TP-16	The TZC shall provide a System Monitoring Application		
TP-17	The monitoring application shall support:		
	1. A real-time dashboard and display of current transactions and system performance, for a particular lane, a toll zone, or for the Tolling Point		
	2. Access to and view of any camera selected by the user with image quality variable to meet limitations or capabilities of communications to the roadside		
	3. Review of video images with image quality variable to meet limitations or capabilities of communications to the roadside		
	4. System MOMS and health, parameters		
Zone Controller Requirements			
ZC-1	The toll zone controllers shall be capable of stand-alone operations and storage for a period of 90 days in the event the Host is off-line or not functional.		
ZC-2	The toll zone controller configurations shall be controlled by the host-level central library.		
ZC-3	The central library shall regulate and define whether configurations including lane number and type, software version and other critical Lane Environment information are correct prior to the opening of a lane		
ZC-4	The toll zone controller shall be a dual-hot-redundant computer array.		
ZC-5	The toll zone controller redundancy shall guarantee the operations 24 hours a day without interruption		
ZC-6	Hot swappable functionality shall be included in the toll zone design		
ZC-7	The toll zone design shall support plug and play operations with minimum field changes or tuning required.		
ZC-8	All replacement units within the toll zone controllers shall be physically and electrically interchangeable with other units of the same function with no adjustments other than normal alignment and configuration settings		
ZC-9	The toll zone controller hardware and software shall be the same for all lanes and all AET mainline and ramp toll zone lanes		
ZC-10	All interfaces with toll zone component equipment shall be defined and documented		
ZC-11	Each toll zone controller shall have data storage for at least 90 days in circular storage on a hard drive.		
ZC-12	Data storage on the toll zone controller shall include: all transactions, event messages, system level messages, logging and any other messages that may be used for maintenance and troubleshooting		
ZC-13	The RTCS shall build a non-proprietary uniform-format transaction message for every toll event passing the toll zone in the full width of the roadway whether it is an ETC-based or a video-based transaction.		
ZC-14	The toll transaction shall apply a uniform transaction format for all vehicles and all conditions.		
ZC-15	The toll transaction shall be composed using an open-standard format such as XML which can be audited and read on a transaction-by-transaction basis.		

ZC-16	The toll transaction message shall include but not be limited to the following:		
	1. Date/Time/Location stamp		
	a. Local-time to the nearest ^{10}0th of a second		
	b. Lane number		
	2. Unique transaction sequence number		
	3. Vehicle classification		
	4. ETC – selected technology-required data		
	5. Video data		
	a. State/province		
	b. Special license plate identifier or vertical letter stack		
	c. Alpha-numeric string		
	d. OCR Confidence level		
	g. Status of lane / toll zone equipment		
	h. Vehicle Speed		
Image Capture System			
ICS - 01	The video cameras shall be used for license plate identification by machine-read algorithms as well as human review.		
ICS - 02	All system cameras' views shall be observable via the Host		
ICS - 03	All system cameras and support systems or recorders shall be time-synchronized by the toll system		
ICS - 04	Video images shall be stored on-line by the TZC for 90 days, except where Alabama Law dictates the purging of personal information following settlement of a violation		
ICS - 05	When both front and rear images are captured, they shall be matched with a single vehicle transaction		
ICS - 06	An image will be captured for each front license plate area, whether or not the vehicle has a license plate.		
ICS - 07	The VPS shall be able to distinguish license plates by state or province plates for all license plates		
ICS - 08	Rear View Camera(s) shall meet the following requirements.		
	1. Capture the rear license plate image clearly with the best contrast possible		
	2. Capture the entire width of the vehicle		
	3. The upper and lower limit of the field of view shall be configurable to capture a license plate located at any portion on the back of the vehicle from the bottom of the vehicle up to the window level		
	4. The back of vehicle shall be clearly recognizable to the human eye in the image		

ICS - 09	The system shall include a color camera for plate color recognition, which may be augmented by an infra-red camera if needed.		
ICS - 10	Continuous white light for illumination shall not be employed		
ICS - 11	Front View Camera(s) shall capture the front license plate image, if any, clearly with good contrast where possible.		
ICS - 12	The front view shall capture the full width of the vehicle		
ICS - 13	The front view camera shall not capture the view of the windshield or driver, they may be masked		
ICS - 14	The front view camera system shall employ a color or B&W camera, which may be augmented by an infra-red camera if needed		
ICS - 15	All video images and associated OCR results shall be associated with the correct vehicle transaction from the roadside controller		
ICS - 16	The upper and lower limit of the field of view shall be configurable to capture a license plate located at any portion on the front of the vehicle from the bottom of the vehicle up to the window level		
ICS - 17	The vehicle identification information shall be provided in the transaction message, and the video image shall be stored at the toll zone		
ICS - 18	Each video image shall be associated with its transaction by the unique transaction sequence number and date / time / location stamp recording with the image file		
ICS - 19	Front and rear plates for the same vehicle shall be packaged in the same transaction		
ICS - 20	The video camera-source images shall be stored image-by-image as separate digital files, in open-standard file architecture (e.g. JPEG, GIF or TIFF)		
ICS - 21	Video cameras shall support a capture rate of no less than 4 vehicles per second per ORT lane for both front and rear images		
ICS - 22	The OCR software shall process images from front and rear cameras at a minimum rate of 2,400 vehicles per hour per lane for all lane types		
ICS - 23	The same camera types shall be used in all lanes.		
ICS - 24	All cameras and lighting shall be installed on pre-set brackets such that replacement units do not require physical re-calibration		
ICS - 25	Each image set shall contain a minimum of 1 Color and 1 IR image for each of the Front and Rear sets		
ICS - 26	VPS components shall report to MOMS any VPS failures		
ICS - 27	VPS shall report to MOMS when minimum OCR confidence level threshold (configurable) are not attained		
ICS - 28	The VPS shall provide event messages (MOMS) that indicates if the images capture field of view is not within the defined, para meters (configurable).		
Vehicle Classification System Requirements			

CLASS. - 01	The toll system shall be able to detect vehicles at any location across the pavement toll zone from curb/end-of-pavement to curb/end-of-pavement, as long as the vehicle is completely on the pavement.		
CLASS - 02	The toll system shall be able to separate vehicles at any location across the pavement toll zone from curb/end-of-pavement to curb/end-of-pavement, as long as the vehicle is completely on the pavement.		
CLASS - 03	Vehicle classification applied by the AVC system shall be on the basis of the EZG vehicle Classes		
CLASS - 04	The vehicle classification system shall support degraded modes of operation if individual AVC components fail		
CLASS - 05	Degraded mode details shall be included in transaction messages		
CLASS - 06	The vehicle classification system shall be able to detect and correctly associate trailers and articulated vehicles		
CLASS - 07	The vehicle classification system's hardware and configuration shall be the same for all lanes and locations		
CLASS - 08	No in-pavement devices except loops or smart loops shall be used for the vehicle classification system		
CLASS - 09	The pavement shall be restored to a clean and drivable condition following installation of in pavement loops		
CLASS - 10	The seals waterproof integrity over the loops shall be maintained during the life of the contract to ensure no degradation in system performance as result and no degradation to pavement performance related to water seeping under the pavement from loop seals.		
CLASS - 11	The Automatic Vehicle Classification (AVC) system shall include maintenance diagnostics which can automatically detect component failures, erroneous data, or impossible or unlikely input, and generate an error or status message with the exception that the Host will detect and generate an alarm when speed data is not provided by the overhead laser during degraded mode of operations.		
CLASS - 12	The Automatic Vehicle Classification (AVC) system shall generate an error or status messages with the exception that the Host will detect and generate an alarm when speed data is not provided by the overhead laser during degraded mode of operations.		
Closed Circuit TV Requirements			
CCTV - 01	The CCTV Roadway Overview system collects and stores motion video of the traffic under a gantry.		
CCTV - 02	The CCTV Site Security cameras shall be used to monitor toll zone sites and access points, for site surveillance		
CCTV - 03	The CCTV Site Security system shall detect, collect and store motion video of activity in the proximity of the toll zone, equipment cabinets and the gantries, other than vehicular traffic.		
CCTV - 04	Activation and adoption of pre-sets in the Site Security system shall be triggered by login through the card-access system or by movement detected in specific zones near cabinets or building doors.		
CCTV - 05	The site Security Cameras shall have configurable pre-sets for the toll zone building access, major cabinet access, and the roadway in both the approach and departure directions		
CCTV - 06	CCTV subsystem settings for event triggering, before-and-after event settings, data and all other system settings shall be configurable by authorized users		

CCTV - 07	It shall be possible to configure the CCTV subsystem recordings, based on motion detection in the field of view or other events, for configurable number of seconds before and after the event.		
CCTV - 08	It shall be possible to configure the CCTV system to record periods of inactivity at lower frame rates and/or resolution than the normal full-resolution of 30 frames per second (fps) recordings.		
CCTV - 09	Data shall be presented either as an overlay or in a dialog box near the image		
CCTV - 10	Personnel with CCTV system administrative rights shall be able to configure for the playback of the system, such that specific fields of data are only visible by specific categories of users		
CCTV - 11	The CCTV Roadway Overview cameras and recordings shall require separate ID and password authentication requirements from those of the CCTV Site security cameras and recordings.		
CCTV - 12	The CCTV administrative application at the Toll Operations Center shall enable authorized system managers to determine access authorizations and CCTV subsystem settings.		
CCTV - 13	The CCTV system shall be a proven commercial product (hardware and software) that can be expanded or updated, in a modular fashion, over time		
CCTV - 14	Customization to meet project requirements of the new CCTV commercial subsystem shall be minimized.		
CCTV - 15	All CCTV components and recordings shall be time-synchronized to the toll collection system.		
CCTV - 16	CCTV cameras shall be color digital cameras		
CCTV - 17	The CCTV camera shall be a color camera and support a resolution of at least 720 vertical lines of resolution in color		
CCTV - 18	Switching from Color to B&W is acceptable as long as the resolution is not compromised		
CCTV - 19	The cameras shall have a viewable image 24 hours a day unless hampered by adverse weather conditions.		
CCTV - 20	The camera shall be capable of “sector blanking” to mask public areas not within the project limits.		
CCTV - 21	The camera shall support normal day and night conditions.		
CCTV - 22	Cameras located in areas with insufficient lighting, the camera shall be capable of adjusting for poor light conditions		
CCTV - 23	The window of the camera housing shall have an anti-reflection coating		
CCTV - 24	The CCTV hardware configuration shall support redundant power supplies and disk storage.		
CCTV - 25	The camera and all of the associated electronic equipment shall be housed in a weatherproof National Electrical Manufacturers Association (NEMA) rated enclosure.		
CCTV - 26	Cameras shall require no more than 24 volts DC power.		
CCTV - 27	CCTV Roadway Overview cameras shall be fixed-position, fixed-focal length cameras (or zoom-lens cameras in a fixed configuration).		
CCTV - 28	CCTV Site Security cameras shall be Pan-Tilt-Zoom (PTZ) cameras in dome enclosures, mounted to provide a view of the Toll Zone including gantries, cabinets and vehicle traffic.		
CCTV - 29	Cameras shall be protected against vandalism and mounted out of physical reach as much as possible		
CCTV - 30	Recording of CCTV motion video shall be provided on a Digital Video Recorder (DVR) at the Toll Zone		
CCTV - 31	Each CCTV camera shall provide continuous capture of its target field of view.		

CCTV - 32	The DVR shall support a range of recording frames per second, up to 30 frames per second (fps) for event recording, and also support slower rates during periods of non-activity.		
CCTV - 33	CCTV cameras and applications shall remain in operation and continue recording when the communications with related systems fail,		
CCTV - 34	It shall be possible to query the DVR based on date/time/location.		
CCTV - 35	It shall be possible to query the DVR based on transaction sequence number		
CCTV - 36	The DVR system at the toll zone shall have sufficient hard disk storage for 60 days of recording		
CCTV - 37	The CCTV recordings shall all be in one open standard format, such as MPEG-4.V11 (H.264) or MJPEG format, or other commercially open standard		
CCTV - 38	The CCTV subsystem shall be configurable to support recording capability from Common Intermediate Format (CIF) to 4CIF.		
CCTV - 39	The CIF rate shall be 4CIF for normal viewing and recording but configurable from CIF to 4CIF.		
CCTV - 40	Camera recordings shall be write-protected, preventing anyone from altering the recording		
CCTV - 41	Recordings shall be able to be viewed within a minimum of two seconds after the file is accessed by the viewing application		
CCTV - 42	The CCTV subsystem shall employ industry standard applications to display live “streaming” video, as well as full-file downloads		
CCTV - 43	The CCTV system application shall enable the authorized user to crop, copy, save, and print segments of recorded data as images or full-motion video.		
CCTV - 44	The CCTV subsystem shall automatically purge CCTV data not marked for archive for a configurable period of time, with the default set at 60 calendar days,		
CCTV - 45	It shall be possible to automatically archive alarm events and other designated critical events regardless of purge cycle		
CCTV - 46	The CCTV recording from each overview camera shall be time-synchronized to the toll system	CCTV	
Access Control Requirements			
ACCESS - 01	A proximity card access control system shall be provided for all equipment cabinets at the roadside.		
ACCESS - 02	All proximity card readers shall be time-synchronized with the host system		
ACCESS - 03	The System shall track data and provide reports showing:		
	1. Entry times, exit times and duration for facilities and secure areas:		
	2. Access times and duration for toll equipment and other devices requiring secure access.		
ACCESS - 04	Access reports shall have the ability to be viewed, printed, or saved to a file, directory, logical share, or local disk		
ACCESS - 05	Access control shall be able to trigger CCTV events for recording and pre-sets		
ACCESS - 06	Master keys to all equipment cabinets shall be provided		
ACCESS - 07	Copies of all keys for roadside equipment shall be provided		
ACCESS - 08	A possession log for all keys shall be provided and maintained		