



STATEWIDE ROADSIDE TOLL COLLECTION SYSTEM

REQUEST FOR PROPOSALS

Mandatory Pre-Proposal Scope of Services Meeting

February 2, 2023

1 p.m. to 2 p.m. EDT

Online via Web Conference

Proposal Due Date

July 27, 2023 (4:00 p.m. EDT)

Physical Delivery Address:

North Carolina Turnpike Authority

Transportation Building

1 South Wilmington Street

Raleigh, NC 27601

Attn: Christopher Garlick

Issue Date: January 20, 2023

Updated through Addendum 11 (September 20, 2023)

STATEWIDE ROADSIDE TOLL COLLECTION SYSTEM RFP

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I. Notice of Request for Proposals

TITLE: Statewide Roadside Toll Collection System Request for Proposals

ISSUING DATE: January 20, 2023

ISSUING AGENCY: North Carolina Turnpike Authority

I.1 Background and Purpose

The North Carolina Turnpike Authority (NCTA) is requesting written Technical and Price Proposals from qualified proposing contractors (“Proposers”) interested in providing a Roadside Toll Collection System (RTCS), inclusive of Express Lanes Types and All Electronic Tolling Lane Types, Intelligent Transportation Systems (ITS) and a Roadside System (RSS) with dynamic pricing capabilities for the Statewide Roadside Toll Collection Systems projects (“Projects”). The Project scope includes the installation, commissioning, and operations and Maintenance of the RTCS. The Projects allow for transponder and license plate-based tolling and will integrate into the NCTA back-office systems. The Project has three phases known as 1) Implementation Phase, 2) Installation and System Acceptance Phase, and 3) Operations and Maintenance Phase as described in **Part IV, Terms and Conditions**.

NCTA, a business unit of the North Carolina Department of Transportation (NCDOT), was formed in 2002 by the North Carolina General Assembly. The mission of NCTA is to supplement the traditional non-toll transportation system by accelerating the delivery of roadway projects using alternative financing options and facilitating the development, delivery, and operation of toll roads.

NCTA currently operates approximately 36 miles of tolled expressway facilities on the North Carolina state highway network, including the Triangle Expressway near Raleigh and the Monroe Expressway near Charlotte. In addition, NCTA’s toll collection program provides back office Toll Transaction processing and customer service for the I-77 Express Lanes in Charlotte, which is an NCDOT public-private partnership project. There are several toll projects under construction or development in North Carolina, including I-485 Express Lanes, Complete 540 (an extension of the Triangle Expressway), the Mid-Currituck Bridge, US-74 Express Lanes, and I-77 Express Lanes South. The Statewide Roadside Toll Collection System will be used for one or more of these projects.

NCTA’s administrative and project development work is performed by professional teams comprised of NCTA staff, NCDOT staff, and consultants. This arrangement provides management oversight while assuring that necessary expertise is available when needed to advance projects in an efficient and timely manner. NCTA has primary responsibility for this Request for Proposals (RFP) process including defining the requirements addressed in this RFP, evaluating Proposals submitted by Proposers, and execution and oversight of the Contract.

The Project limits, details and responsibilities may vary from each project. The following table presents a general description of typical roles and responsibilities for the project's construction, operations, and maintenance of the Project.

Table I-1: Project Responsibility Matrix

Item	Responsible Party
Construction	
Roadway Civil Construction	Constructor or Concessionaire
Most ITS Equipment and Network	Constructor or Concessionaire
Toll Facility Infrastructure (vaults, generator, propane tank, gantries, equipment pads, conduit)	Constructor or Concessionaire
Toll Collection Equipment	RTCS Contractor(s)
Automatic Vehicle Identification (AVI) Transponder Reader Equipment	Vendors within the E-ZPass Next Generation ETC Equipment and Services contract
Operations and Maintenance	
Roadway and Civil Infrastructure	NCTA or NCDOT or Concessionaire
Maintenance of RTCS, Transaction Reconciliation Host (TRH), ITS and Network	RTCS Contractor(s)
Level I and II Maintenance of AVI Transponder Reader Equipment	RTCS Contractor(s), NCTA or other service provider to be procured prior to Project opening
Level III Maintenance of Automatic Vehicle Identification (AVI) Transponder Reader Equipment	Vendors within the E-ZPass Next Generation ETC Equipment and Services contract
Toll Facility Infrastructure	RTCS Contractor(s), NCTA or other service providers to be procured prior to Project opening

1.2 NCTA Facilities

NCTA staff, NCDOT staff, and consultants provide management oversight for all NCTA projects from the following facilities: The NCDOT/NCTA Transportation Building (also known as the "Highway Building"), four NC Quick Pass® customer service centers, the NC Quick Pass Operations Center, the Metrolina Regional Transportation Management Center and the Statewide Traffic Operations Center.

NCDOT/NCTA Transportation Building

The headquarters for the NCTA/NCDOT staff is at the State Transportation Building (“Highway Building”) located at I South Wilmington Street in downtown Raleigh, NC.

NC Quick Pass Storefronts

NCTA currently operates three storefronts in North Carolina, in Morrisville, Monroe, and Charlotte. The Morrisville Storefront, which serves the Raleigh/Durham region, is located just south of the Raleigh/Durham International Airport, and near the northern terminus of the Triangle Expressway. The Monroe Storefront opened in October of 2018 and is located approximately two (2) miles from the Monroe Expressway, midway between the project termini. Also opened in October of 2018, the Charlotte Storefront is located just inside the I-485 loop around Charlotte, near the midpoint of the I-77 Express Lanes. These storefronts are in the vicinity of NCTA toll facilities for customers to perform NC Quick Pass business activities in person. These storefronts are responsible for housing the following services:

- Customer account creation and, closure, management, and maintenance;
- NC Quick Pass Transponder inventory distribution and maintenance;
- Account Conversion management; and
- Walk-In Customer service (e.g. dispute resolution, account payments and replenishments).

NC Quick Pass Operations Center

NCTA currently operates two operations centers in North Carolina, in Morrisville co-located with the Morrisville Storefront, and Rocky Mount co-located with the other DMV buildings. The NC Quick Pass Operations Center houses the call center, account management activities, and back office operations activities. The NC Quick Pass Operations Center also provides office space for the CSC contractor management team, NCTA agency and consultant staff.

Metrolina Regional Transportation Management Center (MRTMC)

Highly trained NCTA operators monitor and manage traffic operations and coordinate incident response and maintenance/construction work for the Monroe Expressway from the Metrolina Regional Transportation Management Center (MRTMC) located in Charlotte at 2327 Tipton Dr. These operators are co-located with NCDOT- managed operators who oversee the Charlotte regional road network. The NCTA operators are responsible for monitoring the Monroe Expressway from 5:15am to 9:45pm, 5-days a week using closed-circuit TV (CCTV) cameras, vehicle detectors, and Toll Zone security cameras. Additionally, they monitor roadside toll technology and facilities.

Statewide Transportation Operations Center (STOC)

NCTA operators at the Statewide Transportation Operations Center (STOC) Traffic Management Center (TMC) monitor the Triangle Expressway and take over management of the Monroe Expressway during the hours the MRTMC is not staffed. The STOC is located at the North Carolina National Guard’s Joint Force Headquarters at 1636 Gold Star Drive in Raleigh. The operators have the same duties, responsibilities, and tools at their disposal as the operators at the MRTMC. The STOC is staffed 24-hours a day, 7 days a week, 365 days a year. Like the MRTMC operators, although not yet decided, It is expected that NCTA and NCDOT operators at the MRTMC and STOC will have a role in the management of all projects procured under this agreement.

I.3 NCTA Toll Program

NCTA operates and manages the NC Quick Pass® Electronic Toll Collection (ETC) and Bill by Mail programs utilized for toll facilities in North Carolina.

NC Quick Pass Transponder Accounts

As of October 2022, there are more than 450,000 active prepaid NC Quick Pass Transponder Accounts. NC Quick Pass account holders have multiple Transponder options to fit specific travel needs, including paying tolls in other states. In addition, NC Quick Pass Transponder users receive a discounted toll rate on North Carolina toll facilities.

NC Quick Pass maintains partnership agreements with E-ZPass®, Florida's SunPass® and Georgia's Peach Pass®. The partnership with E-ZPass allows more than 41 million drivers who have E-ZPass Transponders to use toll facilities in North Carolina, while also allowing all 19 states to accept NC Quick Pass as a form of payment. Similar agreements with SunPass and Peach Pass offer numerous toll payment options for travelers in the southeastern United States.

Currently, approximately sixty-seven percent (67%) of tolls on the Triangle Expressway are paid via prepaid Transponder accounts. On the Monroe Expressway, approximately fifty percent (50%) of tolls are paid via prepaid Transponder accounts, a number expected to rise steadily as customers in the area become more familiar with the project.

Bill by Mail

Customers traveling toll roads in North Carolina without an NC Quick Pass Transponder Account (or interoperable Transponder) are invoiced at a higher toll rate through the Bill by Mail (BBM) program. The registered owner of the vehicle is identified by license plate, and an invoice is mailed to the address registered with the NC Division of Motor Vehicles (NCDMV). If the bill is not paid within thirty (30) days from the date of the invoice, the vehicle's registered owner could incur fees, civil penalties, DMV registration holds, and/or be turned over to a collection agency.

NC Quick Pass Back Office System Technology and Operations

The CSC operations contractor provides customer service support using the existing Commercial Back Office System (CBOS) provided by a separate contractor. The CBOS manages all the North Carolina toll collection system functionality and serves as an Electronic Toll Collection (ETC) clearing house for all Toll Transactions produced in the State. The current system provides functionality for:

- Posting all Toll Transactions (ETC, image-based and interoperable) to Quick Pass and BBM accounts;
- Customer service and customer interaction (website, Interactive Voice Recognition (IVR), email, text message, etc.);
- Financial transactions and account replenishment;
- Financial and lane transaction reconciliations;
- Revenue management;
- Inventory management; and
- Reporting.

The CBOS maintains all NC Quick Pass Transponder and BBM accounts. Numerous interfaces required for interoperability, license plate lookup, document mailing, banking, credit card processing, collections, etc. are in place supporting on-going business processes.

As part of this Project, the Contractor shall provide RTCS with a transaction database system for Toll Transactions and license plate number (LPN) images, and all traffic and revenue related data needed to provide reporting separate from the CBOS and Roadside System.

NCTA expects to transition from an interface between the RTCS and Commercial Back Office System (CBOS) or to a NCTA provided Operations Back Office (OBO). NCTA does not have a timeline for the transition to the OBO at this time. NCTA will provide the Contractor a 60 Calendar Days' notice to transition from the CBOS to the OBO. The Contractor shall provide design, development, integration, and testing of the transition to the OBO. At the time of the transition from the CBOS to the OBO, NCTA may also transition Image Verification Services (IVS) to the NCTA provided OBO. Image Verification Services will be annually renewed, and a determination will be made by NCTA each Fiscal Year for the Contractor to continue or discontinue providing Image Verification Services.

I.4 General Overview of RTCS Scope of Work

As part of the Scope of Work (SOW) of this RFP, the Contractor shall be responsible to provide solutions and pricing to procure, furnish, design, test, install, operate and provide Level I, II and III Maintenance to address the RTCS, which shall include a Roadside System (RSS) and an Intelligent Transportation System (ITS). The Contractor is also responsible for all aspects required to create complete Toll Transactions for ETC (transponder-based) transactions and Bill by Mail (image-based) Toll Transactions, requirements detailed in Part III Scope of Work and transmitting Requirements within this RFP. Upon selection, the transactions from the RTCS to the CBOS and to a future NCTA OBO. Complete transactions are expected to be provided for processing, reporting, and reconciliation with the NCTA CBOS or OBO. Additionally, the Contractor shall be responsible for the implementation, maintenance, and operations scope of Digital Video Audit System (DVAS), Wrong Way Vehicle Detection (WWVD) system, Dynamic Pricing System (DPS) calculation, Image Review and verification services, and road sign display provided will vary, depending on selection for services of travel time and variable pricing information projects over the term of this Contract. The final scope and requirements of each project will be detailed within individual task orders, which will be assigned to the Contractor(s) under this Contract.

1.5 RFP Inquiries and Notices

Any questions regarding this RFP shall be directed in writing to the contact person identified below in **Part I, Administrative**, Section 1.6. Only inquiries in writing will be accepted by NCTA, and only written responses will be binding upon NCTA. Any inquiries received after the deadline referenced in **Table I-2: Procurement Schedule** may or may not be answered by NCTA at NCTA's sole determination. All answers to inquiries will be posted on the NCTA web site at <https://connect.ncdot.gov/business/turnpike>. Proposers shall use the form provided in **Exhibit D-8, Forms** when submitting questions to be addressed by NCTA.

1.6 Contact Person

Mr. Chris Garlick is the contact person on this RFP. Any questions in regard to this RFP shall be directed in writing to Mr. Garlick by e-mail at svc_NCTA_SRTC@ncdot.gov.

1.7 Information Posting

It is the responsibility of all prospective Proposers interested in responding to this RFP to routinely check the NCTA website at <https://connect.ncdot.gov/business/turnpike> for any revisions, question responses, Addenda, and changes to schedule and announcements related to this RFP. NCTA also will develop an email distribution list of contact persons for those Proposers who attend the mandatory Pre-Proposal Scope of Services Meeting and will email this additional information to such contact persons; however, this does not relieve Proposers of the responsibility to be aware of all additional information related to this RFP posted via the website. NCTA and NCDOT grant permission to use its logo on Proposal Submittals.

1.8 Policy Statement

This procurement shall be conducted in accordance with all applicable Federal and State laws and regulations, and the policies and procedures of NCTA, as those may be amended. All future amendments to any such laws, regulations and applicable NCTA policies and procedures shall be applicable to this procurement. A copy of the North Carolina Turnpike Authority Policies and Procedures for the Procurement of Commodities and Services (February 2009) may be obtained from NCTA.

1.9 Prohibited Communications During Evaluation

During the evaluation period, from the date Proposals are opened through the date the contract is awarded, each Proposer submitting a Proposal (including its representatives, sub-contractors and/or suppliers) is prohibited from having any communications with any person inside or outside NCTA, any other government agency office, or body (including NCDOT, department secretary, agency head, members of the general assembly and/or governor's office), or private entity, if the communication refers to the content of the Proposer's Proposal or qualifications, the contents of another Proposer's Proposal, another Proposer's qualifications or ability to perform the contract, and/or the transmittal of any other communication of information that could be reasonably considered to have the effect of directly or indirectly influencing the evaluation of proposals and/or the award of the contract. A Proposer not in compliance with this provision shall be disqualified from contract award, unless it is determined in NCTA's discretion that the communication was harmless, that it was made without intent to influence and that

the best interest of NCTA would not be served by the disqualification. A Proposer's Proposal may be disqualified if its Sub-contractor and supplier engage in any of the foregoing communications during the time that the procurement is active (i.e., the issuance date of the procurement to the date of contract award). Only those discussions, communications or transmittals of information authorized or initiated by NCTA for this RFP or general inquiries directed to the contact person noted in **Part I, Administrative**, Section 1.6 in writing regarding requirements of the RFP (prior to Proposal submission) or the status of the Contract award (after submission) are excepted from this provision.

1.10 Cost Incurred Responsibility

All costs incurred by any interested party in responding to this RFP shall be borne by such interested party. NCTA shall have no responsibility whatsoever for any associated direct or indirect costs.

1.11 Right to Reject

NCTA retains the right and option to reject any and all Proposals.

1.12 Responsiveness of Proposals

NCTA reserves the right to reject any Proposal as non-responsive if the Proposal fails to include any of the required information in the specified order, as further detailed in **Part I, Administrative**, Section 3 Content of Proposal and Section 4 Submission of Proposal.

1.13 Right to Cancel

NCTA reserves the right to cancel this RFP if it is determined to be in the best interest of NCTA to do so.

1.14 Right to Amend and Addenda

NCTA reserves the right to amend, insert, or delete any item in this RFP if it is determined to be in the best interest of NCTA. If it becomes necessary to revise any part of this RFP, a written Addendum to the solicitation will be sent via email to the RFP email list and will be posted to NCTA's website in accordance with **Part I, Administrative**, Section 1.7 Information Posting. NCTA expects to issue the last Addendum no later than the date for NCTA Inquiry Responses and Addendum (if required) Issued provided in **Table I-2: Procurement Schedule**. NCTA will not be bound by, and the Proposer shall not rely on, any oral or written communication or representation regarding the RFP documents, except to the extent that it is contained in an Addendum to these RFP documents or in the questions and answers as posted on the NCTA web site. In the case of a conflict between Addenda the latest Addendum shall apply.

Proposers are required to confirm the receipt of all Addenda issued to this RFP by completing **Exhibit D-11, Forms** and including the completed form in the Proposal Section 7.

1.15 Written Clarifications

NCTA may request written clarifications to Proposals. NCTA will identify in its request the due date for response. If the requested information is not received by the due date for response, the Proposer's scores may be adversely affected.

1.16 Oral and Referenced Explanations

NCTA will not be bound by oral explanations or instructions given by anyone at any time during the Proposal process or after Contract award. NCTA will not consider Proposer referenced information not included in the Proposal; however, NCTA may consider other sources in the evaluation of Proposals, such as reference reviews, financial ratings and Proposer oral presentations, for example.

1.17 Oral Presentations and Interviews

NCTA reserves the right to request oral presentations and interviews with Proposers if NCTA decides that oral presentation and interviews are in its best interests. If oral presentations and interviews are used, NCTA will develop a short list for the oral presentations and interviews based on the scores of the Technical Proposals. See **Part I, Administrative**, Section 5 Procurement Evaluation Process for more details.

In advance of any oral presentations and interviews, Proposers will be given detailed instructions on what the format and content of the presentation and interview will be, including what functionality, if any shall be demonstrated.

NCTA has determined that oral presentations and interviews will be held virtually via Microsoft Teams.

1.18 Proposal Submittal Deadline

Complete and separate Technical Proposals and Price Proposals shall be delivered by mail or to the front desk of the North Carolina Department of Transportation (NCDOT) building location presented on the cover page of this RFP, before the due date and time provided in **Table I-2: Procurement Schedule**, where they will be logged in as received. NCTA will not accept Proposals delivered after the due date and time.

1.19 Submittal Responsibility

The responsibility for submitting a Proposal to NCTA on or before the stated time and date will be solely and strictly the responsibility of the Proposer. NCTA will in no way be responsible for delays caused by the United States mail delivery, common carrier or caused by any other occurrence.

1.20 Waivers

NCTA may waive minor informalities or irregularities in Proposals received where such is merely a matter of form and not substance, and the correction or waiver of which is not prejudicial to other Proposers. Minor irregularities are defined as those that will not have an adverse effect on NCTA's interest and will not affect the price of the Proposals by giving a Proposer an advantage or benefit not enjoyed by other Proposers.

1.21 Modification or Withdrawal of Proposals

NCTA will permit modifications to a Proposal after Proposal Submittal until the specified due date and time for accepting Proposals provided in **Table I-2: Procurement Schedule**. The Proposal may be picked up by a representative of the Proposer provided that the request to modify is in writing, is executed by the Proposer or the Proposer's duly authorized representative and is submitted to NCTA. It is the

Proposer's responsibility to resubmit a Proposal before the deadline in accordance with the instructions and requirements for Proposal submission detailed in this RFP.

A Proposer may withdraw a Proposal without prejudice prior to the Submittal deadline provided in **Table I-2**, provided that the request is submitted in writing to the contact person noted in **Part I, Administrative**, Section 1.6 Contact Person, is executed by the Proposer or the Proposer's duly authorized representative and is submitted with NCTA.

I.22 Confidentiality and RFP Ownership

The North Carolina Turnpike Authority is a public agency of the State of North Carolina, subject to the North Carolina Public Records Act, Chapter 132 of the North Carolina General Statutes. NCTA may maintain confidential information, including any designated as trade secrets or otherwise proprietary, only in accordance with applicable Federal and State laws or regulations. NCTA, therefore, expects that Proposers will keep confidential information designations to a minimum. Any material labeled as confidential constitutes a representation by Proposer that it has made a reasonable effort in good faith to determine that such material is, in fact, a trade secret under G.S. § 132-1.2. Proposer are urged and cautioned to limit the marking of information as a trade secret or as confidential so far as is possible.

Proposer, having formed a good faith opinion, upon consultation with legal or other knowledgeable advisors, that information submitted may contain a trade secret as defined in G.S. § 66-152 or other information exempted from the North Carolina Public Records Act pursuant to G.S. § 132-1.2, may so designate appropriate portions of Proposer Materials by marking the top and bottom of pages containing confidential information in boldface type "CONFIDENTIAL." NCTA, however, may serve only as a custodian of information a Proposer deems confidential. NCTA shall not act as an arbiter or defender of any claims related to assertions of confidential information. If a request is made for disclosure of information submitted, or an action is brought to compel NCTA to disclose information marked confidential pursuant to G.S. § 132-1 et seq. NCTA will notify the affected Proposer of such request or action.

In submitting Proposer Materials in response to this RFP, a Proposer agrees to: (i) defend its assertions of confidentiality by instituting appropriate legal proceedings, at its own expense and through its counsel, or intervening in an action brought against NCTA to compel disclosure, to defend its assertions of confidentiality; and (ii) hold the State and NCTA, and any officials or employees thereof harmless from any and all damages, costs, and attorney's fees awarded against the State and NCTA arising out of any such actions. Nothing in this section shall preclude the State or NCTA from participating in the defense of such actions, at its option and expense through its counsel. NCTA shall have no liability to a Proposer with respect to the disclosure of any information, including confidential information, subject to an order by a court of competent jurisdiction pursuant to G.S. § 132-9 or any other applicable law.

In accordance with G.S. § 136-28.5, bids and documents submitted in response to an advertisement or this RFP shall not be public record until the NCTA issues a decision to award or not to award the Contract.

I.23 Contractual Obligations

NCTA will not be required to evaluate or consider any additional terms and conditions submitted with a Proposal. This applies to any language appearing in or attached to the document as part of the Proposer's Proposal. By execution and delivery of this RFP and Proposal, the Proposer agrees that any additional terms and conditions or changes to the terms and conditions, whether submitted purposely or inadvertently, shall have no force or effect unless such are specifically accepted by NCTA. Further, all exceptions must be taken in accordance with the instructions set forth in in **Part I, Administrative, Section 3.2 Content of Technical Proposal (H. Proposal Section 6)**.

I.24 Proposer's Bid

By submitting a Proposal to NCTA, the Proposer agrees that the Contractor's Technical Proposal and Price Proposal shall remain effective two hundred and forty (240) Calendar Days after the deadline for submitting the Proposal. If NCTA determines it is in the best interest, NCTA may request that Proposers extend the date through which the Price Proposals are valid. Requests by NCTA for time extensions of Price Proposal validity will not result in change to the prices as stated in the original Price Proposals unless so specified in the request to extend or subsequently agreed to by NCTA in writing.

I.25 Certificate to Transact Business in NC

As a condition of Contract award, each out-of-state Contractor that is a corporation, limited-liability company or limited-liability partnership shall have received, and shall maintain throughout the term of the Contract, a Certificate of Authority to Transact Business in North Carolina from the North Carolina Secretary of State, as required by North Carolina law.

I.26 Disadvantaged, Minority, Women Business Enterprises (Race and Gender Neutral)

I.26.1 Policy

It is the policy of NCTA to comply with NCDOT's Disadvantaged Business Enterprises (DBE) Program and ensure that small businesses have an equal opportunity to compete fairly for and to participate in the performance of contracts financed in whole or in part by federal and state funds. NCDOT sets DBE, Minority Business Enterprises (MBE) and Women Business Enterprises (WBE) utilization goals for all construction projects. This Contract, for goods and services specific to establishing and operating a toll collection system, is not a construction contract and does not contain utilization goals. However, the Contractor is encouraged to give every opportunity to allow DBE/MBE/WBE Subconsultant participation on all contracts and supplemental agreements.

I.26.2 Obligation

In compliance with Title VI, 23 CRF 200, 230, 635, 117(d) and (e) and 49 CFR Parts 21 and 26, the Proposer and Subconsultant shall not discriminate on the basis of race, religion, color, creed, national origin, age, disability or sex in the performance of this Contract. Failure by the Proposer to comply with these requirements is a material breach of this Contract, which will result in the termination of this Contract or such other remedy, as NCTA deems necessary.

I.26.3 Participation

Due to the Scope of Work and Requirements for this Contract, specific goals are not established. However, NCTA encourages the utilization of Small Professional Services Firms (SPSF) Subconsultants and/or suppliers on professional services contracts let by NCDOT. All DBE/MBE and WBE firms currently certified by the NCDOT Unified Certification Program (UCP) automatically qualify as a Small Professional Services Firms.

I.26.4 Listing of Subconsultants or Subcontractors

NCTA encourages the use of Small Professional Services Firms. Small businesses determined to be eligible for participation in the SPSF program are those meeting size standards defined by Small Business Administration (SBA) regulations, 13 CFR Part 121 in Sector 54 under the North American Industrial Classification System (NAICS). The SPSF program is a race, ethnicity, and gender-neutral program designed to increase the availability of contracting opportunities for small businesses on federal, state or locally funded contracts. SPSF participation is not contingent upon the funding source.

The Proposer, at the time of the Technical Proposal Submittal, shall submit a list of all known SPSF that will participate in the performance of the identified Work. The participation of each SPSF shall be submitted on a separate Subconsultant or Subcontractor Form RS-2. In the event the Proposer has no SPSF/Subconsultant or Subcontractor participation, the Proposer shall indicate this on the Subconsultant or Subcontractor Form RS-2 by entering the word 'none' or the number 'zero' and the form shall be signed and submitted with the Technical Proposal. Subconsultant or Subcontractor Form RS-2 is provided in **Exhibit D-2, Forms**. The form may also be accessed on the website at: <https://connect.ncdot.gov/business/Turnpike/Pages/SRTCS.aspx>.

See form instructions for each requirement. For TIP, enter the "Type of Work"; for "Submitted by" enter Subcontractor name and name of person responsible for Subcontractor performance; for "Recommended by" enter name of prime Proposer and person responsible for delivery of Services. See instruction no. 7 on form. **A Subconsultant or Subcontractor Form RS-2 is required for all Subconsultants or Subcontractors whether or not they are considered a SPSF entity.**

I.26.5 Directory of Approved Transportation Firms

For Subconsultants or Subcontractors to be considered for SPSF utilization, a firm must be certified as SPSF and prequalified through North Carolina's Prequalification Unit. Real-time information about firms that are prequalified and approved through North Carolina's Prequalification Unit, is available in the Directory of Firms. The Directory can be accessed at <https://www.ebs.nc.gov/VendorDirectory/default.html>.

I.26.6 Reporting Participation

When payments are made to Subconsultants or Subcontractors, including material suppliers, firms at all levels (Contractor, Subconsultants or Subcontractors) shall provide NCTA's contract administrator (the addressee for invoices under this Contract) with an accounting of said payments. The accounting shall be listed on NCTA's Subcontractor Payment Information Form (Form DBE-IS). In the event the firm has no Subconsultant or Subcontractor participation, the firm shall indicate this on the Form DBE-IS by entering the word 'none' or the number 'zero' and the form shall be signed. Form DBE-IS may be accessed on the NCDOT website at

[https://connect.ncdot.gov/projects/planning/TransPlanManuals/MPO_Contractor%20_Payment_Form\(DB E-IS\).pdf](https://connect.ncdot.gov/projects/planning/TransPlanManuals/MPO_Contractor%20_Payment_Form(DB E-IS).pdf).

A responsible fiscal officer of the payee Firm, or Subconsultant, who can attest to the date and amount of the payments shall certify that the accounting is correct on the Form DBE-IS by affixing his/her signature. This information shall be submitted as part of the requests for payments made to NCTA.

I.27 Federal Aid Requirements

Due to the potential of Federal Aid in development of various portions of NCTA Roadside Toll Collection Systems, NCTA has provided related instructions and information in the Appendices to this Request for Proposals. Proposers shall also include the appropriate completed Non-Collusion Forms provided in **Exhibit D-9, Forms** in Proposal Section 7.

Additionally, the FHWA's Buy America policies require a domestic manufacturing process for all steel or iron products that are permanently incorporated in a Federal-Aid highway construction project.

I.28 Insurance Requirements

The Contractor, at all times during the Term of this Agreement, shall maintain the ability to secure insurance in such form as is satisfactory to NCTA, and will furnish NCTA with continuing evidence of insurance viability as provided below. Insurance must be secured according to Task Orders executed within this Contract. With respect to any insurance policy required pursuant to this Agreement, all such policies shall be issued by companies licensed to do business in the State of North Carolina and all such insurance shall meet all laws of the State of North Carolina. The Contractor shall at all times comply with the terms of such insurance policies, and all requirements of the insurer under any such insurance policies, except as they may conflict with existing North Carolina laws or this Contract.

NCTA shall be named as an "additional insured" on all applicable coverage. The Contractor shall provide NCTA with certificates issued by the insurer showing the required coverage to be in effect and showing NCTA to be an additional insured. Such policies shall provide that the insurance is not cancelable except upon thirty (30) Calendar Days prior written Notice to NCTA. The certificates and policies shall provide that in the event of any material change in or cancellation of the policies reflecting the required coverage, thirty (30) Calendar Days advance Notice shall be given to NCTA or as provided in accordance with North Carolina law. Material change includes but is not limited to change in limits, coverage, or status of the policy. Copies of all insurance policies and endorsements shall be provided to NCTA upon request.

NCTA reserves the right to review all insurance coverage and amounts of insurance coverage on an annual basis and to require the Contractor to adjust the insurance coverage and amounts of insurance coverage based on industry standards for contracts of this size and type. Contractor shall timely pay all premiums and deductibles when due for all insurance coverage required herein.

The Contractor shall not commence any Work until it has obtained the following types of insurance, and a certificate of such insurance has been received and Approved by NCTA. Nor shall the Contractor allow any Subcontractor to commence Work until all insurance required of the Subcontractor has been obtained. The Contractor shall provide the required Certificates of Insurance to NCTA within fourteen (14) Calendar Days upon Notice of Award for the initial Technical And Price Proposal submitted to

NCTA. Subsequent Certificates of Insurance shall be provided to NCTA within fourteen (14) Calendar Days after the Task Orders executed within this Contract.

During the term of the Contract, the Contractor at its sole cost and expense shall provide commercial insurance of such type and with such terms and limits as may be reasonably associated with the Contract. As a minimum, the Contractor shall provide and maintain the following coverage and limits in its Technical Proposal and throughout the Contract Term:

1. Worker's Compensation - The Contractor shall provide and maintain Worker's Compensation Insurance, as required by the laws of North Carolina, as well as employer's liability coverage with minimum limits of \$100,000.00, covering all of Contractor's employees who are engaged in any Work under the Contract. If any Work is sublet, the Contractor shall require the Subcontractor to provide the same coverage for any of his employees engaged in any Work under the Contract; and

2. Commercial General Liability Policy - Combined Single Limits: \$1,000,000.00 per person, \$3,000,000.00 per occurrence The Commercial General Liability Policy shall include contractual liability coverage and must be on an "occurrence" basis. A Comprehensive General Liability Policy may be substituted for the Commercial General Liability Policy if the Comprehensive General Liability Policy has been endorsed to insure contractual liability, broad form property damage, and personal injury liability.

3. Business Automobile Liability Policy - To include liability coverage covering all owned, hired and non-owned vehicles used in connection with the Contract. Combined Single Limits: \$1,000,000.00 per person \$3,000,000.00 per occurrence; and

4. Professional Liability Policy- Any other provision herein to the contrary notwithstanding, the Professional Liability Policy must be with a company authorized to do business in the State of North Carolina, affording professional liability coverage for the professional services to be rendered in accordance with this Contract in the amount of at least one million dollars (\$1,000,000). The Contractor shall maintain professional liability coverage for a minimum of three (3) years after completion of the Services rendered under this Contract.

5. Technology Errors & Omissions- The Contractor shall maintain technology errors & omissions liability (or technology professional liability coverage) insurance, covering liability for all professional products and services performed, including liabilities arising from acts, errors or omissions in rendering computer or information technology services including (1) systems analysis (2) systems programming (3) data processing (4) systems integration (5) outsourcing development and design (6) systems design, consulting, development and modification (7) training services relating to computer Software or Hardware (8) management, repair and Maintenance of computer products, networks and systems (9) marketing, selling, servicing, distributing, installing and maintaining computer Hardware or Software (10) data entry, modification, verification, Maintenance, storage, retrieval or preparation of data output with a limit not less than ten million dollars (\$10,000,000) per occurrence. This insurance shall provide coverage for Software copyright liability and contractual liability. Such Technology E&O insurance coverage may be met through or combined with the Professional Liability Insurance referenced in paragraph d; however, if combined then the coverage requirement for Technology E & O insurance shall be equal or greater than the combined aggregate.

6. Cyber Liability Insurance- The Contractor shall maintain Privacy and Network Security (Cyber Liability) insurance covering liability arising from (1) hostile action, or a threat of hostile action, with the intent to affect, alter, copy, corrupt, destroy, disrupt, damage, or provide unauthorized access/unauthorized use of a computer system including exposing or publicizing confidential electronic data or causing electronic data to be inaccessible (2) computer viruses, Trojan horses, disabling codes, trap doors, back doors, time bombs drop-dead devices, worms and any other type of malicious or damaging code (3) dishonest, fraudulent, malicious, or criminal use of a computer system by a person, whether identified or not, and whether acting alone or in collusion with other persons, to affect, alter, copy, corrupt, delete, disrupt, or destroy a computer system or obtain financial benefit for any party or to steal or take electronic data (4) denial of service for which the insured is responsible that results in the degradation of or loss of access to internet or network activities or normal use of a computer system (5) loss of service for which the insured is responsible that results in the inability of a third-party, who is authorized to do so, to gain access to a computer system and conduct normal internet or network activities (6) access to a computer system or computer system resources by an unauthorized person or persons or an authorized person in an unauthorized manner with a limit not less than ten million dollars (\$10,000,000) per occurrence. This insurance shall provide coverage for personal injury (including emotional distress and mental anguish). Such Cyber Liability insurance coverage may be met through or combined with the Professional Liability Insurance referenced in the above paragraph 4 or the Technology Errors and Omissions Insurance referenced in paragraph 5 above; however, if combined then the coverage requirement for Cyber Liability insurance shall be equal or greater than the combined aggregate.

Pertaining to the above paragraphs 4, 5, 6, if coverage is written on a claims made basis, such insurance shall be maintained in force at all times during the term of this Agreement and for a period of three (3) years thereafter for Services completed during the term of this Agreement. Additionally, if a sub-limit applies to any elements of coverage, the policy endorsement evidencing the coverage above must specify the coverage section and the amount of the sub-limit.

Providing and maintaining adequate insurance coverage described herein is a material obligation of the Contractor and is of the essence of this Contract. The limits of coverage under each insurance policy maintained by the Contractor shall not be interpreted as limiting the Contractor's liability and obligations under the Contract.

Subcontractors Insurance: The Contractor shall either require each Subcontractor to obtain and maintain Workers' Compensation Insurance, Commercial General Liability, Business Automobile Liability and Professional Liability coverage similar to those required above in this section for the Contractor, or any other coverage deemed necessary to the successful performance of the Contract, or cover Subcontractors under the Contractor's policies. Such coverage shall be in effect at all times that a Subcontractor is performing Work under the Contract. The Contractor shall have responsibility to enforce Subcontractor compliance with these or similar insurance requirements; however, the Contractor shall upon request provide NCTA acceptable evidenced of insurance for any Subcontractor. The Contractor shall assume all responsibility for risks or casualties of every description, for any and all damage, loss or injury, to persons or property arising out of the nature of the Work, including but not limited to the negligence or failure of its Subcontractors (as well as Contractor's employees) to comply with Contract Documents.

1.29 Prevailing Wages

Contractor shall pay or cause to be paid to applicable workers employed by it or its Subcontractors to perform the Work not less than the prevailing rates of wages, as provided in the statutes and regulations applicable to public work contracts, including the Davis-Bacon Act, and as provided in **Appendix D – Standard Special Provision Minimum Wages**. Contractor shall comply and cause its Subcontractors to comply with all laws pertaining to prevailing wages. For the purpose of applying such laws, the Project shall be treated as a public work paid for in whole or in part with public funds (regardless of whether public funds are actually used to pay for the Project). It is the Contractor's sole responsibility to determine the wage rates required to be paid. In the event rates of wages and benefits change while this Contract is in effect, Contractor shall bear the cost of such changes and shall have no claim against NCTA on account of such changes.

1.30 Work Zone Safety Guidelines

The Constructor and NCDOT have taken steps to maintain a safe and healthy work zone. The Contractor will be working as a NCTA Contractor in the Constructor's work zone and is expected to follow the procedures and guidelines implemented by the Constructor and NCDOT as described in **Part III, Scope of Work and Requirements**, Section 2.10.10 Compliance to Standards and Section 2.10.7 General MOT Requirements and Conditions.

2. Schedule

Below, **Table I-2: Procurement Schedule** provides a planned schedule for this RFP process, listed in the order of occurrence. NCTA reserves the right to change any or all of these dates as it deems necessary or convenient in its discretion. In the event of such a date change, Proposers will be notified in accordance with **Part I, Administrative**, Section 1.7 Information Posting.

Table I-2: Procurement Schedule

Milestone	Date
RFP Issued	January 20, 2023
Mandatory Pre-Proposal Scope of Services Meeting	February 2, 2023 (1:00 p.m. to 2:00 p.m. EDT). <u>Interested parties are required to email the NCTA contact noted in Part I, Administrative, Section 1.6, to register for the meeting.</u> This meeting will be held online via web conference. The meeting may be recorded by NCTA and all attendees must state name so the company may be counted present. See further details below.
Proposer Questions Due	February 17, 2023 (4:00 p.m. EDT)
Proposals (Technical and Price) Due	July 27, 2023 (4:00 p.m. EDT)
Notification of Proposers Shortlisted for Oral Presentations (if selected)	August 18, 2023
Oral Presentations (Proposers to be notified as to the specific schedule within the time period identified)	August 31, 2023 & September 1, 2023
Ranking of Proposers for Negotiations	Week of September 11, 2023
Notice to Proceed / Award of Contracts	End of September 2023

Proposal Due Date: Technical Proposals and Price Proposals will be received by NCTA until the due date and time provided in **Table I-2** above.

Mandatory Pre-Proposal Scope of Services Meeting: NCTA will convene a **MANDATORY** Pre-Proposal **Virtual** Scope of Services meeting for interested firms on the date and time presented in **Table I-2** above. Interested parties are requested to email the NCTA contact noted in **Part I, Administrative**, Section 1.6 Contact Person to receive additional information. NCTA has elected to host the meeting online via web conference only. The purpose of the meeting is to present details of the RFP, discuss the approach to the procurement, and provide attendees with an opportunity to ask questions about the RFP, the procurement approach, or NCTA requirements.

Attendance at the meeting is required for all Proposers who will submit Proposals for the Project.

3. Content of Proposal

3.1 General

Proposals must be submitted in the format, including sections and heading descriptions, as instructed in this Part I, Section 3. To be considered, the Proposal must respond as instructed to all requirements in this Section of the RFP. Proposers must provide complete Technical and Price Proposals, including all Proposal sections, in accordance with the instructions. Omission of any section will render a Proposal

non-responsive and it will not be evaluated. Instructions on the content and form of the Technical and Price Proposals are included in this Section 3 Content of Proposal. Instructions on how to submit the Technical and Price Proposals are provided in Section 4 Submission of Proposal.

All cost data relating to this Price Proposal should be kept separate from and not included in the Technical Proposal Submittal. The Technical Proposal and Price Proposal shall be submitted in two (2) separately sealed Submittals.

3.2 Content of Technical Proposal

Proposals shall be prepared simply and economically, providing a straightforward, concise description of the Proposer's ability to meet the requirements of the RFP. To that end, Technical Proposal Sections 1 through 5 shall be limited to a combined total of 25 pages and Technical Proposal Section 6 shall be limited to a total of 50 pages. Portions of the Proposal that are excluded from these page limitations are shown below in **Table 1-3: Proposal Page Limitations**.

Table I-3: Proposal Page Limitations

Proposal Sections to be Completed by a Proposer	Page Count Limitations
Cover Letter	Up to 2 pages
Executive Summary	Up to 2 pages
Section 1: Firm Qualifications	Limited to a combined total of 25 printed pages (excluding all table of contents, list of tables, or list of figures) and a font of 12 point.
Section 2: Key Team Qualifications	
Section 3: Approach to Scope of Work and Requirements	
Section 4: Approach to Product Roadmap	
Section 5: Approach to Implementation, Operations and Maintenance	
Section 6: Adherence to the Scope of Work and Requirements, Terms and Conditions and Requirements Conformance Matrix	<p>Limited to a total of 50 printed pages (excluding all table of contents, list of tables, list of figures, or Requirements Conformance Matrix) and a font of 12 point.</p> <p>The Proposer shall describe how it will meet the Scope of Work and Requirements using the first section level sub header (e.g. 6.1). for Part III Scope of Work, Sections 3-6.</p>
Section 7: Forms & Submittals	No limitations
Price Proposal	No limitations
Appendix 1: Audited Financial Statements (Two Years)	No limitations
Appendix 2: Preliminary Bill of Materials (BOM)	No limitations
Appendix 3: Sample Reports, Dashboards and analytics	No limitations

The Technical Proposal shall be submitted in the format shown below. The cover sheet for the completed Proposal, provided as **Exhibit D-1, Forms**, shall be included at the front of the Technical Proposal package submitted to NCTA, as directed in this Section 3.2 below. The Technical Proposal criteria below will be used to select Contractor(s). However, Requirements will be provided for each Task Order executed within the Contract and the selection of Contractors to perform work will be based on the Requirements for each Project in accordance with the best interest and sole discretion of NCTA.

Each lettered item designates a specific and separate section to be included in the Proposal:

A. Cover Letter –

The Proposal shall include a cover letter signed by an officer of the firm with signature authority to enter into the proposed Contract with NCTA. This letter should be very brief and provide the corporate commitment that the Proposal meets the scope, schedule, and requirements of the RFP. The letter shall also include the name of the Project Principal and Contractor Project Manager.

B. Executive Summary

The executive summary shall be a brief overview, summarizing the Technical Proposal, and explaining how the Proposal being offered best addresses the evaluation criteria listed in this RFP. Describe your understanding of NCTA's needs and your approach in developing the integration, the coordination with NCTA and other contractors, and how the System's integrity will be protected and enhanced over the life of the Contract. Describe the amount of design and software development anticipated. Identify any Subcontractors and discuss their proposed roles on the Project.

C. Proposal Section I: Firm Qualifications

Provide the following information regarding the Proposer's qualifications, including Subcontractors. Provide the information in the specific format provided below:

1. A brief history and description of the Proposer's organizational structure, including size, number of employees, capability, and area(s) of specialization.
2. A detailed discussion of the Proposer's qualifications and experience related to **Part III, Scope of Work and Requirements** required by this RFP, including Subcontractors' relevant experience in the following areas:
 - a. Completed, in the last five (5) calendar years, at least one (1) project working in AET or Express Lanes with AVI and image-based tolling in North America;
 - b. Developed, operated, and maintained, for at least one (1) active toll project in North America, dynamic pricing algorithms;
 - c. Developed, designed, and implemented, in the last two (2) calendar years, at least one (1) Toll Transaction processing system, and experience with the design, development and implementation of cloud technologies or virtual machine environments.
3. Annual revenues for the firm and for the subsidiary, division or group responsible for a typical Project that will be used to perform this Contract. For the purpose of this RFP, the Contractor shall assume a typical Project will be 10 AET or Express Lanes Toll Zones. However, the actual Task Orders issued within this Contract may vary significantly based on each Project.
4. A copy of the Proposer's audited financial statements for the past two consecutive years as Appendix I to the Proposal and note in your response to this item that it is provided in Appendix I. If a Proposer does not produce audited financial statements, the Proposer shall submit any financial statements that it does have (e.g. lines of credit, statements compiled by an outside accounting firm, etc.) and any other information Proposer feels is pertinent in establishing the financial stability of its business/organization. NCTA reserves

the right to review other publicly available information with regard to the Proposer's financial stability, as part of the evaluation. If a Proposer has questions about what evidence of the Proposer's financial stability will be acceptable to NCTA, the Proposer should communicate with NCTA as set forth in **Part I, Administrative**, Section 1.15 Written Clarifications.

5. A recent Client List using **Exhibit D-3, Forms**, including a detailed description of the size, total dollar value and specific services provided for each client to which the Proposer provided similar services within the past five (5) calendar years. Specify the name, address and telephone number of the individual responsible at the client organization for the supervision of such services. Include in Proposal Section 7 and note in your response to this item that it has been provided in Proposal Section 7.
6. The Proposer Company Reference Forms, Part 1, using **Exhibit D-4, Forms**. Include in Proposal Section 7 and note in your response to this item that it is provided in Proposal Section 7. The completed forms must include at least two (2) references to demonstrate that the Proposer, in combination with its Subcontractors, has successfully developed and delivered at least one dynamically-priced toll project that includes AVI and image-based transactions, toll rate calculation, transaction packaging and processing, and ITS elements and devices such as variable toll message signs and detectors that were also integrated into the system. The Proposer shall have successfully maintained the implemented projects for at least one (1) calendar year. NCTA may or may not conduct reference checks for information provided by Proposers.
7. A detailed statement providing the Proposer background information relative to the following:
 - a. Any criminal felony conviction, or conviction of any crime involving moral turpitude, including, but not limited to fraud, misappropriation or deception, of the Proposer, its officers or directors, or any of its employees or other personnel to provide Services on this Project, of which the Proposer has knowledge or a statement that it is aware of none;
 - b. Any criminal investigation for any offense involving moral turpitude, including, but not limited to fraud, misappropriation, falsification or deception pending against the Proposer of which it has knowledge or a statement it is aware of none;
 - c. Any regulatory sanctions levied against the Proposer or any of its officers, directors or its professional employees expected to provide Services on this Project by any state or federal regulatory agencies within the past three years or a statement that there are none. As used herein, the term "regulatory sanctions" includes the revocation or suspension of any license or certification, the levying of any monetary penalties or fines, and the issuance of any written warnings;
 - d. Any regulatory investigations pending against the Proposer or any of its officers, directors or its professional employees expected to provide Services on this Project by any state or federal regulatory agencies of which the Proposer has knowledge or a statement that there are none;

- e. Any civil litigation, arbitration, proceeding, or judgments pending against the Proposer during the three (3) years preceding submission of its proposal herein or a statement that there are none.

The Proposer’s responses to these requests shall be considered to be continuing representations, and Proposer’s failure to notify NCTA within thirty (30) Calendar Days of any criminal litigation, investigation or proceeding involving the Proposer or its then current officers, directors or persons providing Services under this contract during its term shall constitute a material breach of contract. The provisions of this paragraph shall also apply to any Subcontractor utilized by Proposer to perform Services under this Agreement.

D. Proposal Section 2: Key Team Qualifications

Provide the following information regarding the Proposer’s Key Team qualifications, including Subcontractors. Please number and provide the information in the specific format provided below.

- I. Using **Table I-4** below, identify the following Key Team Personnel on this Project. For Key Personnel positions other than the Project Principal, provide a brief narrative explaining other project commitments the individual may have that would restrict their full availability to the Project and also their expected working location, whether at the NCTA project office or the Project site. The Proposer shall identify a primary point of contact who will be the named person for the Project. The Proposer shall also identify a successor who will serve as a backup in the absence of the primary role, with full authorization of the primary role. The Contractor shall maintain a primary and successor role throughout the Term of the Contract. The successor shall meet the requirements of the Key Personnel, including all onsite requirements, when he/she assumes the primary Key Personnel role. For example, successor will meet all onsite requirements if he/she should become the primary Key Personnel. Please refer to position descriptions in **Part III, Scope of Work and Requirements**, Section 2.1.2 Staffing and Key Personnel. Projects will be in the State of North Carolina.

Table I-4: Key Team Personnel Roles and Commitments

Project Principal:	
Primary	Successor
Contractor Project Manager:	
Primary	Successor
Technical Manager:	

Primary	Successor
Installation/Maintenance Manager:	
Primary	Successor
Quality Assurance Manager:	
Primary	Successor
Test Manager:	
Primary	Successor

2. Describe the experience of each Key Team Member and how it relates specifically to this Project. The resources will be available throughout the Term of the Agreement. Any changes in Key Personnel shall be presented in writing to NCTA for review and approval prior to making such change.
3. Provide resumes (not to exceed two (2) pages per team member), for each of the Key Project Team Members. (Include in Proposal Section 7 and note in your response to this item that it has been provided in Proposal Section 7.)
4. Proposers must complete at least one (1) Key Team References form (Reference Form Part 2) provided in **Exhibit D-5, Forms**, for each Key Team member. (Include in Proposal Section 7 and note in your response to this item that it has been provided in Proposal Section 7.)
5. Complete the List of Subcontractors Form from **Exhibit D-2, Forms**, which includes Subcontractor name, address, Work to be performed, and expected percentage of total Work value to be performed. Also complete the RS-2 Form for each Subcontractor as further instructed in **Part I, Administrative**, Section 1.26.4 Listing of Subconsultants or Subcontractors. Include both the completed list of Subcontractors and the RS-2 Form in Proposal Section 7 and note in your response to this item that they have been provided in Proposal Section 7.

E. Proposal Section 3: Approach to Scope of Work and Requirements

Provide responses to the items below regarding the Proposer's approach to the Scope of Work and Requirements. Please number responses and provide the information in the specific format provided below.

1. Discuss Proposer's technical approach to satisfying all of the Requirements for the RTCS with focus on a commercially available system that has sufficient redundancy and reliability to meet the Requirements. With the aid of drawings, describe how the Proposer's solution will meet the availability Requirements. Drawings shall be provided as an Appendix and not counted towards the Technical Proposal page limitation.
2. Discuss the Proposer's technical approach to providing optimal performance for toll system Equipment while meeting the Performance Requirements as specified in **Part III, Scope of Work and Requirements**. Provide typical Proposer's solution drawings for toll zones equipment layout. Drawings shall be provided as an Appendix and not counted towards the Technical Proposal page limitation. The Contractor shall provide specific drawings for each Project as outlined in each Scope of Work.
3. Discuss the Proposer's approach to meeting all data summarization, data warehouse Requirements as outlined in Sections 4.3.1.4 Data Summarization and 4.3.1.5 Data Warehouse of **Part III- Scope of Work and Requirements**, and External Interfaces and Data Requirements as outlined in Section 4.3.1.6 of the **Part III, Scope of Work and Requirements**.
4. Discuss the Proposer's approach to managing toll rates, fare schedules and fare determination for the Express Lanes implementation to meet Performance Requirements as specified in **Part III, Scope of Work and Requirements**. Please include the following:
 - a. A detailed description of the Dynamic Pricing System features that will be delivered with the RTCS. Include in Proposal Appendix 3 screenshots of graphical user interface (GUI) and provide sample reports. Note: Dynamic Pricing Systems may or may not be included in Task Orders issued on the Contract. However, the Contractor shall describe its functionality and how it will be Proposed on Task Orders or how its Proposed System can operate without it.
 - b. A description of the functionality of the dynamic pricing algorithm, including:
 - i. Identification of the use of different inputs to manage traffic performance in the Express Lanes or AET Lanes, to maintain an acceptable level of service during peak travel periods.
 - ii. A detailed discussion of additional features of time of day and current and future dynamic pricing systems on Express Lanes or AET Lanes and Contractor-provided tools, including:
 - the ability to accurately model performance of Express Lanes and AET Lanes;

- the capability to add roadways to the Express Lanes and AET Lanes network;
 - the ability to monitor and control Travel Time Message Signs and to obtain inputs including data from traffic detectors;
 - the ability to monitor and control TRS and to obtain inputs including data from traffic detectors, and;
 - the flexibility of the module to use static, time of day, and/or dynamic pricing simultaneously on multiple AET Lanes and Express Lanes facilities managed by the Contractor's RTCS solution.
5. Specifically address how the Proposer's RTCS solution and architecture will accommodate changes in technology given anticipated Upgrades, growth, and technology advances during the Contract Term.
 6. Identify all third-party software and vendor with version numbers including operating system, database, security Software, monitoring tools and Software for the Proposer's solution. Also identify other Proposer projects where such Software is deployed and in operations collecting revenue. The Proposer shall also describe any planned changes to third-party software planned during this Contract.
 7. Describe the Contractor's system security compliance with NCDOT IT Communication & Security Policies as described in **Section Error! Reference source not found. and Attachment 2: State of North Carolina, Statewide Information Security Manual** included in **Part III, Scope of Work and Requirements**. The Proposer shall describe its plan and how it continuously monitors security threats and outline its plan to identify, respond, mitigate and recover from any threats. At a minimum, the Proposer shall describe its patching management program including frequency, determination of when and how patches are performed and its change process to evaluate the risk of changes to any Hardware or Software in the RTCS to ensure the RTCS will operate and meet all Requirements throughout the Term of the Contract.
 8. Provide a preliminary bill of materials (BOM) in Proposal Appendix 2 that meets the requirements set forth and described in **Part III, Scope of Work and Requirements for both AET LANES and Express Lanes**. (Note in your response to this item that it has been provided in Proposal Appendix 2). The BOM shall fully match the Equipment and third-party products in the Price Proposal. (Do not include any pricing in this version of the BOM). Identify a second source for each type of Equipment where possible. The Contractor shall provide an updated BOM for each Project with specific components for each Project in the Task Order.
 9. Describe clearly and with the aid of diagrams and flow charts the proposed System transaction processing logic from the initial sensor detection and transaction creation until the Toll Transaction and any related meta data or transactions is posted to the BOS; all updates are made to the Toll Transaction including the timing of such updates and how Toll Transactions are reconciled in the RTCS and between the RTCS and the BOS. Explain

how the Proposer's System processes and frames vehicle transactions. Provide a diagram that identifies framing logic, timing and event processing with specific emphasis on vehicle spacing and the associated Performance Requirements of **Part III, Scope of Work and Requirements**. Details of the System's ability to handle single point of failures within each subsystem and handling of degraded mode operations and their impact on transaction processing and toll revenue shall be explained.

10. Discuss the Proposer's Design approach and tools available for ensuring and confirming:
 - a. That there are no missing Toll Transactions and associated meta data and all vehicles are accurately captured and reported, including during failover from the primary controller to the secondary controller;
 - b. Receipt of all transactions at the TRH;
 - c. Guaranteed successful transmission of all AVI transactions to the CBOS/OBO;
 - d. Guaranteed successful transmission of all image-based transactions and images to the NCTA CBOS/OBO;
 - e. Guaranteed successful transmission of all transactions to the NCTA CBOS/OBO, and;
 - f. That all errors, exceptions, missing, and failed transactions are identified and reported as further set forth in **Part III, Scope of Work and Requirements**.
11. Provide details of the Proposer's solution to the transaction reconciliation and audit process described in **Part III, Scope of Work and Requirements**.
12. Explain the Proposer's solution and the flexibility in the Design to address national interoperability requirements relating to integrating with the E-ZPass approved multiprotocol readers and/or the use of multiprotocol Transponders, modifying and adapting the Design to incorporate new readers, antennas types and locations, and supporting the transition to a new national interoperability solution with limited interruptions to revenue collection. The Proposer shall describe in detail the locations and experience with multiple protocols and the specific configuration in revenue operations that any multiprotocol the Proposer has deployed is in operations collecting revenue.
13. Discuss the Proposer's approach to integrating the NCTA-provided AVI System in order to meet Performance Requirements as further set forth in **Part III, Scope of Work and Requirements**.
 - a. Provide description of experience integrating the Proposer's RTCS solution with the Kapsch Janus MPR II reader using each of the following protocols in a multiprotocol environment:
 - PSI II (TDM/IAG E-ZPass Group)
 - ISOB_80K (SeGo)
 - ISOC (ISO 18000-63/6C)

- b. Describe any logic incorporated into the Proposer's solution to prevent cross lane reads and false reads and to account for multiple Transponders in vehicles.
14. Discuss the Proposer's Automatic Vehicle Detection and Classification (AVDC) system solution for Express Lanes using the use case scenarios as outlined in **Part III, Scope of Work and Requirements**.
15. Discuss the Proposer's response ability to interface with a **NCTA provided CBOS and future OBO** that will support the existing Projects using web services. The Proposer shall use the ICD provided in Attachment 6 NCTA CBOS to RSS ICD-v2 as a reference to discuss how it would integrate to a NCTA provided CBOS/OBO. The Proposer shall describe its approach to integration with API's, testing and validation of such new systems or services. The Proposer shall include API's in its Technical Proposal if available and describe how the Proposer will work with NCTA to transition to future new services or upgrades to existing services.
16. Discuss Proposer's adherence to the Performance Requirements and explain how the Proposer will meet or exceed these Requirements set forth in **Part III, Scope of Work and Requirements**. Provide actual examples, if available, of how each of the Performance Requirements was met or exceeded on similar projects and how the performance was measured. Identify if any Services provided will be performed outside the United States.
17. Discuss Proposer's approach to testing and System Acceptance, as described in **Part III, Scope of Work and Requirements**. Please address:
 - a. Proposer's overall test plan approach;
 - b. Phased approach to testing the lane solutions;
 - c. Plans for Factory Acceptance Test (FAT), including test site location and configuration;
 - d. Approach to Onsite Installation Testing (OIT)
 - e. Approach to Site Installation Test (SIT);
 - f. Approach to Operational Acceptance Test (OAT) of the Project and how the Proposer plans to conduct the accuracy and performance testing within the constraints of live traffic, and;
 - g. Approach to System Acceptance Test (SAT).

F. Proposal Section 4: Approach to Product Roadmap and Quality Assurance

Provide responses to the items below regarding the Proposer's approach the Product Roadmap.

1. Discuss Contractor approach to roadmap including integrations (e.g. SDK), new features and planned product roadmap through the Term of Agreement. The Product roadmap shall describe vision, direction, and priorities of the Product or supporting documents. The Product Roadmap shall describe any additional non-tolling markets that could benefit NCTA or NCDOT in mobility and Transportation systems and networks.
2. The Contractor shall describe its approach to public and private API's available in its products and services available for its product. The Contractor shall describe what services are available at NTP with a written ICD or API available to NCTA or its Partners.

The Vendor shall also describe planned new API's and when the API/ICD will be available to NCTA.

3. The Proposer shall provide its RTCS Product Roadmap and shall describe the product investments or new products expected and timing of any new RTCS roadmaps during the agreement. The Proposer shall describe in detail its current baseline and its planned Roadmap including those features that are included at no additional cost to NCTA in this Contract and for all Task Orders issued by NCTA. The Proposer shall also describe any features or changes in its Roadmap that is planned but will result in additional cost to NCTA.
4. The Proposer shall provide its anticipated schedule for Upgrades, patches and updates, upon which pricing is based. Specifically, address what Software and application Upgrades and updates are included in the Maintenance Services pricing (e.g. operating System and relational database management Systems) and on what frequency. If there is no second source available, the Proposer shall describe its plan to mitigate and provide a second source should the primary Equipment not include any information regarding actual cost or price. If the Equipment is provided by the Contractor, a second source provided by the Contractor is acceptable, the Proposer shall describe how it mitigates risk to NCTA should the Contractor no longer be available to provide that Equipment.
5. The Proposer shall describe the Quality Control Plan and the Firm's procedures and techniques for Quality Control and Quality Assurance in all areas, including development of the System Requirements, functional requirements, business rules and design documentation; hardware procurement; software development; implementation and testing; commissioning; Maintenance and Operations; and trouble ticket tracking. Each Proposer shall specifically address Quality Control (how quality is being ensured) and Quality Assurance (assurance that Quality Control is effectively being performed). NCTA desires that the Proposer include existing company Quality Control Plans and only tailor as required for this Contract.
6. Specifically address the Proposer's approach to coordination of the Design with the Constructor given that the construction of the project is currently underway. Provide examples of similar experience and lessons learned to enhance communication and coordination that will be applied to the benefit of NCTA.
7. The Proposer shall specifically address what elements, such as processes, procedures, communications, meetings, issues tracking, and Quality Control will be in place during the installation process to ensure timely communication and resolution of problems.
8. Provide a The Proposer shall provide a Contractor Organizational Chart that shows planned staffing for all levels of a typical AET and Express Lanes Project. The Contractor Organization chart shall provide a view for its product support and life cycle and a typical project implementation. The Proposer shall only include ONE Contractor Organizational Chart to support Express Lanes and AET Lanes.

G. Proposal Section 5: Approach to Implementation, Operations and Maintenance and Life Cycle Costs

Provide responses to the items below regarding the Proposer's approach to Operations and Maintenance. Please number and provide the information in the specific format provided below.

1. Discuss the Proposer's approach to Maintenance that will meet or exceed all Maintenance Services and warranty requirements as specified in **Part III, Scope of Work and Requirements**.
2. Discuss the installation process and how Proposer intends to meet the installation requirements of **Part III, Scope of Work and Requirements** while meeting the schedule requirements for a typical AET and Express Lanes implementation.
3. Discuss the Plan for coordination with NCTA and Proposer's Operations responsibilities.
4. Discuss the Proposer's training approach for the Proposer's Maintenance staff and for NCTA staff to meet all Requirements.
5. Discuss the Proposer's approach to total life cycle, how product pricing is developed, evaluated and updated and any changes to the pricing in the future for implementation and operations and maintenance of the project.
6. Discuss the Proposer's approach to how its solution provides a low total life cycle costs including minimal preventative and corrective maintenance while meeting all Requirements.
7. Describe the Proposer's technical solution, planned automation levels, staffing approach, and overall approach for image-based transaction processing to ensure that the key performance and accuracy requirements are met or exceeded, as stated in **Part III, Scope of Work and Requirements**.

H. Proposal Section 6: Adherence to the Part III, Scope of Work and Requirements, Terms and Conditions and Requirements Conformance Matrix -

1. The Proposer must complete and submit the Excel version of the Requirements Conformance Matrix which is provided in PDF form in **Exhibit D-6, Forms**. The matrix covers each of the functional and technical requirements set forth in **Part III, Scope of Work and Requirements**. The Excel version of the Requirements Conformance Matrix is attached to the posted PDF of the RFP.
2. Proposers are not to alter the Requirements listed in the Requirements Conformance Matrix in any way and must use the worksheets provided. The Proposer shall submit a PDF version of the completed matrix in this Proposal Section 6, in addition to submitting the Excel version of the matrix on a USB flash drive, as directed in **Part I, Administrative**, Section 4.1 Submission of Technical Proposal.
3. If a Proposer indicates in the Requirements Conformance Matrix that a Technical Requirement is not provided ("N"), the specific Requirement(s) to which exception is taken must also be separately identified and explained in this Proposal Section 6. For each of the "N" items, indicate a description of the exception taken in the comment's column of the Requirements Conformance Matrix and provide a more detailed explanation in this Proposal Section 6, including the Section and Requirement number.

4. The Proposer must submit its Proposal, including the Price Proposal, on the basis of the terms and conditions set out in **Part IV, Terms and Conditions**. NCTA may reject any Proposal that is conditioned on the negotiation of Terms and Conditions set out in **Part IV, Terms and Conditions** or to other provisions of the RFP as specifically identified above.
5. In Proposal Section 6, Proposers may identify and describe any key assumptions made related only to **Part III, Scope of Work and Requirements**. **Part III, Scope of Work and Requirements** assumptions may be considered during the Proposal evaluation process at the sole discretion of NCTA. No assumptions regarding the terms and conditions of the Contract shall be included in the Proposal. An “assumption” is a Proposer’s stated expectation or supposition that would require a change to an RFP term and condition or the addition or deletion of an RFP term and condition.
6. The Proposer must clearly identify any proposed exceptions to the Terms and Conditions in this Proposal Section 6, which will be considered in accordance with **Part I, Administrative**, Section 1.23 Contractual Obligations. The Contractor waives the right to raise new exceptions and alternatives during and after negotiations, however, any details not yet defined in the documents by NCTA may still be negotiated.
7. The Proposer shall use the allotted page count in this section to detail their adherence to the requirements contained in this RFP. Page count does not include Requirements Conformance Matrix.

I. Proposal Section 7: Forms and Submittals –

Proposers shall provide all Proposal forms required to be submitted as part of the RFP in Section 7 of the Proposal, unless otherwise specifically directed. Proposers shall submit properly completed forms that have been provided in **Exhibit D, Forms**. Please refer to **Table I-5** below for a Forms and Submittals checklist. The checklist identifies the location of the form or the Submittal requirement in the RFP and also where the form or Submittal is to be included in the Proposal.

Proposers shall not modify any of the forms unless specifically instructed by NCTA to do so. Completion of forms will be checked during the initial Pass/Fail screening of the submitted Proposals. Proposals not adhering to this requirement may be considered as non-compliant.

Table I-5: Forms and Submittal Checklist

Form #	Form/Submittal Name	Location in RFP	Location of Form/Submittal in Proposal
Forms to be Submitted			
D-1	Proposal Cover Sheet	Exhibit D-1	Technical Proposal Envelope with Original of Proposal
D-2	List of Subcontractors and RS-2 Form	Exhibit D-2	Technical Proposal Section 7
D-3	Recent Client List	Exhibit D-3	Technical Proposal Section 7
D-4	Reference Forms Part 1	Exhibit D-4	Technical Proposal Section 7
D-5	Reference Forms Part 2	Exhibit D-5	Technical Proposal Section 7
D-6	Requirements Conformance Matrix	Exhibit D-6	Technical Proposal Section 6
D-7	Price Proposal Form	Exhibit D-7	Price Proposal Envelope
D-8	Proposer Questions Form	Exhibit D-8	N/A: To be used for submission of Proposer questions to NCTA
D-9	Non-Collusion Forms	Exhibit D-9	Technical Proposal Section 7
D-10	Surety Commitment Letter	Exhibit D-10	Technical Proposal Section 7
D-11	Acknowledgment of Receipt of Addenda	Exhibit D-11	Technical Proposal Section 7
Other Proposal Submittals			
N/A	Resumes	See Part I-3.2	Technical Proposal Section 7
N/A	Contractor Organization Chart	See Part I-3.2	Technical Proposal Section 7

J. Proposal Appendices - The Proposer shall submit the following materials in the form of Proposal Appendices:

- Appendix 1 – Audited Financial Statements (Two Years)
- Appendix 2 – Preliminary Bill of Materials (BOM) that details all Equipment and third-party products provided and will become the basis for the complete, Approved parts list, including spare parts for AET Lanes and Express Lanes.

- Appendix 3 – Sample Reports and Analytics and Dashboards including Data Dictionary or API for analytics products.

4. Submission of Proposal

All Technical and Price Proposals shall be submitted in sealed envelopes or boxes, bearing on the outside the following information, and delivered to the address provided on the front page of this RFP:

Technical or Price Proposal:

STATEWIDE ROADSIDE TOLL COLLECTION SYSTEM

Submitted By:

PROPOSER'S NAME

PROPOSER'S ADDRESS

CITY, STATE, ZIP CODE

PROPOSER'S PHONE NUMBER

4.1 Submission of Technical Proposal

1. **Form of Technical Proposal.** Submit Technical Proposals in printed form and on a USB flash drive.
 - a. The hard copy of the Technical Proposal shall be included in one (1) volume only so that only one (1) three ring binder is required for the Technical Proposal. Proposers may submit Technical Proposal Appendices in a separate volume or volumes, depending upon size of documents and personal preferences.
 - b. On a separate USB flash drive, Proposers shall also submit a redacted electronic copy of the Technical Proposal (Proprietary and Confidential Information Excluded). Any proprietary information identified as confidential and proprietary in accordance with G.S. § 132-1.2 and the Terms and Conditions of this RFP, should be excluded.
 - c. The electronic copy shall be provided in a **searchable (NOT SCANNED)** *.pdf format. All Sections listed in **Table I-3** (Cover Letter, Executive Summary, Proposal Sections 1 – 7, and Appendices) shall be a separate *.pdf file. Any Proposal Exhibits or information prepared either as graphics or with other programs such as scheduling programs shall be viewable in a *.pdf file without any other software required for Proposal review, with the exception of the Conformance Matrix and the Price Proposal, which shall also be provided in Excel. The Excel version of the Requirements Conformance Matrix shall be included on the Technical Proposal USB flash drive.
2. **Page Presentation.** Technical Proposal text shall be single-spaced, a minimum of 12-point Times New Roman font, printed on both sides of the page. Each page header and/or footer should include the Proposer's name and Technical Proposal section, along with page numbers and date of the Proposal. NCTA will not be responsible for reviewing portions of proposals with illegible

text. Headers and footers may be in different size font from that specified but no less than 9 point font.

3. **Number of Copies.** One (1) hard copy and five (5) USB flash drives containing of all portions of the Technical Proposal shall be provided. The copy with the original cover letter and cover sheet should be marked “Original”.
4. **Easy to Read and Cross-Reference.** The Proposers need not duplicate or quote in detail from attached reference materials provided that a summary is included in the technical section and a clear and easy means to locate references to the information is provided. The reference shall include the document name, page number(s) in the document, and paragraph numbers(s) or line number(s) where the referenced information is located. Underlining, boxing, highlighting, etc. that will call attention to referenced information in a manner that will assist in locating it is recommended.
5. **Writing Style.** Proposal Documentation should provide an example of what project design documentation will look like. NCTA prefers economy of words, direct writing, active voice, and minimum of marketing superlatives. NCTA also prefers facts and written evidence with references or data that supports Proposers statements or assertions in the document.
6. **Trade Secrets and Confidential Information.** NCTA is a public agency of the State of North Carolina, subject to the North Carolina Public Records Act, Chapter 132 of the North Carolina General Statutes. NCTA may maintain confidential information, including any designated as trade secrets or otherwise proprietary, only in accordance applicable Federal and State laws or regulations. NCTA, therefore, expects that Proposers will keep confidential information designations to a minimum.

A Proposer, having formed a good faith opinion, upon consultation with legal or other knowledgeable advisors that information submitted may contain a trade secret as defined in G.S. § 66-152 or other information exempted from the North Carolina Public Records Act pursuant to G.S. § 132-1.2, may so designate appropriate portions of its Proposal by marking the top and bottom of pages containing confidential information in boldface type “CONFIDENTIAL.” NCTA, however, may serve only as a custodian of information a Proposer deems confidential. NCTA shall not act as an arbiter or defender of any claims related to assertions of confidential information. If a request is made for disclosure of information submitted, or an action is brought to compel NCTA to disclose information marked confidential pursuant to G.S. § 132-1 et seq. NCTA will notify the affected Proposer of such request or action.

In submitting a Proposal in response to this RFP, a Proposer agrees to: (i) defend its assertions of confidentiality by instituting appropriate legal proceedings, at its own expense and through its counsel, or intervening in an action brought against NCTA to compel disclosure, to defend its assertions of confidentiality; and (ii) hold the State and NCTA, and any officials or employees thereof harmless from any and all damages, costs, and attorney’s fees awarded against the State and NCTA arising out of any such actions. Nothing in this section shall preclude the State or NCTA from participating in the defense of such actions, at its option and expense through its counsel. NCTA shall have no liability to a Proposer with respect to the disclosure of any information, including confidential information, subject to an order by a court of competent jurisdiction pursuant to G.S. § 132-9 or any other applicable law.

In accordance with G.S. § 136-28.5, bids and documents submitted in response to an advertisement or this RFP shall not be public record until the NCTA issues a decision to award or not to award the Contract.

4.2 Price Proposal Content and Format

1. Separate and Sealed: the copies of the Price Proposal shall be submitted in a sealed envelope, separate from the Technical Proposal.
2. Price Proposals shall be submitted using the Price Proposal Workbook included as **Exhibit D-7, Forms**. The Price Proposal submitted in Exhibit D-7 shall be based on Unit Prices for the Scope of Work to meet all Requirements. The Prices shall be the maximum Price for the Term of the Agreement unless NCTA and the Contractor agree in writing due to a material change in Scope of Work.
3. Proposers shall complete the Price Proposal Workbook in accordance with **Exhibit C, Price Proposal Instructions**.
4. One (1) original and one (1) hard copy of the Price Proposal shall be submitted by the Proposer.
5. The original Price Proposal envelope shall be marked "Original". Each copy shall be numbered "Copy 2 of 2".
6. One (1) USB flash drive containing the Price Proposal in electronic format shall be provided. The file format for the electronic copy of the Price Proposal shall be Microsoft Excel and PDF. The USB flash drive containing the Price Proposal shall be clearly labeled with the same nomenclature identified for the outside of the sealed Price Proposal envelope.
7. Proposers shall not include any assumptions in their Price Proposals. If the Proposer includes assumptions in its Price Proposal, NCTA may reject the Proposal. Assumptions should be provided in the manner set forth in this **Part I Administrative**, Section 3.2 Content of Technical Proposal (Proposal Section 6).
8. Any costs for Work that is not provided in the Price Proposal will be assumed as no charge to NCTA.

5. Procurement Evaluation Process

An evaluation and negotiation process will be conducted as set forth in this Section 5 using a Best Value process to allow NCTA to award the Contract to the Proposer(s) providing the Best Value and recognizing that Best Value may result in award to other than the lowest price or highest technically qualified Proposal. By using this method, the overall ranking may be adjusted up or down by the Evaluation Committee when considered with or traded-off against other non-price factors. "Best Value" procurement methods are authorized by G.S. §143-135.9 and in accordance with NCTA Policies and Procedures adopted by the NCTA Board February 18, 2009.

Pursuant to G.S. §143-135.9, the award decision is made based on multiple factors, including: total cost of ownership, meaning the cost of acquiring, operating, maintaining, and supporting a product or service over its projected lifetime; the evaluated technical merit of the Contractor's offer; the Contractor's past

performance; and the evaluated probability of performing the specifications stated in the solicitation on time, with high quality, and in manner that accomplishes the stated business objectives and maintains industry standards compliance. The intent of “Best Value” Information Technology procurement is to enable Contractors to offer and the Agency to select the most appropriate solution to meet the business objectives defined in the solicitation and to keep all parties focused on the desired outcome of procurement.

5.1 Technical Proposal Pass / Fail Screening

In response to this RFP, each Proposer shall submit a Technical Proposal in strict compliance with the Requirements outlined herein. Immediately following the Technical Proposal due date, as detailed in **Table I-2**, an NCTA representative shall validate the completeness of each Technical Proposal, including all Technical Proposal sections, correctly completed forms and required information. Technical Proposals which are incomplete may be rejected. **Note:** Proposers are advised that NCTA is not obligated to ask for, or accept after the Technical Proposal due date, data that is essential for a complete and thorough evaluation of the Technical Proposal.

5.2 Technical Proposal Evaluation

1. The evaluation process will consist of a quantitative scoring and ranking of the Technical Proposals in order to ascertain which Proposer best meets NCTA's needs for the RTCS. The Technical Proposals will be evaluated on their material content and their responsiveness and degree of adherence to **Part III, Scope of Work and Requirements** set forth in this document. The Evaluation Committee will review and evaluate the Technical Proposals and the other related Contract information submitted to ensure that the Proposer understands the **Part III, Scope of Work and Requirements** and has clearly expressed its intent to meet the requirements of the Contract.
2. **Preliminary Technical Scoring.** Following Technical Proposal review, the Evaluation Committee will score the Technical Proposals with maximum potential technical score points for each Technical Proposal as shown in **Table I-6** below.
3. **Oral Presentations and Interviews.** NCTA may invite compliant Proposers to participate in oral presentations and interviews. The oral presentations and interviews and any required demonstrations conducted therein will provide an opportunity for the Evaluation Committee to further its understanding of the Technical Proposals.
4. **Technical Scoring.** The Evaluation Committee will provide a single technical scoring based on Technical Proposal and Oral Presentations. The scoring will consider both the Technical Proposal and the results of the oral presentations and interviews and demonstrations if conducted, with maximum potential technical score points for each Technical Proposal as shown in **Table I-6** below.

5.3 Technical Proposal Scoring

The overall Technical Proposals are scored as shown in **Table I-6** below:

Table I-6: Technical Proposal Elements and Maximum Possible Points Breakdown

Technical Proposal Elements	Maximum Possible Points
Proposal Section 1: Firm Qualifications	5
Proposal Section 2: Key Team Qualifications	5
Proposal Section 3: Approach to Scope of Work and Requirements	20
Proposal Section 4: Approach to Product Roadmap and Quality Assurance	20
Proposal Section 5: Approach to Implementation, Operations and Maintenance	10
Proposal Section 6: Adherence to the Scope of Work and Requirements, Terms and Conditions and Requirements Conformance Matrix	40
Maximum Possible Technical Points	100

5.4 Price Proposals

After compilation of the updated scores for Technical Proposal Scoring following the oral presentations and interviews, the Evaluation Committee will open the sealed Price Proposals only for those Proposals with a technical score that meets the minimum requirement of 70 points or more.

As a Best Value Contract, price will be evaluated based on a combination of anticipated cost to NCTA, the overall quality of the Technical Proposal and the implementation approach. The pricing will also be viewed in terms of any innovation proposed by the bidder as well as the bidder's proven reliability and ability to meet the required performance standards.

5.5 Negotiations and Best and Final Offers (BAFOs)

NCTA reserves the right to negotiate with multiple Proposers concurrently or in serial at its sole discretion that are determined to be in a competitive range based upon the evaluation process described above. NCTA may select none, one, or more than one Proposer. Finalist Proposers may be requested to provide Best and Final Offers (BAFOs) in response. If BAFOs are requested, NCTA will evaluate the BAFOs and adjust its evaluation of the Proposer's respective Proposal accordingly. The BAFO will be based on unit prices as established in the Price Proposal.

6. Award and Execution of Contract

6.1 Notification of Award

Following evaluation and negotiations, NCTA may execute a Contract with one or more successful Proposers. NCTA will notify the successful Proposers in writing via a Notification of Award letter via

email. NCTA will issue an original Contract for execution by the successful Proposer. After the Contract is executed by NCTA, a duplicate copy will be mailed back to the Contractor.

Originals. The original copy will be retained in the NCTA Office. On Federal-Aid projects, a true copy will be sent to the Federal Highway Administration.

Bonding Requirements. The Proposer shall submit a letter from an existing Surety company with the Price Proposal that the Proposer can provide bonding capacity of at least \$20,000,000 for a Project over a 2-year period. The form for this letter is included as **Exhibit D-10, Forms**.

All bid and performance bonds will be handled using the following procedures for each Project. **The Payment and Performance Bonds shall be provided with the Project after the issuance of each Task Order.**

Payment and Performance Bonds:

- a. Successful Proposers will have fourteen (14) Calendar Days after receipt of the Notification of Award for each Project to furnish the performance and payment bonds and insurance. If the successful Proposer NCTA may negotiate with multiple awarded Contractors. The NCTA award of, or continuation of any Contract for or related to its toll RTCS is subject to the availability of funding.
- b. For each Project, the RTCS Contractor shall obtain Contract payment and performance bonds in an amount equal to 100 percent of the Contract Proposal Price for the Implementation Phase and for one year of Operations and Maintenance as further set forth in the paragraphs immediately below. The Operations and Maintenance Phase commence following the completion of the Go-Live.
- c. Bonding must be continuous in that the Operations and Maintenance Bond associated with the Project must be provided prior to the release of the Implementation Phase Bond for that roadway and specific project. The initial bonding level for the Operations and Maintenance Phase shall be provided at 100 percent of Year 1 of Operations and Maintenance. The value of the bond for each year beyond Year 1 shall be in the amount of 100 percent of the estimated Operations and Maintenance Costs for the upcoming Operations and Maintenance Year.

7. Proposer Debrief

Once a Contract has been awarded, all Proposers will be afforded the opportunity for a debriefing with NCTA regarding the relative merits of their Technical and Price Proposal Submittals.

8. Protest Procedure

Each Proposer, by submitting its Proposal, expressly recognizes the limitation on its rights to protest contained herein, expressly waives all other rights and remedies, and agrees that the decision on any protest, as provided herein, shall be final and conclusive. These provisions are included in these RFP documents expressly in consideration for such waiver and agreement by the Proposers. If a Proposer disregards, disputes, or does not follow the exclusive protest remedies set forth in these RFP documents, it shall indemnify, defend, and hold NCTA and NCDOT, and their respective Board members, directors, officials, employees, Agents, representative, and consultants, harmless from and against all liabilities, expenses, costs, fees, and damages incurred or suffered as a result of such Proposer actions. The

submission of a Proposal shall be deemed the Proposer's irrevocable and unconditional agreement with such indemnification obligation.

1. Any request for a protest meeting shall be in writing and filed with the NCTA Executive Director at the address specified below and shall be received within thirty (30) consecutive Calendar Days from the date of the Contract award. Any protest not set forth in writing, including oral objections, is not a protest and shall be null and void.

NCTA Executive Director

1578 Mail Service Center

Raleigh, NC 27699-1578

2. All protests shall include the following: 1) Name and Address of Protestor; 2) RFP Name and date of issuance; 3) Specific reasons for protest; and 4) Supporting exhibits, evidence or documents to support the protest.
3. If the protest does not contain this information or if the Executive Director determines that a meeting would serve no purpose, the Executive Director may, within ten (10) consecutive Calendar Days from the date of receipt of the letter, respond in writing to the Proposer and refuse the protest meeting request.
4. If the protest meeting is granted, the Executive Director shall attempt to schedule the meeting within thirty (30) consecutive Calendar Days after receipt of the letter, or as soon as possible thereafter. Within ten (10) consecutive Calendar Days from the date of the protest meeting, the Executive Director shall respond to the Proposer in writing with the Executive Director's decision.
5. The Executive Director may appoint a designee to act on the Executive Director's behalf with regard to these protest procedures.
6. All Proposals shall be irrevocable until the final administrative and judicial disposition of a protest.

Part II

Defined Terms and Acronyms

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I. Defined Terms

Term	Definition
Acceptance	Approval of a Phase or a test by NCTA, based on meeting certain conditions and test requirements, including Approvals, set forth in Part III, Scope of Work and Requirements and the Agreement.
Addendum or Addenda	A document created to capture any clarification, update, amendment, addition, deletion or modification made to the RFP during the procurement process.
Agreement	Also referred to as the “Contract.” It is the written Contract between NCTA and the respective Contractor covering all parts of this Project.
Agreement Term	The duration of the Agreement, including any authorized renewals and extensions. Also referred to as “Contract Term.”
Amendment	Change in the Agreement executed in writing made by adding, altering, or omitting a certain part or terms.
Appendix	A collection of supplementary material for reference purposes only.
Attachment	Any documentation, appended to this Contract, which does not establish a requirement for Deliverables.
Business Day	A day, excluding NCTA observed Holidays, Saturdays, and Sundays.
Calendar Day	Every day, including weekends and Holidays, beginning at 12:00:00 a.m. and ending at 11:59:59 p.m.
Commercial Back Office System (CBOS)	<p>Customer account management system including all business interfaces to process payments for prepaid accounts, invoice customers, process payments for post-paid customers, and maintain customer accounts. The CBOS also interfaces with Interoperable Agencies in participating programs and to specialized third-party aggregators such as mobile applications, fleet, or commercial drivers.</p> <p>NCTA Provided system that validates transactions received from the Contractor TRH in accordance with the Attachment I: NCTA Business Policies, performs business processes including license plate image review, transaction filtering prior to sending transactions to the CBOS, and determines if the vehicle is part of a toll agency’s prepaid program or if a bill will need to be sent to the registered owner of the vehicle through a post-paid invoicing program. Please refer to OBO for additional information.</p>

Term	Definition
Constructor	The person, firm, corporation or entity undertaking the execution of the civil design, and infrastructure construction for NCTA or NCDOT Projects.
Contract	See “Agreement.”
Contract Documents	<p>All of the documents that make up the Contract, including but not limited to:</p> <ul style="list-style-type: none"> • Executed Agreement, including RFP, all executed RFP Addenda, BAFO, and Amendments; • Part I, Administrative; • Part II, Defined Terms and Acronyms; • Part III, Scope of Work and Requirements, as conformed; • Part IV, Terms and Conditions; • Contractor’s Technical Proposal • Contractor’s Price Proposal • Other Proposer Materials
Contract Term	See “Agreement Term.”
Contractor(s)	The person, firms, corporation or entities undertaking the execution of the Work with whom NCTA has entered into an Agreement.
Deliverable(s)	All Documentation and any items of any nature submitted by the Contractor to the NCTA’s Contractor Project Manager for review and approval pursuant to the terms of this Agreement. See “Submittal.”
Department/Division of Motor Vehicles (DMV)	An authority responsible for motor vehicles registrations and provides ownership data to NCTA for vehicle owner identification. See “NCDMV.”
Equipment	See “Hardware.”
Evaluation Committee	The Committee NCTA will use to evaluate Proposer Materials as described in this RFP, to determine the Best Value Proposer.
Exhibit	A supplement to this Contract that establishes requirements for Deliverables.
Express Lane	A limited access expressway lanes or roadways separated from adjacent general-purpose lanes and employing payment of tolls to manage demand.
Extra Work Orders	Changes resulting in additions or deletions to the type or value of Services provided pursuant to this Agreement as directed by NCTA.

Term	Definition
Go-Live	The date in which live Operations commence. When all Toll Zones on a contract Project are commissioned, and all RTCS systems are sending correct data transmission to and from the NCTA CBOS in full revenue service and successfully collecting revenue at all Toll Zones.
Hardware	An all-inclusive term to mean the Equipment, Hardware, associated peripherals, associated firmware, electrical and other materials and supplies necessary or furnished by the Contractor to provide Services pursuant to the Contract Documents.
Holidays	Days that are designated by NCTA as Holidays for purposes of this Agreement.
Implementation Phase	The phase of the Project, which begins at Implementation Phase Notice to Proceed and ends at Onsite Installation Test, that includes but is not limited to, the System Design, development, installation, Factory Acceptance Test and Operations Installation Test.
Installation and Acceptance Phase	The phase of the Project, which begins at Installation and Acceptance Notice to Proceed and ends at Systems Acceptance. The Installation and Acceptance Phase includes all installation, commissioning, Go-Live and Operations Acceptance Testing and System Acceptance Testing.
Intelligent Transportation System (ITS)	A broad range of diverse technologies, including information processing, communications, control and electronics, which, when applied to our transportation system, can save time, money and lives.
Key Performance Indicators (KPIs)	Technical performance measurements or metrics used to evaluate Contractor performance.
Level I Maintenance	Level I Maintenance is defined as assignment and triage of incidents and issues and reporting and monitoring. Level I Maintenance teams will communicate directly with the Contractor.
Level II Maintenance	Corrective and preventative maintenance that requires minor Software configuration, Equipment replacement and configuration, planned shutdown and minor preventative actions including analysis of log files to ensure that the systems operate in accordance with the Performance Requirements.
Level III Maintenance	Corrective and preventative maintenance for all patch management, Software changes and major changes to the system functionality. Level III Maintenance also includes 24/7 remote support for Level I and II maintenance staff provided by others.

Term	Definition
Liquidated Damages	Damages, whose amount the parties designate during the formation of a contract, for the injured party to collect as compensation upon a specific breach.
Maintenance	Services performed by the Contractor pursuant to Part III, Scope of Work and Requirements . May also be referred to as “Maintenance Services”.
Maintenance Phase	The Project phase which begins upon Go Live. Also known as “Maintenance” and “Operations”.
Maintenance Services	The Maintenance and related Services required to be furnished by the Contractor, pursuant to the Contract Documents. See “Maintenance Phase”.
NCTA Designated Representatives	Person or persons authorized by NCTA to represent NCTA in all dealings with the Contractor.
North Carolina Department of Transportation (NCDOT)	A governmental agency in North Carolina responsible for building, repairing, and operating highways, bridges, and other modes of transportation, including ferries in the U.S. state of North Carolina.
North Carolina Division of Motor Vehicles (NCDMV)	See “Department/Division of Motor Vehicles (DMV).”
North Carolina Turnpike Authority (NCTA)	A Business Unit of NCDOT, responsible for supplementing the traditional non-toll transportation system serving the citizens of North Carolina by accelerating the delivery of roadway projects using alternative financing options and facilitating the development, delivery and operation of an integrated, creative system of toll roads.
Notice	A formal communication addressing legal and Contractual matters, not applicable to daily Implementation and Operation and Maintenance communications.
Notice to Proceed (NTP)	The written authorization by NCTA designating the date and time for the Contractor to commence Work. There are two Notice to Proceed phases, an Implementation Phase Notice to Proceed and an Installation and System Acceptance Notice to Proceed.
Operational Back Office (OBO)	<p>The Contractor shall provide Transactions in accordance with the CBOS Interface. Upon Notice from NCTA, the Contractor will post transactions to the NCTA Provided OBO and stop sending the transactions to the CBOS.</p> <p>NCTA Provided system that validates transactions received from the Contractor TRH in accordance with the Attachment I: NCTA Business Policies, performs business processes including license plate image review, transaction filtering prior to sending transactions to the CBOS, and determines if the vehicle is part of a toll</p>

Term	Definition
	agency's prepaid program or if a bill will need to be sent to the registered owner of the vehicle through a post-paid invoicing program.
Operations Phase	Services performed under this Agreement as defined by Task Order, which may include Maintenance, Image Review and Transaction Processing.
Order of Precedence	The order in which Agreement documents control in the event of a conflict or ambiguity in such documents.
Performance Requirements	The required level of performance standards for this Contract as set forth in Part IV, Terms and Conditions and Part III, Scope of Work and Requirements .
Plan(s)	Contractor Deliverable that identifies approach to a particular aspect of the Work submitted for Approval in accordance with Part III, Scope of Work and Requirements .
Price Proposal	Contractor pricing provided in response to this RFP and in accordance with the instructions provided herein.
Project	The total Work set forth in Part III, Scope of Work and Requirements and as further set forth and detailed in the Agreement Documents. When used in the context of a specific Toll Facility, this will be a specific Project that will be contracted to selected providers.
Proposal	See "Proposer Materials."
Proposer	An entity that has submitted Proposer Materials in response to this RFP.
Proposer Materials	Documentation submitted by the Proposer in response to this RFP.
Quality Assurance (QA)	A process which occurs after the final Work product is complete, to ensure the Work was completed as expected and required.
Quality Control (QC)	A process which occurs before a final product is produced or presented, to ensure the Work product is accurate.
Request for Proposal	Also referred to as the "RFP," this document describes the procurement process and provides the scope of services. The RFP forms the basis for the Agreement.
Requirements	Each of the required Work activities in numbered form as set for in Part III, Scope of Work and Requirements that the Contractor shall perform, including but not limited to technical, functional, Project management, Operations and Maintenance and Performance.

Term	Definition
Requirements Traceability Matrix (RTM)	The structured collection of information that summarizes the requirements of the RTCS submitted by the Contractor for Approval by NCTA and that serves to track completion of Design, development and testing as further described in Part III, Scope of Work and Requirements .
Roadside System (RSS)	Detects and captures Toll Transactions and helps to identify the vehicle using the toll facilities. The RSS has Roadside Equipment (RSE) that is used to provide information about the vehicle to collect tolls in the operation's back office and CBO. Currently, RSS is made up of in lane technologies that capture Radio Frequency Identification (RFID) by way of a Transponder affixed to the vehicle for prepaid account holders and license plate images by way of cameras as the method of identifying customers without prepaid accounts – this latter method also serves as a backstop when RFID does not work, and is used for toll collection enforcement.
Services	The duties and obligations undertaken by the Contractor to fulfill, the Part III, Scope of Work and Requirements , terms and conditions of the Agreement.
Software	All computer programs, media, procedures, rules and associated Documentation pertaining to the control and operation of the data processing and data storage for the System, as further set forth in Part III, Scope of Work and Requirements . Software includes all associated features and functions described in Part III, Scope of Work and Requirements , including all Updates, derivative works, enhancements, modifications or Upgrades thereto, and all error corrections, patches and bug fixes provided by the Contractor and which is made part of the System, as well as all related or ancillary data files, modules, libraries, tutorial and demonstration programs, and other components thereof, all source and object code, firmware and all Documentation.
Subconsultant	See "Subcontractor".
Subcontractor	Any person, firm or corporation, other than the Contractor's employees, who contracts to furnish labor, or labor and materials, at the Site(s) or in connection with the Services, whether directly or indirectly, on the Contractor's behalf and whether or not in privity with the Contractor. Also referred to as "Subconsultant".
Submittal	See "Deliverable."
System Maintenance	Part of the Contractor-provided support of the Hardware Systems and System Software during the Maintenance Phase.

Term	Definition
Technical Proposal	A Proposer's written response to the RFP, which provides a straightforward, concise description of the Proposer's ability to meet the Requirements of the RFP.
Toll Facility	A collection of Tolling Locations within limits of a roadway or roadway segment.
Toll Zone	A single Tolling Location covering one direction of traffic.
Tolling Location	One or more Toll Zones located in close proximity covering tolling in opposite directions of traffic.
Toll Transaction	ETC or Bill-By-Mail(also known as Image) transaction data that is used to create record of all vehicles and other required ancillary data required to meet all Requirements in this Scope of Work. Toll Transactions shall include all data as required to meet the Scope of Work and transmit all data defined in the CBOS/OBO ICD.
Transponder	In-vehicle radio frequency device, supported by NCTA (e.g. NC Quick Pass) and those of NCTA's interoperability partners, read by the RTCS RF antenna(s) and reader Equipment in in a toll lane.
Transaction Reconciliation Host (TRH)	Receives and records transaction and images from RSS before forwarding to CBOS/OBO. TRH will download TSL files to the RSS and support additional features detailed in the Scope of Work.
Updates	Generally, refers to a patch released for existing Software to fix any identified bugs, errors or security issues; may also include providing support for new Hardware, as well as performance tuning.
Upgrade	Generally, refers to transforming existing Software to a new version; provides new features and functionalities rather than fixing existing bugs, errors or security issues but does not include significant new functionality.
Work	See "Services."

2. Acronyms

Acronym	Meaning
ACSMS	Access Control and Security Monitoring Systems
AET	All Electronic Tolling Lane Type
AI	Artificial Intelligence
ALPR	Automated License Plate Recognition
AVDC	Automatic Vehicle Detection and Classification
AVI	Automatic Vehicle Identification
AWS	Amazon Web Services

Acronym	Meaning
BOM	Bill of Materials
CAD	Computer Aided Design
CBOS	Commercial Back Office System
CCTV	Closed Circuit Television
CEMS	Critical Environmental Monitoring System
COTS	Commercial-Off-The-Shelf
CSC	Customer Service Center
CSWRD	Conformed Scope of Work and Requirements Documents
DB	Database
DMS	Dynamic Message Sign
DP	Disaster Recovery
DPS	Dynamic Pricing System
DVAS	Digital Video Audit System
DW	Data Warehousing
EL	Express Lanes
ERD	Entity Relationship Management
ETC	Electronic Toll Collection
ETL	Extract, Transform, and Load
FAT	Factory Acceptance Test
FHWA	Federal Highway Administration
FIFO	First-In/First-Out
FPSL	Full Plate Status List
FTSL	Full Transponder Status List
GDP	Google Data Platform
GP	General Purpose
GUI	Graphical User Interface
HOV	High Occupancy Vehicle
HVAC	Heating, Ventilation, and Air Conditioning
IAG	Inter-Agency Group (E-ZPass governing group)
ICD	Interface Control Document
ICPS	Image Capture and Processing System
IEEE	Institute of Electrical and Electronics Engineers
IP	Internet Protocol
ISP	Internet Service Providers
ITP	Interface Test Plan
ITS	Intelligent Transportation Systems
ITSL	Incremental Transponder Status List
ITSM	IT Service Management

Acronym	Meaning
IVS	Image Verification Services
KPI	Key Performance Indicator
LAN	Local Area Network
LC	Lane Controller
LOV	Low Occupancy Vehicle
MAN	Metro Area Network
MIR	Manual Image Review
ML	Machine Learning
MMFO	Multi-Mode Fiber Optic
MOT	Maintenance of Traffic
MPR	Multi-Protocol Reader
MRTMC	Metrolina Regional Transportation Management Center
MTBF	Mean Time Between Failure
MTP	Master Test Plan
MUTCD	Manual on Uniform Traffic Control Devices
MVD	Microwave Vehicle Detection
NC	North Carolina
NCDIT	North Carolina Department of Information Technology
NCDOT	North Carolina Department of Transportation
NCTA	North Carolina Turnpike Authority
NDA	Non-Disclosure Agreement
NEC	National Electrical Code
NTP	Notice to Proceed
OAT	Operational Acceptance Testing
OBO	Operational Back Office
OCR	Optical Character Recognition
ODBC	Open Database Connectivity
OIT	Onsite Installation Testing
OSHA	Occupational Safety and Health Administration
PDF	Portable Document Format
PDU	Power Distribution Units
PII	Personally, Identifiable Information
PM	Project Manager
PMP	Program Management Plan
QA	Quality Assurance
QC	Quality Control
RDMS	Rapid Data Management System
RF	Radio Frequency

Acronym	Meaning
RFI	Request for Information
RFID	Radio Frequency Identification
RFP	Request for Proposal
ROI	Region of Interest
RSS	Roadside System
RTCS	Roadside Toll Collection System
RTM	Requirements Traceability Matrix
SAT	System Acceptance Test
SDDD	System Detailed Design Document
SFTP	Secure File Transfer Protocol
SHP	State Highway Patrol
SIT	Site Installation Test
SLD	Straight Line Diagram
SMS text	Short Message Service
SNMP	Simple Network Management Protocol
SOV	Single Occupant Vehicles
SOW	Scope of Work
SPD	Surge Protector Devices
SRTCS	Statewide Roadside Toll Collection System
STIP	Statewide Transportation Improvement Project
STOC	Statewide Transportation Operations Center
TL	Tolling Location
TMC	Transportation Management Center
TRS	Toll Rate Sign
TRH	Transaction Reconciliation Host
TSL	Transponder Status List
TTRR	Time to Respond and Repair
UL	Underwriter Laboratory
UPS	Uninterruptible Power Supply
US	United States
USB	Universal Serial Bus
VEL	Violation Enforcement List
VLAN	Virtual Local Area Network
VOD	Vehicle Occupancy Detection
VPN	Virtual Private Network
WAN	Wide Area Network
WBS	Work Breakdown Structure
WWV	Wrong Way Vehicle

Acronym	Meaning
WWVD	Wrong Way Vehicle Detection
ZC	Zone Controller

Part III

Scope of Work and Requirements

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I. Scope of Work Overview

I.1 Roadside Toll Collection System Description

The Roadside Toll Collection System (RTCS) includes two critical components, the Roadside System (RSS), the Transaction Reconciliation Host (TRH) with its supporting subsystems including an interface to the NCTA provided Commercial Back Office System (CBOS) and future Operational Back Office (OBO) provided by others. The RTCS has All Electronic Tolling and Express Lane Types in various lane configurations depending on the project. The RTCS is expected to integrate to the NCTA Operational Back Office (OBO) for the successful transmission of complete Toll Transactions. NCTA desires a future system high-level architecture, as described below, that is coordinated and integrated but loosely coupled so that commercial-off-the-shelf (COTS) products may be Upgraded. The below terminology is intended to identify the various functional components of a toll collection system to provide the Contractor a vision of NCTA's future RTCS.

The RSS detects and captures Toll Transactions and helps identify vehicles traveling on the toll facilities. This RSS has Roadside Equipment (RSE) that is used to provide information about the vehicle to collect tolls in the CBOS/OBO. It is made up of in-lane technologies that capture Radio Frequency Identification (RFID) signals from Transponders affixed to the vehicle for prepaid account holders and technologies that capture license plates, primarily for drivers without a prepaid account. These technologies are also used as a backstop when RFID does not work and as roadside enforcement.

This Transaction Reconciliation Host (TRH) provides transaction processing and reporting, the RTCS interface to the CBOS/OBO and additional features such as image verification processes or Dynamic Pricing as defined for a specific Project. The NCTA provided CBOS/OBO validates the transaction received from the RTCS in accordance with NCTA business policies. It performs business processes including license plate lookup and determines if the vehicle is part of the NC Quick Pass prepaid program or bill the registered owner through a post-paid invoicing program. The CBOS initially and the future the OBO will be the system of record for the transaction records and expected revenue. It shall be a transaction database system for Toll Transactions, license plate number (LPN) images, and all traffic and revenue related data needed to provide reporting separate from the CBOS and RSS. The CBOS/OBO shall support integrations by others for DMV LPN lookups, reports and data streaming tools including artificial intelligence and machine learning (AI/ML) instances provided by others.

After the transition to the OBO, the CBOS receives the transactions transmitted from the OBO. It is the customer account management system that maintains customer accounts and includes all business interfaces to collect payments from customers with and without prepaid accounts and invoice these customers. The CBOS also connects with all external business interfaces to be interoperable with other Toll Operators in participating programs or specialized third-party aggregators such as fleet or commercial drivers.

The ITS provides monitoring and data collection capabilities. It is inclusive of Closed-Circuit Television (CCTV) cameras, Dynamic Message Signs (DMS), Toll Rate Signs (TRS)(Express Lanes Types), and Microwave Vehicle Detectors (MVD). The ITS may be integrated to the RTCS for system health monitoring purposes and to provide traffic data that can be used for travel time and pricing calculation.

I.2 Summary of Scope of Work

The Scope of Work (SOW) involves design, installation, commissioning, and operations and maintenance of the RTCS and ITS for AET and Express Lanes systems. The RTCS is the overall system provided as part of this Agreement and includes the RSS and TRH, which encompasses all toll collection systems functions including dynamic pricing capabilities, as applicable. The ITS components will be included as specified in each Project's Scope of Work.

The Contractor shall be responsible to provide the services detailed in their proposal as they apply to the Scope of Work released as a Task Order for each Project within the term of this Contract.

The RSS shall be located at the tolling locations and shall include, but not be limited to, the following:

- Zone Controller (ZC).
- Automated Vehicle Identification (AVI) system provided by NCTA for integration by the Contractor;
- Image Capture & Processing Systems (ICPS).
- Automatic Vehicle Detection and Classification (AVDC).
- Access Control and Security Monitoring System (ACSMS) for tolling locations and Equipment cabinets;
- Critical Environmental Monitoring System (CEMS) for tolling locations and Equipment cabinets.
- IT Service Management (ITSM) systems (ITSM).
- Additional subsystems detailed in Project specific task orders, such as features to support Express Lanes operations; and
- Supporting electronics, devices, and associated communications Equipment.

The Contractor TRH is expected to include the following:

- Redundant toll host system (including transaction processing, reporting, image verification services, and automated image processing) expandable to other NCTA facilities in the future if NCTA decides to consolidate or move any of its facilities;
- Interfaces for all applicable external elements
- Integrated Digital Video Audit System (DVAS);
- TRH for Toll Transactions.
- Audit application for transaction reconciliation.
- Operations reports, analytics and dashboards.
- IT Service Management systems (ITSM).
- All required local wide area (LAN), and wide area networks (WAN), and;
- Critical Environmental Monitoring System (CEMS).

The ITS shall include the following:

- Integration of Closed-Circuit Television (CCTV) cameras used for monitoring of toll rate messages, Dynamic Message Signs (DMS) used for travel time messages, Toll Rate Signs (TRS), and Microwave Vehicle Detectors (MVD) to the RTCS;
- Traffic data collection process to be used by the DPS algorithm for pricing determination and post travel time and pricing messages on the DMS and the TRS, and;
- Traffic data monitoring and reporting.

The RTCS procured under this Contract **does not** include:

- Operational Back Office (OBO)
- Customer Service Center facilities or associated staffing.
- Commercial Back Office System (CBOS).
- Transponders.
- Construction of the gantries, toll Equipment pads, conduit, line power, pavement and other Toll Zone infrastructure at the RTCS tolling points;

Contractor shall coordinate its RTCS and NCTA CBOS/OBO design, delivery and operations and maintenance, as defined by Task Order.

The Contractor shall coordinate with NCTA and the Design-Build Team (the “Constructor”), for all RTCS construction-related activities anticipated for the RTCS Project(s). The Contractor shall provide RTCS design specifications to the Constructor and shall be required to review the engineering design, provide feedback, and identify potential impacts to the RTCS installation and performance.

The Contractor shall be responsible for furnishing and mobilizing all required Equipment, facilities, and resources to carry out this SOW and to meet Contract Requirements. These may include but are not limited to:

- a. Mobilization;
- b. Local office space defined as office space in the NCTA specific proximity for a Project;
- c. Installation Equipment storage;
- d. Demobilization and remove all site debris;
- e. All permits, licenses, fees, insurance and bonds;
- f. Coordination and cooperation with NCTA, third parties, Constructor, and E-ZPass Group agencies;
- g. Maintenance of Traffic (MOT);
- h. Development and production of documentation,
- i. Design drawings, plans, and schedules;
- j. Training;
- k. Testing; and
- l. Safety.

The Contractor shall conform to NCTA Business Policies found in **Attachment I**. The Requirements intend to permit the Contractor the flexibility in the design and development of the RTCS to reflect innovation and state-of-the-art proven technology that is fully capable of meeting the required operational,

performance, and Contractual Requirements. Further, NCTA intends to provide the Contractor with a set of Performance Requirements, as detailed in **Section 5.3 of Part III, Scope of Work and Requirements**.

2. Roadside Toll Collection System Project, Design, Testing and Implementation Documentation Requirements

2.1 General Documentation Requirements

The Contractor is required to provide various Project, Hardware, Software, Requirements, Design, Testing, Installation, and Maintenance documentation that include Contractor-developed documentation and third-party documentation. All documentation provided under this Contract shall meet the Requirements described below.

1	The Contractor shall use an NCTA-provided online, electronic document management system (such as SharePoint) that is accessible to both NCTA and the Contractor by username and password, to control all project-related documents, submissions, and drawings.
2	The Contractor shall maintain a Deliverable tracking list that accurately tracks all Contractor submissions, NCTA's review comments, resubmissions, and final approval.
3	Each document shall be properly titled, date updated, numbered by revision and version, and shall incorporate signature blocks for authorship and approvals. The Contractor shall provide a logical indexing system making use of documents metadata for ease of access for NCTA to locate documents in the electronic document management system.
4	Updated submissions of the document shall also include the red-lined version showing all revisions to the document since the last submission.
5	The Contractor shall submit a minimum of a preliminary draft, a final draft, and a 100% final to NCTA for review and approval. NCTA will provide new comments in two iterations, provided that the Contractor provides the Deliverables in accordance with the Project Schedule. Additional iterations may be necessary to resolve comments. All final documents shall incorporate all NCTA's review comments to NCTA's satisfaction. Each subsequent submission of a Deliverable shall also include NCTA's comments review log with the resolution of each comment updated by the Contractor.
6	NCTA will review and approve all documents submitted under the Contract. For documents containing less than one hundred (100) pages, NCTA will review and provide comments on preliminary draft documents within ten (10) Business Days. For documents containing more than one hundred (100) pages, NCTA will review and provide comments on preliminary draft documents within fifteen (15) Business Days. NCTA will review and provide comments on all final drafts and final documents within ten (10) Business Days. When multiple documents are submitted to NCTA simultaneously, or within one week of each other, the number of Business Days required for review shall be adjusted to reflect the overlapping submissions.
7	The Contractor shall submit an electronic version of all Contractor-developed documentation for NCTA review and approval unless directed by NCTA to provide hard copies. Acceptable electronic formats are Microsoft Office 365 Suite (or most current version), unsecured PDF and professional CAD applications for Contractor-prepared documentation.

8	The Contractor is required to update documentation as changes occur through the Implementation and Maintenance Phase and shall maintain a document submittals list on the electronic document management site identifying all versions of documents, the date submitted, the nature of changes and provide relevant updates to NCTA as they are published.
9	The documentation package for all submittals as applicable shall include all required electronic media to install, operate, and maintain the RTCS/Deliverable/document being supplied.

2.2 RTCS Project Management Plan

The Contractor shall employ a project management system that is sufficiently detailed to enable NCTA to review and confirm that the Contractor has the necessary management, staff, and controls in place to meet the Requirements of the Contract. This project management system shall be detailed in full in the Project Management Plan, which shall be followed for each Project awarded by Task Order under this Contract.

2.2.1 Program Management

The Program Management Plan describes how the Contractor plans to implement and manage the Project, including staffing, scheduling, and communication procedures for controlling all correspondence, submittals, and other communications between the Contractor and NCTA, and communications with the Constructor, NCDOT and other third-party entities.

10	The Program Management Plan shall, at a minimum, include the following elements:
	a) Project scope and key Deliverables;
	b) a description of the management and organization of the program, an organization chart, identification of key team personnel and their responsibilities, percentage commitment to the Project, task leads for each functional area and location and identification of the resources and key personnel during the Contract to be used in fulfilling the Requirements of the Contract;
	c) Project team (Contractor, Subcontractors, NCTA, NCTA representatives, NCDOT) contact information;
	d) a succession plan for key personnel (All successors should be familiar with the Project and be able to engage in the Project, if necessary, should key personnel no longer be on the project);
	e) a description of the Project planning, documentation and reporting methods to be utilized, both for use within the Contractor’s staff and externally to NCTA and other entities;
	f) a description of the process for communication, escalation, and resolution of project issues with NCTA;
	g) meeting schedules with NCTA and other entities including the form of the meeting;
	h) inclusion of the approved Project Schedule;
	i) a description of the process for reporting, updating and tracking the Project Schedule and Project performance;

	<ul style="list-style-type: none"> j) a description of the coordination process with NCTA, and NCDOT during the tolling facility infrastructure Implementation Phase;
	<ul style="list-style-type: none"> k) a description of the coordination process with NCTA, and NCDOT during the installation drawing review process;
	<ul style="list-style-type: none"> l) approach to change management, consistent with Contract Requirements, including a description of the process for documenting and submitting change requests, the approval process and how the change management approach shall be integrated into daily Project management;
	<ul style="list-style-type: none"> m) approach to document control, including Software NCTA will use to access the documents;
	<ul style="list-style-type: none"> n) approach to risk management;
	<ul style="list-style-type: none"> o) approach to QA and QC;
	<ul style="list-style-type: none"> p) documenting the invoice submission, invoice backup information, verification, and approval process;
	<ul style="list-style-type: none"> q) a section with all approved Project forms including but not limited to, meeting agenda, meeting notes, action items tracking log, monthly progress report, and invoices; and
	<ul style="list-style-type: none"> r) an emergency contact list and succession plan.
11	The Contractor shall identify the tools and products used to manage the Project, including the Software development lifecycle and the internal controls instituted by the Contractor to guarantee successful delivery of the Project.
12	The Contractor shall develop and submit the communication procedures to NCTA for review and approval that address the following, including but not limited to:
	<ul style="list-style-type: none"> a) Correspondence - correspondence shall be identified as to originator and designated receiver and include the form of transmission;
	<ul style="list-style-type: none"> b) Document control - tracking of document versions and changes including naming conventions;
	<ul style="list-style-type: none"> c) Invoices - all invoices shall be submitted with accompanying backup information as required by the Contract and consistent with NCTA processes and invoicing and auditing policies. The Contractor shall work with NCTA to develop the appropriate invoice and back-up materials as a part of the PMP development;
	<ul style="list-style-type: none"> d) Submittals - all submittals shall be delivered as an enclosure to the Contractor's submittal letter. Each submittal letter shall be limited to a single subject or item. The Contractor's letter shall identify the contract number, contract name, and subject of the submittal;
	<ul style="list-style-type: none"> e) Contract Number and Contract Name - all items of correspondence, invoices, submittals and documentation shall contain the contract number and the designated contract name, and;
	<ul style="list-style-type: none"> f) Comments Log - process for validating that all comments provided by NCTA on Contractor Deliverables are successfully addressed.

13	<p>The Contractor shall provide a Requirements Traceability Matrix (RTM) for each Project within 10 Business Days after the issuance of each Task Order unless otherwise agreed to by NCTA and the Contractor in Writing.</p> <p>The RTM shall include, but not limited to:</p> <ul style="list-style-type: none"> a) listing and categorization of all functional and technical Requirements; b) identification of the source of all Requirements; c) additional derived requirements required to verify by inspection, test, demonstration or analysis Requirements for this Contract. d) identification of the design section of the SDDD that addresses the Requirement; and e) identification of the test procedure that addresses the Requirement.
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2.2.2 Staffing and Key Personnel

14	<p>The Contractor is responsible for maintaining and assigning a competent and qualified professional who speaks fluent English to meet the requirements of the Contract.</p>
15	<p>The Contractor shall ensure key personnel is readily accessible to NCTA or their authorized representatives during the Contractor’s performance of this Contract.</p>
16	<p>The Contractor is required to provide sufficient staff at all times to meet the Project Requirements and Contract. The following are designated as key personnel for this Project and are subject to the approval, replacement, and removal requirements of NCTA for key personnel.</p> <ul style="list-style-type: none"> a) Project Principal – responsible for the overall conduct and performance of the Project; oversight of the Project; the performance of the Contractor Project Manager and a point of contact for any escalated project issues that cannot be resolved by the Contractor Project Manager. The Project Principal shall have experience in Express Lanes projects in the last five (5) calendar years. b) Contractor Project Manager – responsible for all daily work, the overall execution and delivery of the Project and the Contractor contact person on the Project. The Contractor Project Manager shall have worked as Project Manager for a minimum of three (3) similar All-Electronic Roadside Toll Collection projects, including an Express Lane project, in the past five (5) calendar years. c) Technical Manager - responsible for the management of all the design, development and implementation of the technology solution and resources related to the RTCS, including the ITS, RSS, and interfaces to a NCTA provided CBOS/OBO. The Technical Manager shall serve as the overall RTCS solution architect, including management of Software development, backlog, on-going Hardware/Software maintenance, Equipment and systems and information security as required to satisfy the requirements of the Contract. The Technical Manager shall be one hundred percent (100%) dedicated to the Project during the design, development, and commissioning of the Project. The Technical Manager shall have worked in an equivalent position for on a minimum of two (2) similar transaction processing projects that include cloud or virtual machine deployments in the last two (2) calendar years.

	<p>d) Installation/Maintenance Manager – responsible for the installation, commissioning, and subsequent Maintenance Services of the RTCS, including ITS, RSS, and interfaces to a NCTA provided CBOS/OBO. The Installation/Maintenance Manager shall work primarily in the applicable project area but shall need to attend regular meetings at the NCTA Raleigh offices and be available in Raleigh or project vicinity Monday through Friday from 8 a.m. eastern to 5 p.m. eastern or additional days or times as required to complete the work. During the installation and maintenance of the Project, the Installation/Maintenance Manager shall be one hundred percent (100%) dedicated to the Project. The Installation/Maintenance Manager shall have worked in an equivalent position on a minimum of two (2) similar transaction processing projects that include cloud or virtual machine deployments in the last two (2) calendar years.</p>
	<p>e) Quality Assurance Manager – responsible for consistent quality throughout the design, development, testing, and implementation of the Project through good QA and QC practices, similar all-electronic roadside toll collection projects, and transaction processing projects in the past five (5) calendar years.</p>
	<p>f) Test Manager – responsible for the overall planning and implementation of the Project’s testing program. The Test Manager shall be one hundred percent (100%) dedicated to the Project during the development of testing plans and procedures and during the testing of the Project. The Test Manager shall have worked in an equivalent position on a minimum of two (2) similar all-electronic roadside toll collection, and transaction processing projects in the past five (5) calendar years.</p>

2.2.3 Cooperation with Other Contractors and Providers

<p>17</p>	<p>The Contractor shall cooperate to the fullest extent with NCTA and NCDOT to ensure the Project Implementation and Maintenance Services do not conflict with or cause any interruption in capability, service or safety issues to the traveling public or customers.</p>
<p>18</p>	<p>The Contractor shall cooperate with the Constructor, NCTA, NCDOT, existing contractors, and external parties, as directed by NCTA, to support any activity related to the RSS Implementation, including but not limited to:</p> <ul style="list-style-type: none"> a) NCTA employees; b) NCTA Designated Representatives; c) other third parties, as directed by NCTA; d) law enforcement; e) inspectors; f) auditors, and; g) all contractors.
<p>19</p>	<p>The Contractor shall cooperate with and immediately notify NCTA of any customer complaints and RTCS defects identified in the toll lanes or facilities that come to the Contractor’s attention during implementation, testing, or maintenance.</p>

20	The Contractor shall provide and maintain a current emergency contact list for NCTA’s use at all times for handling emergencies and escalations. The emergency contact list shall name primary and secondary (multiple secondary contacts as applicable) points of contact for each anticipated emergency type. The emergency contact list shall name the Contractor’s preferred points of contact in order of precedence and shall include, at a minimum, the Contractor’s project manager, installation manager, technical manager, and other support staff. The purpose of the emergency contact list is to ensure the Contractor can be reached outside normal working hours to address urgent matters.
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2.2.4 Monthly Report and Progress Meeting During the Implementation Phase

Monthly project reports and progress meetings shall enable NCTA and the Contractor to monitor the status, progress, and quality of the work performed on the project and to take proactive steps to ensure the successful delivery of the Project.

21	The Contractor shall provide and maintain a schedule for monthly progress meetings at a location designated by NCTA. The meeting shall be scheduled no later than the 20 th day of the following month and shall cover progress up to the 15 th of the current month.
22	No less than five (5) Business Days prior to the meeting, the Contractor shall submit a draft monthly progress report to NCTA for the period covering the previous reporting period. NCTA will review and comment on the progress report prior to or during the meeting.
23	The Contractor shall obtain Updated installation status prior to the monthly meeting and include such Updates in the Project Implementation Schedule which shall be submitted with the monthly progress report
24	The format of the monthly progress report shall be agreed upon as one of the initial project tasks upon NTP and shall be incorporated by the Contractor into the Program Management Plan.
25	<p>The monthly progress report shall include but not be limited to the following items</p> <ul style="list-style-type: none"> a) a summary outlining progress and status, and percentage of work performed for each task as compared to planned activities in the Project Schedule. Comments shall be included where appropriate. The summary shall also identify key milestones met and missed in the period. b) an analysis of all critical path tasks, potential risks associated with the tasks, and proposed contingency/workaround plan to circumvent or mitigate delays to the Project. c) identification of any approved changes to approved milestone dates and approved Project Schedule, clearly noting the details and identifying the Contract Amendment. d) a discussion of schedule compliance and an updated Project Schedule showing current status against the baseline approved Project Schedule. Past due tasks shall be updated, and actual dates shall be recorded for completed tasks. e) construction/installation coordination status; f) an updated action items list that tracks the status of all outstanding action items, activities and issues that need decision/resolution;

	g) an updated Deliverables list showing submission dates, current version, current review status, responsible party, and due date;
	h) a payment request, if applicable. Payment requests must identify the payment milestone, number, and dollar amount. Payment requests shall be made for completed and approved milestone payments only;
	i) a list of change requests (Contractor and NCTA initiated) and their status;
	j) the previous monthly final meeting minutes; and
	k) a six (6) week look-ahead schedule.
26	No more than five (5) Business Days after the meeting, the Contractor shall submit the final monthly progress report and draft meeting minutes for NCTA’s review and approval.

2.2.5 Project Meetings

27	In addition to the monthly progress meeting, weekly or bi-weekly project status meetings, as applicable and approved by NCTA, and other regularly scheduled installation and ad-hoc project meetings shall be required during the course of the Project to address specific Deliverables, work items, maintenance procedures, and issues as they arise.
28	The Contractor shall perform the following tasks related to all meetings, including but not limited to: <ul style="list-style-type: none"> a) develop and coordinate the Project meeting schedule; b) distribute notices of project meetings in accordance with document control requirements; c) prepare the agenda in coordination with NCTA; d) attend the meeting with all required staff in attendance; e) prepare minutes of the meeting and forward them to NCTA within five (5) Business Days after the meeting date; and f) maintain an action item list for each type of meeting, identifying issues that need to be resolved at the project level.

2.2.6 Project Schedule

The Project Schedule is a comprehensive list of Project milestones, activities, and Deliverables, with intended start and finish dates, including a detailed Work Breakdown Structure (WBS) that identifies project tasks down to the work package level and the activities required to complete the work package Deliverables.

29	<p>The Contractor shall provide and maintain a detailed Project Schedule for the Project in Microsoft Project format (Project 365 or above) that lists all project activities and tasks in the Contract, including but not limited to:</p> <ul style="list-style-type: none"> a) requirements; b) design; c) development; d) testing; e) installation; f) transition; and g) deployment and acceptance of the RTCS at the various RSS locations.
30	<p>The Project Schedule shall include coordination with Constructor, NCDOT, existing contractors, and NCTA and shall clearly document all interfacing tasks.</p>
31	<p>The Project Schedule shall identify all milestones and tasks, starting with the NTP through the date of acceptance for the entire duration of the contract.</p>
32	<p>The Project Schedule shall be resource loaded, shall include all draft submissions and review cycles, and shall include all tasks required of NCTA, NCDOT and other contractors with critical tasks.</p>
33	<p>The Project Schedule shall identify all critical path tasks and shall be used to manage the Project.</p>
34	<p>The baseline for the Project Schedule shall be submitted to NCTA for approval ten (10) Business Days after NTP. Once approved, the baseline Project Schedule shall only be modified by Contract Amendment.</p>
35	<p>The Contractor shall maintain status and update the Project Schedule at least once a month, as identified in the requirements for the monthly progress report.</p>
36	<p>The Contractor shall obtain approval from NCTA for any and all changes to the approved Baseline Project Schedule and associated milestones. In accordance with the Contract process for changes and amendments, schedule changes are not considered approved unless an Amendment is executed.</p>

2.3 System Detailed Design Document (SDDD)

NCTA expects the Contractor to propose a baseline product for the RTCS, and that some custom development shall be required. To ensure the design requirements for the RTCS are fully understood by NCTA and the Contractor, a series of requirements and design review steps are specified following a sequential design process or waterfall model, as presented in **Figure 1**.

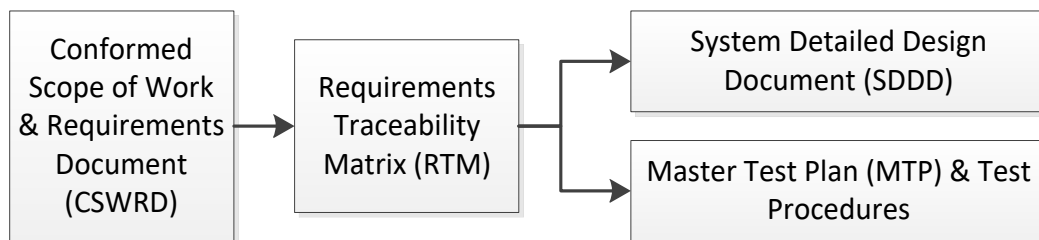


Figure 1: System Design Approach

Requirements derived during the design process shall become part of the Contract Conformed Scope of Work and Requirements Documents (CSWRD) including the Requirements Traceability Matrix (RTM), the System Detailed Design Document (SDDD), and the Master Test Plan (MTP). The RTM allows for verification that the requirements are addressed in the design and documented in the SDDD as well as verification that requirements are traced to test procedures that validate the developed RTCS meets the Contract Requirements. The RTM shall be the basis for all design, development, and testing efforts and documentation to be developed by the Contractor to meet the Requirements set forth in this Contract.

37	The Contractor shall establish and maintain an effective Software design and development program along with a documented Software development life cycle to ensure compliance with the Requirements of the Contract.
38	Prior to conducting any workshops, requirements reviews, focus group meetings, and design reviews, the Contractor shall develop the necessary documentation for NCTA review and submit such documentation ten (10) Business Days prior to such meetings.

2.3.1 System Detailed Design Review

Based on the RTM and Business Policies documents, the Contractor shall design the RTCS and the SDDD for NCTA to review and provide comments. The Contractor shall conduct a review meeting with NCTA demonstrating how the RTCS design shall meet the Contract Requirements. Upon the submittal of an Updated SDDD, one more review cycle shall take place.

39	The NCTA Business Policies for NC Quick Pass and Roadside and the RTM shall be used to develop the SDDD. NCTA will provide the NCTA Business Policies for NC Quick Pass and Roadside within ten (10) Business Days after NTP.
40	The Contractor shall schedule design meetings with NCTA to understand the design requirements fully.
41	The Contractor shall demonstrate pre-production working products (such as beta versions) during the design review process, and stakeholders shall be walked through the workflow, utilizing screens and data flow diagrams.
42	The Contractor shall trace how the RTCS design meets the SDDD, the NCTA Business Policies Document, and the Contract Requirements using the RTM.
43	The RTM shall map all requirements to Contractor documentation and/or testing as applicable.

2.3.2 System Detailed Design Document (SDDD)

44	The Contractor shall develop and submit a System Detailed Design Document (SDDD) that describes the design specifications of all Hardware and Software provided as part of the RTCS to meet the approved Contract Requirements. The SDDD shall demonstrate that the Contractor understands the functional, technical, and Performance Requirements of the RTCS and has the processes, Hardware and Software design in place to provide a high-quality and reliable product that meets the Requirements of the Contract.
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45	The Contractor shall provide detailed drawings of Equipment rack space layout for NCTA review/approval (verification) for consistency with the toll Equipment pad design.
46	The SDDD shall include the use of diagrams, figures, tables, and examples, and it shall apply to all environments, including production, Quality Assurance, training, and testing environments.
47	<p>The SDDD shall include but not be limited to:</p> <ul style="list-style-type: none"> a) System architecture, including overall system design concept; b) lane layout electrical and logic diagrams; c) image-processing details and image review screens; d) dashboard layouts and design; e) the requirements for all peripheral device Interfaces and control; f) roadside server design, including sizing and processing calculations; g) storage system design, including sizing and processing calculations; h) data backup systems design, including sizing and processing calculations; i) network sizing and design details including IP scheme; j) Uninterruptable Power Supply (UPS) sizing information detailing all Equipment on the UPS(s) and their total power requirements; k) high availability design, including servers, storage, network, database, and application; l) Disaster Recovery (DR) design, including servers, storage, network, database, data resiliency, and application. m) business continuity design, including cameras, AVI Equipment, and other associated Equipment near a tolling point in the case of catastrophic damage to the gantry at a damaged Toll Zone; n) Hardware dependencies and inter-dependencies; o) detailed infrastructure Software design, p) detailed operating systems design; q) detailed peripherals configurations, including requirements for all peripheral device Interfaces and control; r) all internal RTCS Interfaces; s) all custom-developed Software; t) all Software provided by the Contractor or a third party; u) Software dependencies and inter-dependencies; v) detailed database design, schema and data modeling, including sizing and processing calculations; w) Entity Relationship Diagram (ERD);

	x) data flow diagrams, state diagrams and data queues;
	y) module level descriptions and interaction among various modules;
	z) detailed description to the module and/or process level for all the functions according to the functional requirements of the RTCS;
	aa) lane logic and vehicle framing design and rules with illustrations;
	bb) degraded mode of operations and impacts of failures on system operations;
	cc) transaction audit and pre-processing;
	dd) transaction processing design, including sizing and processing calculations;
	ee) detailed interface specifications between all Software components;
	ff) design RTCS system interfaces including electronic interface to the NCTA provided CBOS/OBO;
	gg) detailed data management design and processes, including summarization, archiving and purging;
	hh) all user interfaces (including reports and screen formats);
	ii) system data dictionaries;
	jj) application performance monitoring design;
	kk) access/identity security methodology;
	ll) ACSMS layout and interconnections;
	mm) environmental specifications;
	nn) specification sheets for all Equipment;
	oo) a logical division and an index of all contents within the SDDD, and;
	pp) upon the completion of the Software development, and prior to the start of the RTCS formal testing, the Contractor shall submit the final updated SDDD that includes all changes/clarifications made during the Software development and validation activities.
48	The Contractor shall submit an updated SDDD on an annual basis throughout the Contract Term that includes all changes/clarifications made during the just-completed year. The Contractor shall use the approval of System Acceptance as the anniversary date to deliver an SDDD as described above.

2.4 Installation Drawings

Equipment shall be installed on infrastructure and overhead structures/toll gantries that shall be designed and constructed by the Constructor.

49	The Contractor shall provide the installation requirements including acceptable tolerances for the system Equipment, including all related plans and documents. The Contractor shall be fully responsible for the accuracy of its installation requirements.
50	The Contractor shall prepare and submit the RTCS Installation Design Requirements package to NCTA for review in accordance with the approved Project Schedule.
51	The Contractor shall develop a half-size (11” by 17”) set of drawings providing sufficient and accurate detail to install the system components.
52	In addition, the drawing shall contain notes and other detail defining specific processes that cannot be graphically depicted. The notes shall also be used to delineate specifications, tolerances, special conditions, or any other factor required to install and integrate a fully functional system.
53	The Contractor shall indemnify all related parties as more fully described in the Part IV, Terms and Conditions for any damages that result from reliance on the installation requirements provided by the Contractor.
54	The Contractor shall submit shop drawings detailing the installation design that shall be used onsite for installation work. Detailed drawings shall be provided for each site where Equipment procured and supplied under the Contract shall be installed.
55	The drawings shall include but not be limited to the following:
	a) lane Equipment layout for each tolling location type;
	b) placement of the Equipment on the toll gantry;
	c) lane geometry and dimensions of actual size and placement of all roadside Equipment;
	d) Equipment brackets mounting detail to the mounting arm;
	e) a detailed drawing showing the Equipment mounting brackets and details of their installation to the gantry;
	f) specifications and tolerances;
	g) detailed installation drawing for each piece of Equipment;
	h) details related to the range of Equipment adjustments;
	i) conduit and cable schedule showing all conduits, cables, and wires used for each RTCS location;
	j) detailed conduit layout for power and communications;
	k) all junction boxes and panels;
	l) any specific infrastructure limitations (i.e., the proximity of rebar);
	m) placement of overhead sensors;
	n) details describing the termination process for each termination;

	o) lightning and surge suppression system;
	p) a graphical diagram of the network connectivity and data flow;
	q) detailed interconnection diagrams for all systems;
	r) detailed electrical schematics;
	s) detailed communications layout;
	t) Equipment rack layout, including power panels and connection to the UPS;
	u) detailed cabinet/vault/Equipment rack layout and interconnections;
	v) detailed cabinet/vault Equipment rack space requirements;
	w) a detailed diagram of the network connectivity, including IP scheme;
	x) server set-up and configuration;
	y) other Hardware installation and connections; and
	z) floor loading calculations.
56	The Contractor shall use only the latest approved drawing version for installation.
57	The Contractor shall provide the installation requirements for the Equipment, including all related plans and documents. The Contractor shall certify the installation requirements provided as accurate and appropriate for its intended purpose, to the satisfaction and approval of NCTA.
58	During installation, the Contractor shall maintain a redline version of the drawing package that is submitted to NCTA upon the completion of the installation.
59	Documentation shall include memos denoting changes or modifications to Requirements.
60	The Contractor shall submit detailed component level network drawings showing all WAN, LAN and VLAN connections, including connection to the RSS, the TRH, NC Quick Pass Operations Center, MRTMC, NCTA OBO/CBOS and the STOC.
61	The Contractor shall utilize a predefined range of IP addresses provided by NCTA. An IP schematic shall be submitted that shows all the IP addresses for all Contractor supplied Equipment on the network.
62	The Contractor shall submit detailed bill of materials for the TRH including configuration instructions, including storage device mirroring, virtual private clouds, back-up devices and configuration, and network configuration, security provisions, and testing.
63	The Contractor shall submit detailed instructions on the installation and configuration of the operating system, database, third-party Software, and application Software on the servers as customized for NCTA operations.
64	The Contractor shall submit detailed network drawings showing all WAN, LAN and VLAN connections, including all interface connections and IP addresses for all Equipment on the network.

65	All testing required to verify successful installation shall also be documented.
66	The Contractor shall secure the services of a fully qualified engineering design firm(s) for the purpose of performing any necessary infrastructure-related engineering design (civil, structural, electrical, mechanical, and architectural) and the preparation of related plans and documentation under the Contract for any design that impacts life safety. The Contractor shall submit the name of the engineering design firms in its proposal for NCTA approval. Any changes to the engineering firm shall be required by the Contractor.
67	All design work shall be performed under the direct supervision of a licensed engineer of the appropriate discipline in the State of North Carolina. All design professionals shall be licensed and authorized to practice in the State of North Carolina.
68	The Contractor's design submittals shall not be required to be signed / sealed by a licensed engineer. However, should the Contractor provide custom manufactured infrastructure that is structural in nature or other structure(s) or appurtenances (e.g., Equipment mounting brackets, Equipment arms, etc.) that have the potential to impact life safety, the Contractor shall secure the services of a fully-qualified engineering design firm(s) licensed in North Carolina for the purpose of performing engineering design and the preparation of related plans and documentation under the Contract.
69	In addition, any electrical work performed in an occupied building shall require the seal of a licensed engineer of the appropriate discipline in the State of North Carolina.

2.5 Bill of Materials (BOM)

70	The Contractor shall include the Bill of Materials (BOM) for all Equipment and Hardware supplied for the RTCS. The second manufacturer source, if available, for all Equipment and Hardware shall be included with any exceptions noted and explained.
71	Prior to purchase of any Equipment and as part of its design, the Contractor shall submit the final BOM to NCTA for Approval. No Equipment shall be purchased by the Contractor prior to approval of the BOM and the design, unless otherwise authorized in writing by NCTA authorized representative.
72	The Contractor shall provide an initial BOM and Updates to the BOM whenever Equipment and Hardware changes occur and at a minimum on a semi-annual basis over the Contract Term. All Equipment and Hardware changes shall be subject to the approval of NCTA.

2.6 Master Test Plan

73	<p>The Contractor shall provide a Master Test Plan (MTP) no later than sixty (60) Calendar Days after NTP. The Master Test Plan shall also describe how The Contractor shall execute each of the test activities as outlined in these requirements. The MTP shall describe testing planned by the Contractor in each test, entry and exit test criteria, test tools, test roles and responsibilities. The MTP shall include test cases based on the NCTA provider use cases. The test cases shall then be made up of test procedures with step-by-step instructions to verify the use cases. The Contractor shall provide FAT test cases and test procedures with the MTP for NCTA review and approval. The Contractor shall provide test procedures for OIT, SIT, OAT, and SAT at least thirty (30) Calendar Days prior to the start of each respective test.</p>
74	<p>The Master Test Plan shall detail the Contractor’s plan to perform each of the tests in order to satisfy NCTA use cases as described in Attachment 4: Use Cases.</p> <ul style="list-style-type: none"> a) Factory Acceptance Test (FAT); b) Onsite Installation Testing (OIT); c) Site Installation Test (SIT); d) Operations Acceptance Test (OAT); and e) System Acceptance Test (SAT).
75	<p>During each testing in the MTP, the Contractor shall use testing data encompassing at least 24 hours of image-based transactions to demonstrate it can meet the accuracy and timeliness Requirements set forth in this Contract. It is desired that the Contractor captures images from an existing NCTA roadway and use a statistically significant sample size, representative of production, from the data collected for testing purposes in FAT, OIT, SIT. This Requirement shall also be verified by test during the entire duration of each of the OAT and SAT as defined in the MTP. The statistically significant sample shall be proposed to the NCTA for its review and approval in the MTP.</p>
76	<p>The Contractor shall demonstrate its image review process during each test described in the Master Test Plan (using technology and manual image verification) to demonstrate how it shall meet the accuracy and timeliness Requirements during the Maintenance Phase.</p>
77	<p>The Contractor shall demonstrate during the test program the image review process and uses, license plate data, QA and QC processes such as double-blind verification if necessary and demonstrate its efficiencies to confirm it can meet the Performance Requirements set forth in this SOW and Requirements.</p>
78	<p>The Contractor shall plan and execute a baseline test known as Factory Acceptance Test (FAT). The FAT is intended confirm that the use cases as described in Attachment 4: Use Cases, as well as additional use cases and workflows needed to operate the system, are validated using the Contractor baseline system. <u>The definition of the testing required for FAT can be found in Attachment 4: Use Cases.</u> The Contractor shall propose additional use cases in its response to the Proposal to validate that the system can meet all use cases as a <u>baseline functional and working system.</u> The FAT shall be conducted at the Contractor’s test facilities in the continental US.</p>

79	The Contractor shall demonstrate performance of the system with a combination of vehicles and test transactions and simulated data provided by the Contractor. The Contractor shall provide a list of all simulators planned to be used in its Master Test Plan (MTP). The Contractor shall provide access to all test simulators and schedule a workshop at least thirty (30) Calendar Days prior to the start of FAT to demonstrate how the simulator works and validate the inputs, processes and outputs of such simulator prior to its use on the system.
80	For OIT and SIT, NCTA will provide interfaces that to allow both OIT and SIT to be conducted as end-to-end tests with all interfaces tested. NCTA participation in the OIT and SIT end-to-end testing requires all elements of information from the FAT to be available in accordance with the Project Schedule. Any such deviation of this schedule or in complete data may impact NCTA readiness of its interfaces during the OIT or SIT.
81	The Contractor shall plan and execute a baseline test known as Onsite Installation Test. (OIT). The purpose of the OIT is intended to validate that the system meets all use cases as outlined in Attachment 4: Use Cases and proposed by the Contractor in its proposal at a single NCTA-provided facility. <u>The definition of the testing required for OIT can be found in Attachment 4: Use Cases.</u> NCTA and the Contractor may choose to conduct the OIT on additional facilities as mutually agreed and if it benefits both parties. The OIT shall also configure the system to verify that the RTCS can meet all NCTA Business Policies. The Contractor shall propose any exceptions that must be simulated in the MTP.
82	<p>The Contractor shall develop and implement an operations Site Installation Test (SIT). The purpose of the SIT is intended to validate that the system meets all use cases as outlined in Attachment 4: Use Cases and proposed by the Contractor in its proposal at a NCTA provided toll location with the purpose of validating the RTCS in accordance with the Requirements during the transition from the installation to the Operations Phase, as well as demonstrate that the system can perform and meet all Performance Requirements. <u>The definition of the testing required for SIT can be found in Attachment 4: Use Cases.</u></p> <p>The Contractor shall provide additional testing resources that support the transition from the period of 2 weeks prior to Go-Live through a period of 3 weeks after Go-Live of the last commissioned Toll Zone. If there are Priority I issues, the SIT shall continue until NCTA agrees that the Priority I issue is resolved. The SIT commissioning test requires transactions created from the RTCS and post to the CBOS accounts and meets all Performance Requirements. The Contractor shall meet all Performance Requirements whether interfacing to the OBO or CBOS.</p>
83	The Contractor shall plan and execute a baseline test known as Operations Acceptance Test (OAT) immediately following the Go-Live. The purpose of the OAT is intended to validate that the system meets all use cases as outlined in Attachment 4: Use Cases and proposed by the Contractor in its proposal in a NCTA provided facility. <u>The definition of the testing required for OAT can be found in Attachment 4: Use Cases.</u> The OAT shall be conducted on all lane configurations using controlled vehicles and live traffic and meet all requirements as outlined in Section 5.3 of Part III, Scope of Work and Requirements for a period of sixty (60) continuous Calendar Days.

84	The Contractor shall plan and execute a baseline test known as System Acceptance Test (SAT) immediately following NCTA approval of the OAT. The purpose of the SAT is intended to resolve any remaining punch list items, review and fully transition the system to a target operating model and to confirm that the system meets all requirements in accordance with Section 5.3 of Part III, Scope of Work and Requirements for a period of thirty (30) continuous Calendar Days. <u>The definition of the testing required for SAT can be found in Attachment 4: Use Cases.</u>
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2.6.1.1 Interface Test Plan

85	The Contractor shall provide an Interface Test Plan (ITP) no later than thirty (30) Calendar Days after NTP for all external interfaces that shall connect to the NCTA systems. The Interface Test Plan shall describe all testing required to transfer data to NCTA to meet the Requirements set forth in this Contract.
86	The Contractor shall demonstrate data from its RTCS to all external interfaces during FAT. The results from FAT shall be provided in the form of test cases, test procedures and actual test data from its interfaces that NCTA can use for its internal testing. The test cases shall be provided in the ITP and approved by NCTA and should cover, at a minimum: <ul style="list-style-type: none"> a) success testing for normal transaction posting that test NCTA Business Policies; b) failure testing when data fails to be sent or be received from the Contractor system, and; c) exception scenarios that include system behaviors in the NCTA CBOS/OBO ICD that demonstrate error or failure reporting.

2.7 Training Program and Plan

The Contractor shall provide comprehensive training for all aspects of the RTCS, including RSS, TRH, and ITS. The training should include, but not be limited to the operations, system monitoring, problem detection and resolution, reconciliation and audit, and Maintenance of the RTCS. The training program shall recognize and incorporate the plan for NCTA to operate the toll collection system. As such NCTA operations staff shall be fully trained to successfully perform all aspects of the RTCS operations. **The Contractor is required to provide all training documentation including all manuals defined for Level I, Level II, and Level III Maintenance Services. The Contractor shall train NCTA or its designated staff on how to provide Level I, and Level II Maintenance Services.**

87	The Contractor shall develop and submit a Training Plan for NCTA approval in accordance with the approved Project Schedule that describes the approach to training supervisors, auditors, administrators, end-users, maintenance, and support personnel.
88	The Training Plan shall describe the plan for training new personnel and shall outline the required operational/maintenance and system knowledge for each position to be gained from the training.
89	For each position/user type, the plan shall include a training instructor guide, training manual, and other materials to be used in training. The Training Plan also shall include a schedule for follow-up training and continuing education for staff.

90	The Training Plan shall provide a plan for cross-training staff from other areas of operations or management for the peak period, emergency, or temporary assignments to provide for staff redundancy. The Training Plan also shall include the training schedule for regular staff training and continuing education/training.
91	The Training Plan shall address the following areas including but not limited to: <ul style="list-style-type: none"> a) overall description of the training program; b) training techniques; c) training delivery schedule; d) names and descriptions of each training class; e) purpose of each training class; f) who should attend the class; g) qualification requirements for the trainer; h) minimum qualifications for personnel attending the class; i) duration of the class; j) training materials, including syllabus, schedule, training goals, manuals, guides, other support materials and techniques to be used; k) data preparation, such as users and test transactions; l) trainee assessment and scoring methods; m) trainee surveys and feedback; n) required Equipment; and o) facility requirements.
92	Courses shall be limited to a maximum of eight (8) hours per Business Day for NCTA staff trained.
93	The Contractor shall be responsible for maintaining a training database baseline and supporting data files that can be restored at the beginning of each training session.
94	The Contractor shall provide up to 5 separate training modules to address the training needs of NCTA program to support the project. Multiple sessions of some or all modules may be required, based on demand and class size limitations. The Contractor and NCTA will determine specific training modules during the system design. Examples of training modules might be: NCTA Auditor Training, System Overview Training, and TMC Operator Training.
95	The Contractor shall be solely responsible for supplying all items necessary, including but not limited to training documentation, Software, Hardware, and any other Equipment required to complete the delivery of the training program.
96	The Contractor's program shall include but not be limited to instruction, models/devices, manual, diagrams and component manuals and catalogs as required.

97	The Contractor’s training shall be hands on and use actual Hardware and Software in the training environment.
98	The Contractor shall agree that NCTA staff, or their representatives, may attend any training sessions and may make recordings and/or copies of all training program materials for their use in training new employees.

2.8 Manual Requirements

Various manuals shall be provided as described below to allow NCTA to understand the operations of the RTCS, including the RSS and interface to the NCTA provided CBOS/OBO. New manuals developed under this Contract that are not standard commercial catalogs or manuals, shall meet the Requirements set forth in this Section 2.8 of **Part III, Scope of Work and Requirements**.

99	The Contractor shall submit the Project manuals to NCTA for review and approval in accordance with the approved Project Schedule.
100	Each manual shall include, but not be limited to a title sheet; revision history; table of contents; list of illustrations (if applicable); and list of reference drawings and exhibits (if applicable).
101	All manuals shall have a consistent look and feel and shall be professionally written and presented in clear and organized fashion.
102	All manuals prepared for NCTA under this Contract shall be produced, or editable, using Microsoft Office 2019 Suite (our most current version). In addition, electronic copies of manuals shall be provided in native file format and unsecured PDF, if requested by NCTA.
103	Any special Software required to produce scalable typefaces or other graphs shall be provided by the Contractor as part of the documentation for the manuals.

2.8.1 Manual Submissions

104	The Contractor shall submit electronic copies of all manuals listed in Table I: List of Manuals below.
105	All manuals shall be maintained in electronic format in the NCTA-provided document management system.

Table I: List of Manuals

Manual Name
RTCS (includes ITS) Maintenance Manual including any host systems provided by the Contractor
Standard Operating Procedures for Image Review Manual
RTCS Reconciliation and Audit Manual
RTCS (includes ITS) User Manual

2.8.2 RTCS Maintenance Manual

I06	The Contractor shall submit the RTCS Maintenance Manual prepared for properly trained technical personnel assigned to the maintenance of the Hardware and Software installed as part of this Project.
I07	<p>The RTCS Maintenance Manual shall document information required to support roadside maintenance and repair activities, including but not limited to:</p> <ul style="list-style-type: none"> a) RSS Equipment layout for each tolling location type; b) ITS Equipment layout throughout the project; c) schematics and layouts of the Hardware in the cabinets, Equipment racks, and the interconnection diagrams; d) parts lists required to service each piece of Hardware installed under this Project; e) a general and detailed description and concepts of RSS, ITS, and TRH operations and functions; f) detailed RTCS monitoring activities, specialty tools, and schedule; g) detailed Software monitoring activities and troubleshooting procedures; h) maintenance instructions to repair and replace parts and modules; i) mechanical functions and installation of all Hardware; j) listing of all event and error logs; k) testing and basic troubleshooting procedures; and l) preventative, pervasive, and corrective maintenance procedures.
I08	<p>The RTCS Maintenance Manual shall document information required to support including but not limited to:</p> <ul style="list-style-type: none"> a) all dashboards, monitoring screens, notifications and data that needs to be checked; b) listing of all jobs/process, their dependencies, and their schedule; c) listing of all folders and directories that need to be checked; d) details related to the activity that needs to be checked; e) frequency of the validations; f) actions to take when results are not as expected; g) notification and escalation process; h) basic troubleshooting procedures; and i) creation of work orders in ITSM system.
I09	The RTCS Maintenance Manual shall provide a description of the tools and Software for personnel to record the monitoring activity and instructions to use the tools/Software.
I10	The RTCS Maintenance Manual shall document information required to maintain and repair activities including but not limited to:

	a) detailed Hardware maintenance activities and schedule;
	b) detailed database maintenance activities and schedule;
	c) detailed Software monitoring activities and schedule;
	d) detailed monitoring procedures for file transfers and exception handling;
	e) detailed procedures and processes for all maintenance activities;
	f) detailed procedures for backup, archiving and purging of data;
	g) detailed procedures for testing Disaster Recovery systems;
	h) detailed schedule for desktop and peripheral preventive maintenance activities;
	i) the detailed schedule for all preventative maintenance activities;
	j) technical contact lists for all external interfaces and NCTA system integrators;
	k) Large-size logic diagrams and mechanical assembly diagrams do not have to be reduced or incorporated into the manuals if these drawings are provided with the manuals and presented in a useable and durable form;
	l) technical contact lists for Hardware and Software providers; and
	m) details and copies of all third-party system support agreements.
111	Standard service manuals for commercial products used for the Equipment shall be acceptable if they contain sufficient information to service and maintain the Equipment properly. This information shall be included in the RTCS Maintenance Manual.
112	Photographic documentation of Equipment with appropriate labels and callouts are satisfactory if they contain sufficient information to identify components, parts, and features properly.

2.8.3 Standard Operating Procedures for Image Review Manual

113	Standard Operating Procedures (SOPs) shall provide a description of NCTA policies and detailed, step-by-step procedures for every task that the image review personnel must perform in the operation of the RTCS. Screenshots shall be included in the detailed description of the task.
114	Standard Operating Procedures shall integrate the TRH application with the associated manual procedures required to complete each task, including but not limited to:
	a) image review clerk activities;
	b) image review supervisor activities;
	c) image review QA management;
	d) audit and reconciliation; and
	e) operations monitoring.

2.8.4 RTCS Reconciliation and Audit Manual

I15	The Reconciliation and Audit Manual shall detail all procedures used to reconcile the data within RTCS and audit the toll operations.
I16	The reconciliation of transactions and revenue within the RTCS and reconciliation of transactions to the NCTA CBOS shall be fully described.
I17	Investigation of variances, discrepancies, unusual occurrences, and system exceptions processing shall be described.
I18	A detailed description of the screens, reports, and functions shall be provided and shall allow a qualified auditor to access, understand, and work with all financial aspects of the RTCS.
I19	A complete description of all audit procedures and a non-technical description of the screens, reports, and functions shall be provided.
I20	The manual shall contain illustrations and pictorial diagrams to demonstrate the step-by-step operations required for performing the audit and reconciliation functions.
I21	The manual shall contain QC and audit procedures to ensure that the Performance Requirements are met.
I22	Samples of all reports and analytics shall be included in an attachment to the Reconciliation and Audit Manual with any specific instructions that may be applicable to a given report and analytics. Reports and analytics included in the submittal shall have correct and accurate data, and this manual shall be used to train the auditors to validate the RTCS.

2.8.5 RTCS User Manual

The Contractor shall develop and provide a comprehensive set of system documentation and user manuals for the RTCS users. The RTCS User Manual shall include RSS and ITS. At a minimum, the documentation shall include all user and training manuals, screen layouts, reports definitions, and data flow diagrams.

I23	The Contractor shall provide an RTCS User Manual to be used by NCTA staff to operate the RTCS as well as for training purposes.
I24	The Contractor shall develop a separate manual for each job category that details all the processes, procedures, and policies developed by the Contractor and approved by NCTA required to fulfill the requirements of each specific job description.
I25	The manual shall include screen images detailing the step-by-step activities that need to be completed in order to fulfill a specific functionality.
I26	The manual shall not include any information that could jeopardize the integrity of toll operations or the toll collection system.
I27	Each user manual shall include but not be limited to: <ul style="list-style-type: none"> a) step-by-step actions to take to complete an operation; b) screen images detailing the step-by-step activities needed to fulfill a specific functionality; c) flowcharts to provide NCTA staff with a clear understanding of the workflow; d) all screens, reports, and data fields, clearly explained using sample formats applicable to the RTCS; and e) samples of all reports and analytics, included in the manual or as an attachment to the RTCS User Manual, with any specific instructions that may apply to a given report or analytics.

2.8.6 Third-Party Documentation

Third-Party documentation includes standard commercial documentation for third-party provided Hardware, Software, Services, and materials.

128	The Contractor shall catalog all third-party documentation and include the catalog with the third-party document submissions.
129	The Contractor shall provide and maintain the standard, commercially available, Updated documentation for third-party provided Hardware, Software, services, and materials provided under this Contract. This set of third-party documentation shall be retained at the NCTA offices for the duration of this Contract and upon the termination of the Contract.
130	All Updated documents shall show the revisions and include a version of the clean document.
131	An electronic copy of all third-party COTS Hardware and Software installation and user manuals, with Updates, shall be provided to NCTA. Acceptable electronic formats are Microsoft Office 2019 Suite (or most current version), unsecured PDF and professional CAD applications.
132	Documentation shall include sufficient detail to describe the configuration of the Software as it was installed by the Contractor for the RTCS. These should include any customization or modifications made to the Software or configurations specific to the NCTA environments.

2.9 Disaster Recovery Plan

The Disaster Recovery Plan shall be a comprehensive, documented statement of actions to be taken before, during, and after a disaster to protect and recover the information technology data, assets, and facilities of the RTCS.

133	The Contractor shall develop and submit a Disaster Recovery Plan and subsequent Disaster Recovery (DR) procedures that describe the approach, as well as activities and procedures that take place in the event of a disaster for each element of the RTCS.
134	The Disaster Recovery Plan shall document the Contractor's approach to recovering from a disaster, including but not limited to:
	a) events that constitute a disaster and party responsible for the declaration of a disaster;
	b) assessment of disaster risks;
	c) mitigation of disaster risks;
	d) preparations in the event of a disaster;
	e) disaster declaration and DR process to invoke;
	f) organization chart illustrating DR team members, roles and responsibilities;
	g) notification contact list, including contact information;
	h) notification protocol;
	i) sites and Equipment for DR, presented in a diagram format;

	j) DR process initiation and completion checklist;
	k) Software and data replication processes;
	l) detailed logistical processes for activation of DR site and systems;
	m) detailed technical processes for activation of DR site and systems;
	n) detailed procedures for failover and failback of the host including a checklist for ensuring that it failed over and failed back properly;
	o) detailed operational functions for activation of DR site; and
	p) detailed technical processes for reactivation of primary site (or moving to a new primary site if the original primary site is destroyed), operations and systems.
135	The Disaster Recovery Plan shall be tested no less than annually with NCTA participation. The Contractor shall schedule the test no less than twenty (20) Calendar Days prior to the start of the Disaster Recovery Plan test.
136	The Disaster Recovery Plan shall include an emergency response management plan, and the Contractor shall follow the procedures set forth in this plan when an emergency situation is invoked.
137	The Contractor shall respond to any emergency and repair the RTCS, as notified by NCTA or otherwise, that may arise that has already or could potentially damage the RTCS. The Contractor shall be prepared to put forth all necessary resources to divert or correct an emergency condition.
138	Such emergency conditions shall be handled in accordance with the policies and procedures established by NCTA. The following are a few examples of emergency conditions: <ul style="list-style-type: none"> a) weather-related; b) vehicle accident; c) conditions that invoke the Disaster Recovery Plan; d) third-party (power outage or communication failure); e) vandalism that causes parts of the RTCS to be inoperable; and f) detection of security breaches, discovered vulnerabilities and activities that pose a security threat to the toll collection system.

2.10 Installation and Transition Plan

The Contractor shall submit an Installation and Transition Plan that identifies its approach to installation and drawing package submissions, and covers the major elements of the installation, including coordination with Constructor and existing systems. The plan shall also detail the transition of the RTCS into operations.

2.10.1 Installation Program

The Contractor shall have an installation program that addresses all aspects of the installation of the RTCS, inclusive of the RSS and ITS, including all installation design, submissions, and coordination.

139	The Contractor is responsible for the design, procurement, installation, cabling, configuration, check-off, and testing of all Hardware, Equipment, communications, and Software and fixtures provided by the Contractor as part of the RTCS at each of the tolling locations.
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140	The Contractor shall install any RSS servers and Hardware in the cabinets provided by the Constructor and approved by NCTA.
141	The Contractor shall work with NCTA to test the WAN and the connections to the NCTA CBOS/OBO. Testing shall include expected traffic loads and all types of production operation data.

2.10.2 Installation Requirements

142	The Contractor shall develop an Installation Plan that documents all installation-related activities for the project. The Installation Plan shall be the master document from which the elements of the RTCS shall be installed.
143	<p>The Installation Plan shall include and define, at a minimum, the following items:</p> <ul style="list-style-type: none"> a) The installation schedule detailing all activities, shifts, and resources for the installation of the RTCS including third-party and Constructor activities. Once the baseline schedule is approved by NCTA, the Constructor shall provide Updates during the installation periods identifying all schedule changes and work progress in the form of percentage completions shall be submitted to NCTA for approval. b) The minimum resource allocation requirement for any installation and segment including sequencing of Toll Zone and ITS installation, testing and Go-Live. c) How the Contractor manages delivery and staging of the RTCS Equipment to be installed, including any staging, installation, and testing performed by the Contractor or third-party facilities and their subsequent delivery and installation at the production sites. d) The coordination between other contractors, including the Constructor, and service providers. e) Coordination of any travel lane or shoulder lane closures with NCTA and NCDOT Division 10 for the duration of the Project. f) Coordination activities as applicable to other third-party entities for the various interfaces. g) Testing of the Contractor-provided LAN and WAN communications for connection to the NCTA provided CBOS/OBO. h) QC, QA inspection, and testing processes including validation of Contractor installation to the Requirements of the Contract installation drawings. i) The order in which Equipment items are to be installed with estimated durations. j) Special or unique installation requirements.

	k) A detailed component list and a description of how each item version number and serial number shall be recorded for each installation and configuration into the ITSM system.
	l) A record keeping method such as the daily work reports identifying, at a minimum, the date, location, weather conditions, staff on site and classification, tasks completed, visitors, MOT, issues and resolution, and communications to other parties. These daily reports shall be delivered at the end of each work week to NCTA for review during the upcoming week installation meeting.
	m) Contractor Organization Chart defining key team personnel, roles and responsibilities, and contact information. All Subcontractors shall be identified.
	n) Contingency Plan: A detailed contingency plan shall be prepared for reopening closures to public traffic. A general contingency plan shall be included in the Installation Plan; however, a site-specific contingency plan shall be submitted to NCTA before work at the job site begins.

2.10.3 RSS Installation Requirements

144	The Contractor’s installation responsibilities for the RSS shall include but not be limited to:
	a) Furnish and install clean, uninterruptable power to all RSS Equipment on the overhead structures/toll gantries and in the toll Equipment cabinets.
	b) Furnish and install separate ground wires for the RSS, Surge Protection Devices (SPD), junction boxes, pull boxes, conduits, and other such items as required by the installation standards and requirements.
	c) Furnish and install all connecting conduit from wire ways and conduits provided and installed by others and/or stubbed out conduits to the Equipment on the toll gantries. The Constructor shall install the conduits from the toll Equipment pads to the foundation of overhead structures/toll gantries.
	d) Furnish and install all wiring for all in-lane Equipment and connections to the Equipment racks in roadside cabinets. This includes the proper termination of all power, communication, and RF cables and/or wiring (copper or fiber-optic) required to connect the individual components into a fully operational system as specified by the manufacturer.
	e) Furnish, and install the cables necessary for terminating and connecting the RSS Equipment on the toll gantry to the electronics in the Equipment cabinets. Cable lengths shall include sufficient service loops to facilitate maintenance.
	f) Furnish and install all Equipment racks required for the in-lane electronics and toll network communications in the toll Equipment cabinets.
	g) Furnish and install all electronics and other devices in their respective Equipment racks as required to provide a fully operational system.

	h) Furnish and install all Zone Controller computers and other servers (Hardware and Software) into the Equipment racks and test the connection between the Zone Controller, and the NCTA provided CBOS/OBO.
	i) Furnish and install all Equipment mounting brackets to support structures for the installation of all RSS Equipment on the overhead structures/toll gantries.
	j) Furnish and install the AVDC system Equipment, overhead mounted Equipment and controllers as specified by the manufacturer. Includes all NCTA approved materials, Equipment and supplies required to complete the system.
	k) Calibrate and test the AVDC system in full accordance with the manufacturer's guidelines.
	l) Install all NCTA-provided AVI readers on the gantries, in the toll Equipment pads, or at approved NCTA locations.
	m) Install the AVI system Equipment, including antennas, readers, related Equipment, cables, and any support brackets required. All AVI mounting Hardware, junction boxes, and cables shall be procured and supplied by the Contractor.
	n) Time synchronize the new RSS with the AVI system, including the provision of required cables as needed.
	o) Validate all cable and wire terminations via a test process to ensure that the cable is connected to the correct location on each end and that the cable/wire is properly terminated.
	p) Power up and provide a field check out/installation acceptance test of all systems, to be witnessed and approved by NCTA or its Designated Representative. Provide the completed installation checklist as described in this SOW and Requirements.
	q) Furnish and install the ICPS Equipment, including cameras, ICPS illumination, and any video controller Equipment, sensors, Software, controllers/servers, or specialty Equipment associated with the ICPS. Configure and tune the cameras to meet the Performance Requirements of the SOW and Requirements.
	r) Calibrate and test the ICPS in full accordance with the manufacturer's guidelines and to meet the image processing requirements specified in the SOW and Requirements.
	s) Furnish, install, calibrate, and test the DVAS cameras and Equipment.
	t) Integrate, calibrate, and test the toll related ITS elements that are provided by the Contractor to the ITSM system.
	u) Transaction Status Indicator (TSI) HOV indicator beacons for Express Lane facilities.
	v) All other items, materials, and Equipment to complete installation in accordance with the Contract.

2.10.4 Operational Back Office (OBO) Interface Requirements

The Contractor is to interface with a NCTA provided OBO operations identified in this **Part III, Scope of Work and Requirements**. NCTA intends to provide an initial CBOS interface but will transition to a NCTA-provided OBO during the Term of the Contract. The Contractor shall provide design, testing, installation, and transition support services to transition to the NCTA OBO.

145	The Contractor shall integrate to a NCTA provided OBO with Toll Transaction data, DVAS, ITSM, and all images and image services.
146	The Contractor shall transmit all data directly from the RSS and ITS Equipment to the OBO or the Contractor shall provide a on-premises or cloud-based TRH for its systems to serve as an aggregator prior to sending to the NCTA OBO. The Contractor shall describe its architecture in its Technical Proposal.
147	The Contractor shall provide an interface to all elements of the OBO. The Proposer shall include in its Technical Proposal ICD's and other related information on how the Contractor will integrate with the OBO.

2.10.5 Installation Checklists

148	The Contractor shall develop an installation checklist that tracks the progress and completion of all RTCS installation activities for the RSS and ITS systems.
149	The checklist shall be the document detailing those items required for the installation crew and technical team to complete the installation process for all Equipment and components, including terminations, connections, and configurations.
150	A copy of the checklist signed and approved by the Contractor, attesting to the completeness of the installation, shall be provided to NCTA after the completion of the installation activities for each lane at each Tolling Location.
151	The Contractor shall conduct a final inspection of all installations and certify the installation work.
152	NCTA reserves the right to obtain the services of a certified engineer to witness the Contractor inspection and conduct an independent inspection. The Contractor shall coordinate and support such inspections at each tolling location.
153	The checklist shall identify all non-conformances, discrepancies, and exceptions, and the Contractor shall be responsible for all corrections.
154	The checklist shall document all changes identified during the installation process, and all such changes shall be approved by NCTA or its designated representative.

2.10.6 Electrical Work

155	<p>Electrical work to be performed under this Contract shall include, but not be limited to the following general items of work:</p> <ul style="list-style-type: none"> a) Provide and install Surge Protection Devices (SPD) as required to protect all toll collection Equipment and electronics. b) Install junction boxes and terminate new cable and conduit attachment devices, where applicable. c) Bond all conduits, manhole frames, and other conductive items to the grounding system in conformance with the NEC.
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156	All electrical work shall be performed in accordance with the applicable regulations and approved by NCTA and NCDOT. Appropriate NEC compliance shall be adhered to with all electrical articles for installation pertaining to wiring, enclosures, and other electrical Equipment in hazardous locations. UL labels shall be provided for all electrical panel boards, enclosures, and accessories.
157	All electrical Equipment must be inspected prior to installation for defects that could damage the Equipment or harm personnel. Any Equipment found to have defects shall not be installed but shall instead be replaced with a fully functioning replacement.
158	All electrical Equipment shall be properly grounded for safety. Equipment shall be furnished with grounding pads or grounding lugs. All ground connections shall be cleaned immediately prior to connection.
159	The Contractor shall provide all grounding material required for installation of the Contractor Equipment and all installations shall be in compliance with the applicable standards.

2.10.7 General MOT Requirements and Conditions

160	The Contractor shall cooperate with NCTA, NCDOT and the Constructor, as applicable, to minimize the required number of lane closures and to maximize the use of other scheduled lane closures. The Contractor shall transmit all lane closure requests to NCTA for approval.
161	The Contractor shall work with NCTA and agree to a reasonable plan for scheduling and approving lane closures, including a procedure for advance notice of cancellations of lane closures and allowable conditions for such cancellations as described in this SOW and Requirements.
162	Requirement Removed
163	Requirement Removed
164	For all lane closures, the Contractor shall conform to the latest versions of the NCDOT Standard Specifications for Roads and Structures and the NCDOT Roadway Standard Drawings for regulations for MOT activities during the maintenance period. The NCDOT Standard Specifications for Roads and Structures and the NCDOT Roadway Standard Drawings are located at: https://connect.ncdot.gov/resources/Specifications/Pages/default.aspx
165	By 12:00 p.m. Tuesday, the Contractor shall submit to NCTA and NCDOT a written closure schedule that details the schedule of planned closures for the following week period, defined as Sunday 12:00 p.m. through the following Sunday 12:00 p.m.
166	Requirement Removed
167	Requirement Removed
168	The closure schedule request shall show the locations and times of the proposed closures. The closure schedule shall be submitted in the format requested by NCTA and NCDOT and must be made in accordance with NCDOT lane closure requirements and in observation of the lane closure restriction for designated legal holidays. Closure charts for freeway/Express Lane and multilane requirements and the lane closure restriction for designated legal holidays may be obtained upon request from NCTA.

169	Closure schedules requests submitted to NCTA with incomplete or inaccurate information shall be rejected and returned for correction and resubmittal. The Contractor shall be notified by NCTA and/or NCDOT of disapproved closures or closures that require coordination with other parties as a condition of approval.
170	Closure schedule request amendments, including adding additional closures, shall be submitted by 12:00 p.m. to NCTA and NCDOT, in writing, at least three (3) Business Days in advance of a planned closure. Approval of closure schedule amendments shall be at the discretion of NCTA. NCTA will be notified of canceled closures two (2) Business Days before the date of the closure. Closures that are canceled due to unsuitable weather may be rescheduled at the discretion of NCTA.
171	Any work involving removal/relocation of Equipment (both existing Equipment and the Contractor's Equipment), loosening or removal of nuts/screws, cables, connectors, etc., shall be done with appropriate lane closures during a nighttime period or off-peak hours and in accordance with NCTA approved lane closures.
172	If extended lane closures (lane closure exceeding 2 hours) are required, the lane closures shall be completed between the hours of 11:00 P.M. EST and 6:00 A.M. EST, excluding holiday periods as set forth in the lane closure requirements.
173	Lane closures scheduled for less than 2 hours shall be approved by NCTA and NCDOT in accordance with the documentation provided on the website, and shall not occur during peak traffic times, and shall be solely at NCTA's and NCDOT's discretion.

2.10.8 Installation and Construction Coordination and Meetings

The Contractor shall coordinate all installation activities with NCTA to ensure all RTCS Equipment specifications are addressed in the design and installation of all roadway infrastructure. During installation and construction meetings, it shall be required that both NCTA and NCDOT be represented to clearly define and develop the installation requirements, methodology, timetables, test plans, roles, and contingency plans. The Contractor is responsible for coordinating with NCTA any meetings necessary with the Constructor or other NCTA contractors to meet the Requirements of this Contract.

174	The Contractor shall schedule, manage, and attend weekly installation meetings during the active design and installation of the Project and report on the progress of the installation. The Contractor shall identify and communicate any issues regarding system construction and installation immediately upon discovery to the Constructor, NCDOT and NCTA.
175	The Contractor shall ensure that the appropriate personnel is present at these meetings who can represent the Contractor's interest and provide the information necessary in a meaningful manner.
176	Prior to the meeting, the Contractor shall Update the installation schedule based on the construction schedule, and all changes shall be identified.

177	The Contractor shall prepare and distribute a meeting agenda at least forty-eight (48) hours prior to the scheduled meeting. The meeting agenda shall consist of those items pertaining to the installation and schedule for the previous and current week's installation efforts and for an agreed to "look ahead" period. The meeting agenda should include any potential risk items identified and corresponding mitigation efforts.
178	It is the Contractor's responsibility to make sure all issues that arose during the installation activity for the week are addressed and resolved or are scheduled for resolution.
179	At these meetings, the Contractor shall also be prepared to address any issues or questions raised by the Constructor, other contractors, and NCTA or its representatives.
180	The Contractor shall document the meeting discussions and distribute the meeting minutes within one (1) Business Day to everyone from the team invited to the meeting. It shall be up to the recipients of the meeting minutes to distribute to other interested parties. The Contractor shall also record and maintain an action items list that tracks all installation-related issues.
181	The Contractor shall install racks, enclosures, and UPS within the cabinets in accordance with applicable North Carolina State building codes.
182	The Contractor shall adhere to the latest version of the NCDOT Standard Specifications for Roads and Structures, NCDOT Roadway Standard Drawings.

2.10.9 Construction Coordination

The Contractor shall coordinate all installation activities with NCTA, the Constructors, any Subcontractors, and NCDOT to ensure all RTCS Equipment specifications are addressed in the design and installation of all roadway infrastructure.

183	The Contractor shall coordinate all installation activities with NCTA, NCDOT, and the Constructor where applicable.
184	Prior to the start of any installation activities the Contractor, including any Subcontractors, shall complete the safety orientation provided by the Constructor.
185	The Contractor shall participate in the design and installation of the infrastructure on the Roadway, including but not limited to: <ul style="list-style-type: none"> a) review and reach consensus on all toll and ITS Equipment submittals; b) review and reach a consensus of the ITS network design provided by the Constructor; c) support and supply all information requested by the Constructor and civil designer in the form of a Request for Information (RFI); d) review and reach consensus on all Constructor-provided drawings with respect to the RSS; and e) of such drawings related to the RSS.

2.10.10 Compliance to Standards

The Contractor shall adhere to all installation standards, applicable laws, ordinances, and codes as required.

186	<p>The Contractor shall meet all electrical codes, traffic control, seismic considerations, calibration, configuration, and environmental requirements of and including but not limited to:</p> <ul style="list-style-type: none"> a) Equipment manufacturer's; b) National Electrical Code (NEC); c) UL standards; d) NCTA; e) NCDOT; f) FHWA; g) MUTCD; h) IEEE (Institute of Electrical and Electronics Engineers); i) OSHA requirements; and j) any local authorities having jurisdiction.
187	<p>The Contractor shall adhere to the latest NCDOT Roadway Standard Drawings, the latest NCDOT Standard Specifications.</p> <p>The NCDOT Standard Specifications for Roads and Structures and the NCDOT Roadway Standard Drawings are located at: https://connect.ncdot.gov/resources/Specifications/Pages/default.aspx</p>
188	<p>The Contractor shall be responsible for all costs associated with any permits, plan reviews, and inspections related to RTCS work.</p>
189	<p>It shall also be the Contractor's responsibility to procure all documentation required to install and adhere to the proper installation standards, law, ordinance, or codes.</p>
190	<p>The Contractor shall procure services of Subcontractors qualified to work in this industry. If a Contractor's component requires a Contractor-approved installer, the Contractor shall use an approved component installer, including qualified Contractor staff.</p>

2.11 Maintenance Plan

The Contractor shall submit a Maintenance Plan that describes how the Contractor plans to maintain the entire System including Level I, II, and III Maintenance and any required coordination with NCTA and NCDOT in accordance with the Requirements of the Contract. The Contractor shall have appropriate documentation available to all maintenance and Software support personnel, as required to perform their respective duties.

2.11.1.1 Maintenance Plan

191	<p>The Maintenance Plan defines the approach to services, staffing, and resources to fulfill the maintenance requirements. The Maintenance Plan shall include:</p>
	<ul style="list-style-type: none"> a) organizational structure, organizational chart, and job descriptions and responsibilities;

	b) detailed matrix of responsibilities (NCTA and Contractor);
	c) staffing plan;
	d) approach to staffing and training;
	e) detailed system monitoring requirements;
	f) coverage and personnel locations;
	g) third-party system support agreements overview;
	h) schedule of all system maintenance activities;
	i) all system maintenance related communication methods;
	j) maintenance procedures, communication protocols, and approval processes for system and Software Upgrades, scheduled maintenance activities, Software releases, change management and scheduled downtime;
	k) maintenance procedures and communications protocols for unscheduled downtime;
	l) communication protocol for coordination with NCTA operations and third-party entities;
	m) communication protocol for coordination with NCTA’s existing system integrators;
	n) trouble reporting processes;
	o) escalation processes;
	p) spare parts levels and reorder thresholds, Equipment and Software warranty tracking and return material processes;
	q) monitoring the ITSM dashboards;
	r) monitoring maintenance performance for compliance to Performance Requirements;
	s) sample maintenance reports;
	t) Equipment obsolescence/replacement/refresh schedule;
	u) Upgrades to third-party Software and tools;
	v) process in place to meet maintenance Performance Requirements; and
	w) pervasive methodology and activities.
192	The Maintenance Plan shall detail the Contractor’s Software maintenance and warranty program including the approach to services, staffing, and resources to fulfill the Software maintenance requirements including but not limited to:
	a) all Software maintenance related communication methods;
	b) approach to receiving and prioritizing Software defects (bugs);
	c) reporting, categorization, prioritization, remediation and disposition of Software defects;

	d) maintenance procedures, communication protocols, and approval processes for Software Upgrades, Software releases, testing, scheduled maintenance activities, change management and scheduled downtime;
	e) Software Updates and testing to comply with interoperability specification changes, and third-party interface changes;
	f) Software and security Updates, remediation and testing to be compliant to NCTA Audit Requirements; and
193	The Maintenance Plan shall detail the Contractor preventative maintenance program in accordance with this SOW and Requirements.
194	The Contractor shall provide a preventive maintenance schedule as part of the Maintenance Plan. The schedule shall detail the preventive maintenance to be performed on each Equipment item and system. The schedule shall provide a description of the work to be performed, expected duration, and the frequency.

2.12 As-Built Documentation

2.12.1 As-Built System Detailed Design Document

195	Within ten (10) Business Days after the approval of the System Acceptance Test (SAT) and prior to NCTA acceptance of the RTCS, the Contractor shall submit the As-Built SDDD that includes all Software and Hardware changes made during the RTCS development, implementation, and testing.
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2.12.2 As-Built Drawings

196	The Contractor shall Update the latest drawings with red lines as changes are incorporated during the installation and check-out process. At the completion of the installation of the RTCS, the Contractor shall gather all red line drawings into a single package.
197	The red-line drawings shall be verified and then incorporated into a final As-Built Drawing package. This final As-Built Drawing package shall include installation drawings, shop drawings and sketches, and other drawing types that may have been used to install the RTCS.
198	All other documentation used regarding the installation shall also be finalized and submitted as part of the As-Built Drawing submittal.

2.13 End of Contract Transition Plan

The Contractor acknowledges that the services it provides under the terms of the Contract are vital to the successful operation of the RTCS and that said services shall be continued without interruption. Upon the end of the Contract, a successor (NCTA, or a new contractor) may be responsible for providing these Services. The Contractor agrees to exercise its best efforts and cooperation to affect an orderly and efficient transition to a successor in accordance with **Part IV, Terms and Conditions**. The Contractor shall provide an end of Contract Transition Plan no later than one hundred twenty (120) Calendar Days after Go-Live for each Project for NCTA review and approval. The end of Contract Transition Plan shall be updated at least sixty (60) Calendar Days prior to the End of the Contract or notice by NCTA of termination of the Contract.

199	Upon NCTA's written notice, the Contractor shall furnish transition services prior to the end of the Contract Term. The Contractor shall develop with the successor contractor or NCTA staff, a Contract Transition Plan describing the nature and extent of transition services required.
200	The Contract Transition Plan and dates for transferring responsibilities for each division of work shall be submitted within thirty (30) Calendar Days of such notice. Upon completion of NCTA review, both parties shall meet and resolve any additional requirements/differences.
201	The Contractor shall provide sufficient experienced RTCS technical and Software support personnel in each division of work during the entire transition period to ensure that the quality of services is maintained at the levels required by this Contract.
202	The Contractor shall provide sufficient staff to help the successor maintain the continuity and consistency of the Services required by the Contract. The Contractor shall allow the successor to conduct onsite interviews with the employees.
203	The Contractor shall provide the necessary Software and systems support services to assist the successor contractor in setting up the systems, transfer of appropriate licenses and third-party Software, and transition of all data required to sustain uninterrupted service as directed by NCTA.
204	The Contractor shall make all necessary provisions for transferring any leases or sub-leases held by the Contractor to NCTA, including without limitation, all keys, security codes, and other codes and other facility access information or devices.
205	The Contractor shall make all other records, documents, data, and Software which are licensed to NCTA and pertaining to the Services rendered for this Agreement available within thirty (30) Calendar Days upon written notice or as otherwise provided in the executed license Agreement.
206	The Contractor shall make all operational records, documents, data, systems, specialty tools and Equipment, and facilities required to support and maintain daily services being rendered under this Agreement available before the date of such termination, suspension, or expiration.

3. Constructor Design Support

As part of a typical Design-Build Contract, the Constructor is responsible for the design and construction of all roadway and Toll Zone infrastructure where the Contractor will install, test, and commission the RTCS. While the specific Requirements may vary with each Project Task Order, the Contractor shall meet all Requirements if asked to provide in a Task Order for each Project. The Contractor shall provide pricing in each Task Order.

3.1 General Design Requirements

207	The Contractor shall work with NCTA and provide input into the civil design and/or construction schedule, and requirements for all civil construction work to be performed by others on the project, including toll gantry, toll Equipment pads, roadway/pavement, and conduit relative to the aspects that integrate with the design and installation of the RTCS.
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208	The Contractor shall cooperate and provide support as needed to the civil design and construction efforts. During civil design, Contractor support is anticipated to include responses to information requests for clarification on proposed designs as well as actively reviewing the civil plans and drawings.
209	During construction, the Contractor shall provide review and comment on shop drawings or similar within the context of the RTCS functional and Performance Requirements.
210	During installation, the Contractor shall provide verification and comment on RTCS related elements that the Constructor is responsible for installing.
211	Upon approval of shop drawings or similar design elements by the Contractor, within the context of system function and performance, the Contractor 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 SOW and Requirements, the Contractor shall be responsible for the costs of redesign, civil rework, and additional Equipment costs as further set forth in the Contract.
212	The Contractor shall review and comment on the Constructor infrastructure installation and confirm it is in compliance with the approved civil drawings. A site acceptance checklist, based on the approved civil drawings, shall be generated by NCTA. The site acceptance checklist shall be reviewed and approved by the Contractor, and signed by the Contractor and NCTA, prior to site acceptance.
213	The Contractor shall be responsible for ensuring that the locations, positions, installation, connections and other elements of the Contractor inputs identified on the design and installation drawings provided by the Constructor, for all Contractor and NCTA-provided Equipment, whether in-roadway, structure/toll gantry mounted, or in or around the toll Equipment pads, or otherwise located, are accurate and correct.
214	The Contractor shall also ensure that the installed roadway, infrastructure, structures/toll gantries, and toll Equipment pads meet the design requirements provided by the Contractor and shall certify this in writing.
215	The Constructor will provide these components in accordance with the Contractor approved design plans. Any changes to the configuration by the Contractor shall be adjusted or moved by the Contractor at no additional cost to NCTA.

3.1.1 Toll Gantry

216	The Contractor shall coordinate in-lane Equipment design, installation specifications, structural requirements and drawings for mounting the Equipment to the overhead toll gantry at each RTCS location as it relates to the Contractor's Equipment requirements to the Constructor, including but not limited to: Equipment mounting locations and installation instructions for mounting structure and mounting brackets, conduit, junction box, electrical requirements, wind load, Equipment load and power calculations, deflection and vibration limits for the various tolling Equipment, as well as Contractor Requirements related to special electrical grounding and isolated circuit integrity by Equipment.
217	The Contractor shall also review and provide comments on all aspects of toll gantry design drawings submitted by the Constructor that is related to the RTCS Equipment required to meet the Requirements of this SOW and Requirements, when applicable.

218	The Contractor shall be responsible for all necessary installation and mounting Hardware required to install the toll Equipment on each gantry at each lane as specified in this Part III, Scope of Work and Requirements .
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3.1.2 Toll Equipment Pad

219	The toll Equipment pads shall house the RSS Equipment cabinets, racks, enclosures, and UPS provided by the Contractor. All RSS electronics, devices, servers, and associated communications Equipment shall be installed in the Equipment racks and enclosures.
220	The Contractor shall review and comment on all aspects of toll Equipment pad design drawings, power specifications, electrical and cabling design, circuit breaker and switches, and grounding design submitted by the Constructor that are related to the RSS Equipment, when applicable.
221	The Contractor shall coordinate with the Constructor for the installation of the toll Equipment pads and shall ensure consistency with the detailed drawings of Equipment rack space layout provided by the Contractor.
222	The Constructor will procure, furnish, and install the conduits between the toll Equipment pad and the demarcation point on the toll gantry. The Contractor shall procure, furnish, and install any additional conduit required in addition to the Constructor installed conduit on the gantry to the Equipment and between the various components on the toll gantry.

3.1.3 Communications

223	The Constructor will provide, terminate, and test the fiber connections from Toll Zone to Toll Zone. The Contractor is responsible for all network Equipment/switching at the Toll Zone and is responsible for all elements of the Local Area Network (LAN). The Contractor is responsible for Wide Area Network (WAN) connections to the NCTA CBOS.
224	The Contractor is responsible for the RTCS WAN communications. RTCS WAN design must be approved by NCTA and shall conform to Section Error! Reference source not found. 4.2.1 General RSS Functional Requirements and 4.3.1 Transaction Reconciliation Host (TRH) and Attachment 4: State of North Carolina, Statewide Information Security Manual included in Part III, Scope of Work and Requirements . All networking Equipment at the toll sites and other locations necessary to provide full communication capabilities to meet the Requirements in this SOW, such as the host and DR, shall be provided by the Contractor.
225	The Contractor shall allocate a range of IPv4 class C addresses, and all networking addressing shall be coordinated with NCTA. The Contractor provided LAN Equipment shall be capable of supporting IPv6 addresses.
226	Network monitoring Software shall be procured, furnished, and installed on the host servers to monitor the RTCS network status and communications, including the connection to the NCTA CBOS. All network alarms shall be reported to the ITSM. The Software tool shall utilize the Simple Network Management Protocol (SNMP) to poll devices real-time for status where possible.
227	If communications to any element of the RTCS are down, an alarm shall be generated and reported to ITSM system.
228	The Contractor shall provide network security at all RTCS locations and shall comply with the security policy as described in Section Error! Reference source not found. and Attachment 2

	: State of North Carolina, Statewide Information Security Manual included in Part III, Scope of Work and Requirements .
229	The LAN within a toll site shall be connected by CAT6 (or higher) cabling. The LAN connections from the gantry to the roadside Equipment may either be CAT6 or multi-mode fiber-optic (MMFO) cable, according to the Contractor's design. The Contractor shall be responsible for providing and obtaining the WAN connectivity from any primary or secondary host locations to the NCTA CBOS.
230	The RSS at the Toll Zones shall be connected and communicate to the NCTA provided CBOS/OBO.
231	The Contractor shall coordinate with NCTA, NCDOT IT, and the Constructor regarding demarcation points between the onsite fiber network and Internet Service Providers (ISPs). The Contractor shall coordinate with NCTA and the Constructor regarding overall network design and splicing for the physical network between the Toll Zones. Once network design is finalized, the Contractor shall certify in writing that network design meets all RTCS needs.
232	The Contractor may install the secondary host at a Contractor location within the contiguous United States as approved by NCTA. The Contractor is responsible for securing the connectivity from such a secondary location to the NCTA CBOS.
233	The Contractor shall work with NCTA in designing the network communication interfaces between the RSS, ITS and TRH systems that compromise the RTCS.
234	The Contractor shall make final acceptance of the physical network that shall be designed and installed by the Constructor. The site final acceptance shall be based on the completion of all items on an NCTA developed and approved installation checklist.

3.1.4 Intelligent Transportation System

235	The Contractor shall assist NCTA in reviewing all aspects of the ITS design revisions, construction submittals, catalog cuts, etc.
236	The Contractor shall design, furnish, install, and commission additional ITS devices if deemed necessary to meet the Performance Requirements. The Contractor shall be responsible for any additional costs.
237	The Contractor shall also coordinate and be available onsite as needed during the acceptance test of the ITS performed by the Constructor and shall be responsible for signing off that the ITS is performing in accordance with the Contractor's Requirements.
238	The Contractor shall complete the commissioning and integration of the ITS to the RTCS.
239	The Contractor shall be responsible for the integration of ITS to existing tools used by the Statewide Traffic Operations Center (STOC) and the Metrolina Regional Transportation Management Center (MRTMC).

3.1.5 Wrong-Way Vehicle Detection System

If Deployed, the Contractor shall integrate Wrong-Way Vehicle Detection Systems with its RTCS. The current NCTA standard for WWDD can be found in **Attachment 10: ITS Standard Drawings**.

240	The Contractor shall coordinate and be available onsite as needed during the acceptance test of the unique WWVD system performed by the Constructor and shall be responsible for signing off that the system is performing in accordance with the Contractor's Requirements.
241	The Contractor shall be responsible for integrating the WWVD system to the RTCS and meeting all WWVD Performance Requirements.

3.1.6 Wrong Way Vehicle Detection and Notification

The Contractor shall provide a Wrong Way Vehicle Notification System as part of their RTCS solution which adheres to the following requirements.

242	The RTCS shall alert TMC personnel via email within 10 seconds of a vehicle passing through a toll zone travelling in the wrong direction. The email shall identify the location and time of the event and include a link to a video recording of the event.
243	The RTCS shall alert TMC personnel through a Contractor provided user interface within 10 seconds of a vehicle passing through a toll zone travelling in the wrong direction. The user interface alert shall be prominently displayed on the operator's monitor and include the time and location of the event and a five (5) second looping video of the vehicle passing through the zone.

3.1.7 Express Lanes Time Signs (Express Lane Types only)

244	The RTCS shall calculate average speed and travel time information for the Express Lanes and general-purpose lanes along an entire corridor.
245	The RTCS shall display the average speed and travel time on the two speed/travel time signs.

4. RTCS (includes RSS and ITS) Functional Requirements

4.1 NCTA Business Policies and Operational Concepts

246	The NCTA Business Policies for NC Quick Pass and Roadside includes operations concepts, business policies, business rules and concept of operations for this Project and the NCTA systems roadside and customer service center and can be found in Attachment I: NCTA Business Policies . All specific requirements that differ or expand upon these documents are included in this Part III, Scope of Work and Requirements . NCTA may update the NCTA Business Policies from time to time throughout the Contract Term . The Contractor shall review and adhere to all Business Policies. The Contractor may request reimbursement from NCTA if new functionality not contemplated in the Requirements is added to meet new Business Policies in accordance with the dispute resolution provisions as outlined in this Agreement.
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4.2 RSS Functional Requirements

4.2.1 General RSS Functional Requirements

247	All Hardware and Equipment supplied under this Contract shall be new, Commercial Off-the-Shelf (COTS). Materials and products that have been previously used for development work or the Contractor's internal Formal testing, or items that have been salvaged or rebuilt shall not be used in connection with this Contract.
248	The RSS shall meet all functional requirements in all weather and lighting conditions.
249	The RSS shall accurately capture and identify all vehicles that pass through the toll zone.
250	The RSS shall accurately identify the lane location of each transaction or buffered Transponder Read and identify if the vehicle straddled an adjacent lane or shoulder.
251	The RSS shall assign a timestamp to all transactions or buffered Transponder records. The timestamp must be associated with a defined event in the transaction formation process, to be determined during the design process.
252	The RSS shall capture at least one front and one rear unique color image of the vehicle and its license plate(s) for every vehicle that passes through a toll lane or Toll Zone.
253	The transaction images produced by the RSS must support the CBOS/OBO ICD and must provide readable images of properly mounted and unobstructed license plates.
254	The RSS shall capture properly mounted transponders and accurately correlate them to their associated vehicle as they pass through the toll zone.
255	(Express Lanes Excluded) The RSS for AET Zones shall accurately detect the number of vehicle axles and include all data in the Toll Transaction.
256	The RSS shall accurately measure and report the length of each vehicle associated with a Toll Transaction.
257	The RSS shall accurately measure and report the travel speed for each vehicle associated with a Toll Transaction.
258	(AET Lanes Excluded) The Express Lanes RSS must use only gantry mounted equipment. No in-pavement sensors will be permitted for Express Lane installations.
259	The RSS shall support accurate assignment of fare to each transaction.
260	All RSS Software developed, furnished, and installed under this Contract shall be warranted, by the Contractor, against Software defects, security vulnerabilities, and deficiencies for the life of the Project.
261	RSS elements and subsystems shall be designed and installed in a manner that minimizes the need to close toll lanes for routine maintenance and minimizes the duration of any lane closures for maintenance.
262	The Contractor shall provide, manage, and maintain all network Equipment within the RSS and required to interface outward; including servers, switches, routers, and firewalls, and all network cabling.

263	The RTCS shall include a minimum of two (2) network time servers each synchronized to a minimum of three (3) independent stratum 1-time servers.
264	The RTCS shall synchronize all components of the RTCS to within 1/1000 of a second.
265	The RSS shall support monitoring and collection of data on system and Equipment statuses continually 24 hours a day, 7 days a week.
266	The RSS shall generate a video record for all transactions generated using a frame rate and video quality that supports accurate identification of the vehicle and covers its complete traverse through the toll zone.
267	Requirement Removed
268	The DVAS shall provide continuous video recording of the lane(s) at all times and retain the video recordings as defined in this Contract. DVAS recordings shall be retained for 90 days.
269	All toll lanes and Toll Zones shall be capable of operating without any communications to the RTCS TRH for up to 90 Calendar Days while storing all lane transactions and images to be processed when communications are restored.
270	All Toll Zones shall be capable of processing and creating lane transactions for a minimum 2,000 vehicles per lane per hour with no loss of data and with all vehicles with front and rear license plates and an AVI Transponder. Toll Zones may have one or more Equipment lanes and shall meet the above Requirement for all AET or Express Lanes. Simulation Software shall be accepted as a method of compliance with this requirement to ensure the system is properly sized, coded and configured to achieve the highest level of system efficiency for processing all types of transactions that shall be processed on the NCTA toll roads.
271	The RTCS shall provide supplemental illumination (if needed) for image based (Bill by Mail) tolling that does not interfere with vehicle travel or distract drivers and shall not cause light pollution to areas adjacent to the roadway.
272	The RSS shall support time-of-day and Dynamic Toll Rate (DTR) scheduling configurable in five (5) minute time intervals.
273	The RSS shall support fare override functions so that the Contractor and NCTA can override the toll roads to discount the toll rate from 0% to 100% to be CLOSED or to a pre-determined rate manually or automatically based on certain conditions.
274	The RSS shall receive, and process Transponder and license plate data files as required to meet all Requirements. This data is required to complete the Toll Transaction and send to the CBOS/OBO in accordance with the Requirements and NCTA Business Policies for NC Quick Pass and Roadside. The license plate and Transponder interface consist of Full Transponder Status List (FTSL), Incremental Transponder Status List (ITSL), Full Plate Status List (FPSL) as outlined in CBOS/OBO to RTCS ICD in Attachment 6: NCTA CBOS to RSS ICD .
275	The RTCS shall not delete any information included in the lane transaction. Data in the lane transaction can only be created and amended.
276	All transactions shall be uniquely identified within the RSS.
277	When multiple Transponders are detected within a vehicle the system shall assign a single Transponder to the transaction as determined by NCTA business rules. NCTA Transponders

	shall be first priority followed by away agency Transponders. Away agency Transponder priorities shall start at the lowest agency number and work to the higher number. The additional Transponder record(s) shall be retained and identified as additional.
278	The RSS shall generate records for all buffered Transponder reads.
279	The RTCS shall allow toll lanes operational modes to be changed by authorized users from the operations center.
280	All in-lane Equipment controllers and RSS electronics, devices, servers, and associated communications Equipment shall be installed inside environmentally controlled Equipment cabinets at the roadside. The Contractor shall purchase and install the cabinets per the Requirements of this Contract.
281	All cabinets and enclosures that shall be installed outdoors shall be designed to withstand typical North Carolina area environmental conditions and shall not suffer any visible or functional degradation over the term of the Contract.
282	The cabinets shall have monitoring sensors (including humidity and temperature), and if environmental conditions inside the cabinets exceed the configurable threshold, alarms shall be generated and reported to the ITSM system. There shall be no loss of data in such conditions, and the integrity of the RTCS shall be maintained.
283	All cabinets and enclosures shall be configured to “fail secure” in the event of power outages. The Contractor shall maintain a set of all keys to be used in the event of a “fail secure” incident and access to Equipment is necessary.
284	Access to all Equipment cabinets shall be recorded automatically and reported to the ITSM system. The data reported shall include, but not be limited to cabinet status, date, time of door open, time of door close, and any applicable alarm conditions.
285	<p>The Contractor’s services shall be designed, developed, implemented and maintained in a manner consistent with security requirements, defined as the requirements levied on Information Environments that are derived from laws, Executive Orders, directives, policies, standards, instructions, regulations, procedures, or organizational mission/business case needs to ensure that security and privacy protections are implemented in the collection, use, sharing, storage, transmittal, and disposal of information. Security requirements shall be supported in a manner that makes verification possible via analysis, observation, test, inspection, measurement, or other defined and achievable means. The Contractor shall meet the following requirements (where applicable):</p> <ul style="list-style-type: none"> • 18 U.S. Code § 2721 — Driver’s Privacy Protection Act • N.C.G.S § 143B-1375 — Security • N.C.G.S § 143B-1376. Statewide security standards • N.C.G.S. §143B-1331 — Business Continuity Planning • Functional Schedule for North Carolina State Agencies • North Carolina Statewide Information Security Manual

	<ul style="list-style-type: none"> • NCDOT Policies, Standards, Guidelines and Procedures • NCDIT-T Policies, Standards, Guidelines and Procedures • NCTA Policies, Standards, Guidelines and Procedures <p>NC Statewide Information Security Manual can be currently viewed at: https://it.nc.gov/statewide-information-security-policies.</p> <p>The policy regarding data classification and handling can be currently viewed at: https://it.nc.gov/documents/statewide-data-classification-and-handling-policy.</p> <p>The Functional Schedule for North Carolina State Agencies can be currently viewed at: https://archives.ncdcr.gov/documents/functional-schedule-state-agencies.</p> <p>The definitions in the Statewide Glossary of Information Technology Terms apply to all statewide information technology policies and standards and can be currently viewed at: https://it.nc.gov/documents/statewide-glossary-information-technology-terms.</p> <p>The NIST Glossary of Information Technology Terms can be used to supplement the Statewide Glossary of Information Technology Terms and can be currently viewed at: https://csrc.nist.gov/glossary.</p> <p>The Contractor shall also adhere to the standards listed in Attachment 2: State of North Carolina, Statewide Information Security Manual.</p> <p>Any exceptions to the standards described in this Requirement above and in Attachment 2: State of North Carolina, Statewide Information Security Manual shall be described in its proposal by adding Attachment 4 compliance in the Proposer’s Technical Proposal. The Contractor shall describe any exception to the security policy and why they are exempt. The Contractors shall identify only of those exceptions within the policy with an explanation. Categorical exception to the policy shall be considered non-compliance.</p>
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4.2.2 RSS Additional Requirements

4.2.2.1 Automatic Vehicle Identification (AVI) System Integration

286	<p>The Contractor shall integrate the RTCS with an AVI system at the tolling locations as specified in this SOW and Requirements. If specified in a specific Task Order, NCTA may elect to include the procurement, acquisition, installation testing and operations readiness of AVI system Equipment by the Contractor. These integration requirements shall include all the following anticipated protocols to be supported by the RTCS in no specific order of precedence:</p> <ul style="list-style-type: none"> a) PSIII (TDM/IAG E-ZPass Group); b) ISOB_80K (SeGo); and c) ISOC (ISO 18000-63/6C).
287	<p>The Contractor shall furnish and install all Hardware, cabling (including RF, communication, and power cables), connectors, and associated mounting fixtures to form a fully functioning AVI system that meets the Requirements of this SOW.</p>

288	The Contractor shall be responsible for the physical tuning AVI Equipment, and for integrating the AVI system into the Contractor in-lane design. All AVI installation, configuration, and tuning shall be in compliance with the AVI vendor requirements.
289	The RTCS integrated with the AVI system shall process Transponders mounted on vehicles traveling in stop and go and bumper-to-bumper traffic and vehicles traveling at speeds of up to 100 mph. This requirement may be testing at a closed facility but not on any NCTA roadways due to safety reasons unless otherwise permitted in writing by NCTA.

4.2.2.2 Automatic Vehicle Detection and Classification (AVDC) System

290	The AVDC system shall determine the vehicle axle count as well as vehicle length, height and width to classify vehicles in accordance with the NCTA vehicle classification structure for all travel lanes and shall include the logic to handle the exceptions identified. Classification of vehicles traveling on the shoulder lanes is not required; however, the RTCS shall detect vehicles that travel on the shoulder and trigger the Image Capture & Processing System (ICPS). The vehicle classification structure for each facility type is defined in requirements 291 and 292.
291	<p>(AET Lanes Excluded) The NCTA vehicle classification structure for the Express Lanes is defined as:</p> <ul style="list-style-type: none"> a) Low Occupancy Vehicle (LOV) defined as two-axle motor vehicles other than motorcycles, without trailers, not larger than L:22' W:8.5' H:12', with less than 3 occupants b) Registered High Occupancy Vehicle (HOV) defined as two-axle motor vehicles, without trailers, not larger than L:22' W:8.5' H:12', pre-registered as HOV, with three or more occupants for future occupancy and rideshare discount programs c) Motorcycles defined as motor vehicles with two or three wheels, not larger than a LOV d) Transit Vehicles defined as recognized non-profit transit agency buses, rubber wheeled trolleys, and vans used for mass transportation under applicable laws e) First Responder Vehicles defined as law enforcement vehicles, emergency fire and rescue vehicles and emergency medical service vehicles f) Extended Vehicles defined as two-axle motor vehicles exceeding the length of a LOV or two-axle motor vehicles traveling with a one-axle trailer
292	<p>(Express Lanes Excluded) The NCTA vehicle classification structure for AET Lanes is defined as:</p> <ul style="list-style-type: none"> a) Class I defined as a vehicle with 2 axles b) Class II defined as a vehicle with 3 axles c) Class III defined as a vehicle with 4 or more axles
293	The Contractor shall design, procure, furnish and install a secondary sensor and Equipment that are part of the AVDC system as a back-up to support image capture and vehicle framing in the event any element of the primary system fails or is degraded. The RTCS shall determine the conditions (configurable) that invoke the use of the secondary sensors and Equipment.
294	In the event there is a class mismatch between the AVDC system and the Transponder class. The RTCS shall default to the AVDC class and flag the transaction as an unusual occurrence as defined in this SOW and Requirements.

4.2.2.3 Zone Controller

295	Storage shall be sized to hold a minimum of ninety (90) days of one hundred percent (100%) of transactions, images and event data for each lane at the tolling location supported by the Zone Controller.
296	In the event of a power interruption, the Zone Controller shall open in the operational mode it was in before it was powered down.
297	Authorized users shall locally connect to the Equipment and remotely connected by authorized Software configure the next operating mode and to gracefully shutdown the Zone Controller. Each time a mode change is requested, an alert message shall be sent to the ITSM system.
298	When a lane is operating in a mode other than normal open mode (to be finalized during design), an alert shall be generated and sent to ITSM system at regular (configurable) intervals.
299	The RTCS shall support various modes of operation that are managed and initiated by authorized users through the host.
300	Transactions shall be processed according to different NCTA Business Policies either at the RSS level or the host level based on the mode of operation and the facility type. The Contractor shall be responsible for ensuring that the AVI and image-based transactions are processed according to NCTA Business Policies for NC Quick Pass and Roadside and transmitted correctly to the existing NCTA CBOS.
301	The RTCS shall provide functionality to operate in the following modes of operations:
	a) Open mode: All transactions shall be processed normally in an open mode;
	b) Maintenance mode: Transactions created in maintenance mode are processed as normal transactions but are identified as maintenance mode transactions and transmitted to the host. Transactions that occur during maintenance mode are not reported as traffic or revenue transactions; and
	c) Emergency mode: Transactions created during emergency mode shall be identified as emergency mode transactions and processed in accordance with NCTA Business Policies for NC Quick Pass and Roadside to be determined during the design.

4.2.2.4 Transponder Data Requirements

302	The RTCS shall capture the raw Transponder class obtained from the Transponder data and map that to the NCTA mapped class for each of the toll facilities in accordance with the CBOS/OBO ICD. Attachment 6 NCTA CBOS to RSS ICD for reference only.
303	The RTCS shall retain the raw Transponder class and include that in the transaction data along with the mapped class for each RTCS facility in accordance with NCTA Business Policies Document.
304	If a Transponder has a raw Transponder class that is not mapped to the NCTA class, then the RTCS shall apply the class as defined by the business rules.

4.2.2.5 Revenue Class (NCTA Class)

305	The assignment of the revenue vehicle class in normal operations and in the degraded mode of operations shall be in accordance with the NCTA Business Policies for NC Quick Pass and Roadside. If no classification data is obtained, a configurable default revenue class shall be assigned to the transaction, and the transaction shall be flagged.
306	The revenue vehicle class shall be one of the factors used to determine the fare for a transaction as defined by the NCTA Business Policies for NC Quick Pass and Roadside. Flags in the transaction shall identify which class was used as the revenue vehicle class.
307	The RTCS shall cap the maximum and minimum (configurable) inferred axles and class and to charge a set toll rate per classification.
308	Transactions shall include the AVDC class, raw NCTA interoperable partner Transponder class (if applicable), mapped interoperable partner Transponder class (if applicable), and revenue vehicle class. The revenue vehicle class assigned in accordance with NCTA business rules shall be used to determine the toll amount transmitted to the NCTA CBOS interface.

4.2.2.6 Fare Determination

309	The RTCS shall provide determination of the fare class at the tolling location or other supplemental systems prior to posting to the CBOS/OBO based on the vehicle class.
310	The fare class shall be determined in accordance with NCTA business rules and may vary by payment method and lane status including lane open, maintenance or closed statuses
311	The RTCS shall have a configurable default fare class to be used in the event classification data is not available.
312	Tolls shall be assessed using the toll rates and schedules established for each tolling point. The RTCS shall support the toll rate and the NCTA vehicle classification structure based on the Toll Zone and facility. The initial toll rates shall be defined during RTCS design and shall be configurable to support periodic rate adjustments as approved by NCTA.
313	The RTCS shall provide toll rates by payment type, for example, AVI, image-based, and non-revenue, vehicle class, lane health, agency code, and location-based on NCTA business rules.
314	Home (NCTA-issued) non-revenue Transponders shall be charged \$0.00 (configurable) fare, but away non-revenue Transponders shall be charged the normal fare based on vehicle class and location.

4.2.2.7 Saving Images

315	Images shall be captured and saved for all transactions, regardless of operating mode in accordance with the NCTA data retention policy.
316	Images saved during ICPS loss of communication event shall be flagged and subsequently matched with the correct transaction data when communications resume with the Zone Controller. This matching can occur at the host but shall take place in a manner that does not interfere with or degrade real-time Zone Controller operations.

317	In the event that the system captures vehicle images without any other supporting system data such as AVDC, these images shall be saved such that all non-valid Transponder transactions that occur during the AVDC malfunction can be subsequently pursued for collection. Sufficient data, such as image capture time stamps, shall be provided in the transactions to allow the TRH and CBOS/OBO to process such transactions so that customers are not charged in error when lane operation is degraded.
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4.2.2.8 Configuration Files

318	All parameters and settings required to run the Zone Controller application shall be maintained in configuration files. Access to configuration files required to support the Zone Controller operations shall be controlled, and access to these files shall be limited to authorized personnel.
319	The configuration files shall be maintained at the host for configuration and version control. All Zone Controllers shall have default configuration files that shall allow the lane to start-up automatically.
320	Authorized personnel shall be able to make changes to parameters and settings that are defined as configurable in this SOW and Requirements and in the approved design documents. Authorized personnel shall be able to make changes to the configuration files in the field. Changes to configuration files shall be recorded in the ITSM. All changes made to the configuration files in the field shall be synchronized to the master configuration file that is maintained at the host.
321	Each Zone Controller shall automatically back up its critical configuration files to a back-up server to be used to rebuild the master drive in the event of hard disk failures.

4.2.2.9 Transmitting Data

322	The RTCS shall support exception handling in accordance with the NCTA business rules. Alarms shall be generated and reported to the ITSM system for all exceptions/errors.
323	All messages generated at the Zone Controllers shall be transmitted to the host in real-time using a transport mechanism that performs error detection and correction to guarantee data transmission. All messages shall be uniquely identified and validated at the host to ensure there are no missing or duplicate messages. Failure of transmission of data to the host shall result in the generation and transmission of an alarm message to the ITSM system.
324	All messages shall be confirmed as received by the CBOS/OBO before they are flagged for write-over. In the event of communication failures, the messages shall be stored on the Zone Controller until the successful transmission is complete and verified.
325	The Zone Controller shall transmit to the TRH or CBOS/OBO all data, including but not limited to those identified below: <ul style="list-style-type: none"> a) all transaction messages generated in the lanes; b) all alarm and status messages generated in the lanes; c) all lane operational, communication status and self-health messages; d) all events generated in the lanes that are displayed on the roadway operations monitoring screen or are required at the host; and e) all events required by the DVAS for real-time review or playback.

4.2.2.10 Receiving Data

326	The RTCS shall rate the AVI transactions based on Transponder Status List (TSL) and any other interoperable agency lists and shall support every interoperable agency and its assigned Transponder number range as described in the national interoperability specifications.
327	The RTCS shall accept comprehensive and incremental (changes Updated on a configurable interval, but not more frequently than every ten minutes) TSL in accordance with the established business rules and shall activate the lists upon receipt after validation of the files.
328	All RTCS Software shall be downloaded to the Zone Controllers from the host, and versions on each Zone Controller shall be maintained, tracked, and recorded.
329	The RSS shall institute checks whereby it detects issues with the data it receives from the host, including but not limited to: <ul style="list-style-type: none"> a) incorrect versions of the data received; b) corrupted data received; and c) missing files when a file was expected.
330	The RTCS shall support exception handling in accordance with the NCTA Business Rules approved during the design. Alarms shall be generated and reported to the ITSM system for all exceptions/errors.

4.2.2.11 Monitor All Lane Equipment for Device Status

331	Each Zone Controller shall self-monitor the system health of internal components and all associated in-lane Equipment devices for status. All RTCS components, including AVI system, AVDC system, and ICPS, shall be continuously polled for status. The health of some digital devices shall be inferred from events.
332	The RTCS shall generate a recovery message and restore its operational status if a device recovers after reporting a failure. Recovery messages shall be recorded against the original failure work order, shall be reported through the ITSM system, and shall be available to authorized staff. Recovery messages shall not close the associated failure/work order but shall serve as supporting evidence of an Equipment recovery.
333	All alarm, health, and recovery messages shall be transmitted and reported to the ITSM system.
334	If communications from the Zone Controller to any host is unavailable, an alarm message shall be generated and reported to the ITSM system.
335	If the lane is operating in any mode other than the normal open mode, an alert message shall be generated at configurable intervals and reported to the ITSM system.

4.2.2.12 Stand-Alone Mode of Operations

336	The Zone Controller shall operate in a stand-alone mode for a minimum of ninety (90) Calendar Days if communications to the host is down. When operating in stand-alone mode, the last files downloaded from the host shall be used for processing vehicles.
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337	The Zone Controller shall have an available data port to permit onsite manual uploading of Software, TSL, or other pertinent data required for continued operation until communications with the host is re-established. Devices utilized to download the TSL to the lanes shall have the capability of synchronizing the current versions whereby a new TSL is Updated on the device within an hour.
338	Upon re-establishing communications with the host, all back-logged messages, including manually transferred messages, shall be transmitted and synchronized to the host without affecting the real-time operations or degrading the lane operations.

4.2.2.13 Uninterruptible Power Supply (UPS)

339	All roadside Hardware and Equipment required to operate the RSS shall be on UPS. The UPS shall be supplied by the Contractor.
340	The Contractor shall interface with the transfer switch and the Contractor-provided smart Power Distribution Units (PDUs) in the toll cabinetry to manage the roadside power distribution. Maintenance technicians shall have remote access to manage power to critical devices.
341	The UPS shall support the RTCS at each tolling location for a minimum of 2 hours on battery.
342	The UPS shall provide all critical status updates to the ITSM including on battery, low battery and critical low battery.
343	When utility power is restored, and Hardware/Equipment is no longer on the UPS, a notification shall be reported to the ITSM system.

4.3 RSS Support Functional Requirements

4.3.1 Transaction Reconciliation Host (TRH)

344	The TRH shall be accessible to NCTA via a virtual private network approved by NCTA and operate on NCTA provided workstations.
345	The TRH shall include redundancy in the TRH (including transaction processing, reporting, image verification services, and automated image processing) expandable to other NCTA facilities in the future if NCTA decides to consolidate or move any of its facilities. This redundant TRH shall be located at a Contractor provided facility separate from the TRH.
346	The TRH shall be designed to allow for transaction processing, image verification processing, reporting processing, as well as system monitoring and auditing processing to occur simultaneously.
347	The Contractor shall provide, manage, and maintain all RTCS network Equipment within the TRH including servers, switches, routers, and firewalls, and all network cabling required to connect to the associated RSS.
348	The RTCS shall monitor and collect data on system and Equipment statuses continually 24 hours a day, 7 days a week.
349	The TRH shall provide an interface to access recorded color video of every toll lane and Toll Zone that allows for the visual identification of vehicle size and number of axles and length at all

	times of the day and under all environmental conditions. The frame rate shall be sufficient to clearly identify vehicle characteristics to support an audit.
350	The TRH shall provide time-of-day and Dynamic Toll Rate (DTR) fare scheduling configurable in five (5) minute time intervals.
351	The TRH shall provide fare override functions so that the Contractor and NCTA can override the toll roads to discount the toll rate from 0% to 100% to be CLOSED or to a pre-determined rate manually or automatically based on certain conditions.
352	The TRH shall accommodate use of grace periods to account for the time between when a customer sees a Toll Rate Sign (TRS) and the time they pass under a toll point, as applicable. TRS data shall be made available to the CBOS and to CSR's, available for review for at least one hundred eighty (180) Calendar Days. The history shall be viewed using a browser-based access that does not require any applications loaded on the CSR workstations.
353	The Contractor shall calculate the average speed of travel and travel time within each toll segment (i.e. between Toll Zones).
354	The Contractor shall calculate the average speed of travel and travel time between Toll Rate Sign (TRS) locations and the next toll gantry.
355	The Contractor shall provide associated data for Toll Transactions captured from the RTCS and sent to the NCTA CBOS/OBO. The Contractor shall provide an Toll Transaction that is compliant with CBOS/OBO to RTCS ICD as outlined in Attachment 6: NCTA CBOS to RSS ICD . During the design, NCTA will work with contractor to convert the current data exchange method from file transfer to web services between RTCS and CBOS/OBO. Refer to the current Interface control document as a reference for number of Web services and minimum data exchange elements. The Contractor shall describe its existing interface in its Technical Proposal.
356	The Contractor shall receive, and process Transponder and license plate data files as required to meet all Requirements. This data is required to complete the Toll Transaction and send to the CBOS/OBO in accordance with the Requirements and NCTA Business Policies for NC Quick Pass and Roadside. The license plate and Transponder interface consist of Full Transponder Status List (FTSL), Incremental Transponder Status List (ITSL), Full Plate Status List (FPSL) as outlined in CBOS/OBO to RTCS ICD in Attachment 6: NCTA CBOS to RSS ICD .
357	The RTCS shall conform to the CBOS/OBO ICDs for the transfer of Toll Transactions and all other necessary data from the RTCS hosts to the NCTA CBOS/OBO.
358	All transactions shall be uniquely identified and validated within the RTCS to ensure there are no missing or duplicate transactions prior to sending to the NCTA CBOS/OBO.
359	When multiple Transponders are detected within a vehicle the TRH shall be capable of indicating which Transponder is assumed to be the valid Transponder for processing by the CBOS and also include the other Transponders in the Roadway Transaction Files or web services that is sent to the NCTA CBOS/OBO, as determined by NCTA.
360	The RTCS shall account for every lane transaction that is the result of a buffered Transponder read for tracking and disposition which shall be reported to and auditable by NCTA.
361	Transponder reads buffered during lane degradation where no other information or images are captured shall be sent to the NCTA CBOS for processing as a transaction at the lowest toll class.

362	<p>The RTCS shall provide function to review the transaction accuracy, including the Toll Transactions sent to the CBOS as well as transactions that were retained in the CBOS/OBO for the purpose of:</p> <ol style="list-style-type: none"> a) Audits conducted by the Contractor or NCTA and its agents. b) Provide an application or filtering capabilities that allows the Contractor or NCTA and its agents to select problem plates to be added to queue that requires manual image verification. The plates shall be added by the image verification Software or manually by an authorized user in the system. c) Support existing NCTA review and auditing processes to measure the system against the Performance Requirements. d) The Contractor shall be able to filter AVI and images-based transactions including, but not limited to: <ol style="list-style-type: none"> 1. ALPR confidence levels 2. ALPR results based on location and Jurisdiction 3. Manual image review results based on location and jurisdiction 4. Contractor rejected images 5. Image-based transactions by vehicle class as defined in the NCTA Business Policies for NC Quick Pass and Roadside 6. Filtered criteria based random sampling for QA/QC (every XX transactions) 7. System exceptions as defined in this SOW and Requirements 8. Unusual occurrences as defined in this SOW and Requirements 9. Location 10. Date and Time
363	<p>The RTCS shall map transactions that are not subjected to audit for accuracy, defined as System Exceptions, including but not limited to:</p> <ol style="list-style-type: none"> a) auto flushes (tags read at the lane that did not correlate to a vehicle or lacks AVC data); b) images that were not correlated to a transaction (video auto flush); c) lane unavailable (transactions captured during a period of time when the system (lane or host) is deemed “unavailable”); and d) transactions captured when in lane mode: maintenance.
364	<p>The RTCS shall map transactions to be used as indicators for potential lane issues, defined as Unusual Occurrences, including but not limited to:</p> <ol style="list-style-type: none"> a) AVI unrecognized or unknown from the CBOS FTSL file; b) class mismatch of Transponder versus lane AVC (only applicable to transaction with programmed Transponders [6C and TDM]); c) transaction without images; d) transaction with unusual number of axles (7+); e) Wrong Way Vehicle (WWV); f) speed over 100 mph; and g) speed of 0 mph (not including auto flush transactions).
365	<p>The RTCS shall support manual audit and amendments to lane transactions.</p>
366	<p>Interfaces shall allow authorized users to quickly search by various query criteria, including:</p> <ol style="list-style-type: none"> a) lane transaction number; b) specific time and time range; c) location (facility);

	<ul style="list-style-type: none"> d) lane/Toll Zone; e) class mismatch; and f) any combination of these parameters.
367	<p>The RTCS shall support the remote monitoring of Toll Zones by authorized users. Remote monitoring shall at a minimum include:</p> <ul style="list-style-type: none"> a) observing lane transactions as they are created; b) being able to look at past lane transactions; c) reviewing ICPS images; d) security and environment conditions; e) monitoring of dynamic pricing, and travel time; f) observing Equipment status; and g) observing system status.
368	The RTCS shall automatically generate and track work orders for preventative maintenance, corrective maintenance, and emergency maintenance.
369	The RTCS shall automatically alert maintenance staff once a work order has been generated.
370	The RTCS shall support the assignment of maintenance priority levels based on the system configurable combination of severity level, facility, day and time.
371	Data from the alerts, logs, Hardware and Software status, work orders, tickets and any items in the IT Service Management (ITSM) system shall not be deleted or modified for the duration of the Contract.
372	The RTCS shall support the generation of ad-hoc work orders by authorized users.
373	The RTCS shall track spares and inventory levels including serial numbers and associated warranty information for installed Equipment and inventoried Equipment.
374	If applicable, the Contractor shall provide images and video stream of toll rate signs with playback capability.
375	Error logs shall be transmitted to the ITSM system and available to authorized user in viewable form. Search and filter capability shall be provided to display and review up to one-hundred eighty (180) Calendar Days of data since the event.
376	All work and diagnostics performed by Contractor staff on the RTCS shall be recorded and automatically reported to the ITSM system, including the technician identification, the time the maintenance was performed, and all status and recovery messages.
377	Applicable industry standards and best practices for network and data communications shall be met.
378	The Contractor shall supply all diagnostic Software and specialty tools required for support of maintenance activities, and NCTA will have full rights and access as further defined in the Contract to such diagnostic Software and specialty tools.
379	Transaction data, Images, DVAS video and system logs shall be retained online for ninety (90) Days and then archived and purged.
380	Summarized data shall be retained for at least 10 years and then archived and purged.
381	The Contractor's services shall be designed, developed, implemented and maintained in a manner consistent with security requirements, defined as the requirements levied on Information

	<p>Environments that are derived from laws, Executive Orders, directives, policies, standards, instructions, regulations, procedures, or organizational mission/business case needs to ensure that security and privacy protections are implemented in the collection, use, sharing, storage, transmittal, and disposal of information. Security requirements shall be supported in a manner that makes verification possible via analysis, observation, test, inspection, measurement, or other defined and achievable means. The Contractor shall meet the following requirements (where applicable):</p> <ul style="list-style-type: none"> • 18 U.S. Code § 2721 — Driver’s Privacy Protection Act • N.C.G.S § 143B-1375 — Security • N.C.G.S § 143B-1376. Statewide security standards • N.C.G.S. §143B-1331 — Business Continuity Planning • Functional Schedule for North Carolina State Agencies • North Carolina Statewide Information Security Manual • NCDOT Policies, Standards, Guidelines and Procedures • NCDIT-T Policies, Standards, Guidelines and Procedures • NCTA Policies, Standards, Guidelines and Procedures <p>NC Statewide Information Security Manual can be currently viewed at: https://it.nc.gov/statewide-information-security-policies.</p> <p>The policy regarding data classification and handling can be currently viewed at: https://it.nc.gov/documents/statewide-data-classification-and-handling-policy.</p> <p>The Functional Schedule for North Carolina State Agencies can be currently viewed at: https://archives.ncdcr.gov/documents/functional-schedule-state-agencies.</p> <p>The definitions in the Statewide Glossary of Information Technology Terms apply to all statewide information technology policies and standards and can be currently viewed at: https://it.nc.gov/documents/statewide-glossary-information-technology-terms.</p> <p>The NIST Glossary of Information Technology Terms can be used to supplement the Statewide Glossary of Information Technology Terms and can be currently viewed at: https://csrc.nist.gov/glossary.</p> <p>The Contractor shall also adhere to the standards listed in Attachment 2: State of North Carolina, Statewide Information Security Manual.</p> <p>Any exceptions to the standards described in this Requirement above and in Attachment 2: State of North Carolina, Statewide Information Security Manual shall be described in its proposal by adding Attachment 4 compliance in the Proposer’s Technical Proposal. The Contractor shall describe any exception to the security policy and why they are exempt. The Contractors shall identify only of those exceptions within the policy with an explanation. Categorical exception to the policy shall be considered non-compliance.</p>
382	Remote access to all RTCS shall be VPN based and controlled through a central repository, with each user having a unique log-in.
383	All remote access to the RTCS shall require two-factor authentication.

384	User sign-on, access, and access failures, both local and remote, to any element of the RTCS shall be recorded and tracked for security audit purposes and reported to the ITSM system. The RTCS shall continuously and automatically monitor for unauthorized access; access violations shall be reported to the ITSM system as Priority I alert. These reports shall be provided to NCTA within one (1) hour of discovery.
385	The RTCS shall support access levels, user roles, and privileges to be defined in a matrix during RTCS design with NCTA input and approval. The RTCS shall allow for additional changes to the access levels, user roles, and the addition of personnel in a secure manner.
386	A system-level account shall be provided for NCTA security systems to perform “credentialed” scans. Additionally, NCDOT IT security can request the Contractor to perform vulnerability, anti-malware and intrusion detection scans and provide reports through the term of the Contract.
387	The Contractor shall not circumvent NCTA approved RTCS security. All access to the RTCS and approved changes made shall be recorded, monitored, and available for review and audit. Specific requirements for this shall be developed by the Contractor during RTCS design.
388	The Contractor is responsible for all Updates, patches and hotfixes for all Software developed, furnished and/or installed under this Contract which are needed to maintain functionality and system security. Critical Updates shall be tested and installed within thirty (30) Calendar Days of release. All applicable Updates shall be reviewed to determine if they are necessary and, if so, shall be tested and installed within ninety (90) Calendar Days of release.
389	The Contractor shall perform monthly vulnerability tests that are scheduled in the ITSM system, as well as every time a new Software release is deployed or new network Equipment, is added or replaced to evaluate the security risk to the RTCS and identify potential vulnerabilities. NCDOT IT security shall be a party to these security tests and shall be notified in advance of any scheduled tests.
390	The Contractor is responsible for correcting all RTCS security deficiencies at the Contractor’s cost and ensuring that all security risks are mitigated to a level that is acceptable to NCTA and meets state guidelines.
391	<p>The Contractor shall provide at their cost an annual information security risk assessment to be performed by a third-party approved by NCTA and in consultation with NCDOT IT security. The Contractor shall provide the assessment results to NCTA.</p> <p>The Contractor, and third parties supporting the RTCS Information Environment, shall provide at their own cost applicable third-party risk assessment reports to NCTA that demonstrate the Contractor’s compliance to industry accepted guidelines (e.g., SOC 2 Type II, ISO 27001, FedRAMP, PCI DSS, etc.) before the Contractor is permitted to handle Restricted and Highly Restricted NCTA data, and annually thereafter. The Contractor shall adhere to the Statewide Information Security Manual Risk Assessment Policy, Section RA-2:</p> <p>https://files.nc.gov/ncdit/documents/Statewide_Policies/SCIO_Risk_Assessment.pdf https://it.nc.gov/documents/statewide-data-classification-and-handling-policy</p>
392	<p>The TRH shall provide access to:</p> <ul style="list-style-type: none"> a) DVAS and ACSMS live and historical recordings; b) Live and historical transaction records, including but not limited to video and images captured;

	c) Audit application for transaction reconciliation and transaction accuracy verification;
	d) Operations reports, analytics and dashboards;
	e) ITSM
	f) CEMS
	g) ACSMS
	h) All required local wide area (LAN), and wide area networks (WAN)

4.3.1.1 Critical Environmental Monitoring System (CEMS)

393	The Contractor shall provide a Critical Environmental Monitoring System (CEMS), which shall consist of an environmental monitoring unit for the HVAC and other environmental conditions. The environments monitored shall vary as appropriate depending on the enclosure type (roadside cabinet, or Equipment enclosure) and shall include: a) HVAC status (on/off); b) temperature; c) humidity; d) utility power; e) UPS power; f) smoke detector; and g) carbon monoxide detector.
394	The CEMS shall provide historical reports and trends for the monitored conditions.
395	The CEMS shall interface with ITSM system to generate and transmit alarms, alerts, recovery messages, and operational status. The CEMS shall also be accessible through the TRH interface for real-time and historical monitoring purposes.
396	The CEMS shall be accessible from the MRTMC and STOC via a virtual private network approved by NCTA and on a NCTA provided workstation.

4.3.1.2 Access Control and Security Monitoring System (ACSMS)

397	The Contractor shall furnish and install an Access Control and Security Monitoring System (ACSMS) for access and monitoring all Tolling Locations and equipment enclosures/vaults and roadside cabinets.
398	The ACSMS shall interface with MOMS to generate and transmit alarms, Alerts, recovery messages and operational status.
399	The ACSMS shall maintain access information and video logs of access events.
400	The ACSMS shall include proximity cards, readers, and access management software for all secure locations defined in future Task Orders.
401	The ACSMS shall have the ability to query and report the quantity and assignment of active cards in the System.
402	The Contractor shall provide sufficient quantities of proximity cards for the Contract Term.
403	The Contractor shall update the ACSMS to disable access within 2 hours of becoming aware of an employee's change in employment status.

404	The ACSMS shall be capable of providing escalated Alerts for unusual monitored events, including forced door openings and parking lot movements after hours via motion detection in areas of interest.
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4.3.1.3 Uninterruptible Power Supply (UPS)

405	All Hardware and Equipment required to operate the TRH shall be on UPS. The UPS shall be supplied by the Contractor.
406	The Contractor shall interface with the transfer switch and the Contractor-provided smart Power Distribution Units (PDUs) to manage the TRH power distribution. Maintenance technicians shall have remote access to manage power to critical devices.
407	The UPS shall support the RTCS at each tolling location for a minimum of 2 hours on battery.
408	The UPS shall provide all critical status updates to the ITSM including on battery, low battery and critical low battery.
409	When utility power is restored, and Hardware/Equipment is no longer on the UPS, a notification shall be reported to the ITSM system.

4.3.1.4 Data Summarization

410	In order to support NCTA reporting functions, the Contractor shall provide a data dictionary and entity relationship diagram complete with defined tables, primary keys, and joins. The Contractor shall provide the data dictionary and views listed below.
411	Data Dictionary: Reference the baseline data dictionary provided in Attachment 3: Data Dictionary and fill in the Contractor compliance column as part of the Proposal. This dictionary should then be used to track Contractor development and additional fields through the duration of the Contract.
412	Transaction Detail Data View: Listing of transaction identification and all corresponding datapoints as listed in the data dictionary. Parameters shall include start date/time, end date/time, facility, and Toll Zone. This view shall be used by NCTA to create transaction summary reports, conduct detailed audits of transactions to assess system performance and functionality.
413	Finance Traffic Details Data View: Summary of total transactions that occurred in the lane grouped by vehicle class, transaction type and location with search parameters of start date/time, end date/time, facility, and Toll Zone. This view should also include a summary of assigned fares associated with the transactions in the counts. This view shall be used by NCTA to report on roadway usage.
414	Transactions Sent to CBOS Data View: Summary of total transactions sent to the CBOS grouped by vehicle class, transaction type and location with search parameters of start date/time, end date/time, facility, Toll Zone and timestamp reference (transaction time or time sent to CBOS). This view should also include a summary of assigned fares associated with the transactions in the counts and any dispositions received from the CBOS. This view shall be used by NCTA to track transactions sent to CBOS from a financial perspective. This dashboard also provides a transaction reconciliation for the Contractor provided system including data sent or received from the Contractor provided system with external interfaces.

415	Image Verification Services Data View (if provided): Total number of reviewed images grouped by number of image reviews complete (confirmed value sent to CBOS), number of images escalated, number of images rejected and number of images skipped with search parameters for start date/time, end date/time, facility, reviewer, and timestamp reference (transaction date or review date). This view shall be used by NCTA to monitor image review trends and Contract compliance.
416	Rejected Image Data View: Total number of rejected images grouped by reject reason, with search parameters of start date/time, end date/time, facility, Toll Zone and timestamp reference (transaction time or review time). This view shall be used by NCTA to track trends of reject reasons and ensure Contractor compliance with image quality requirements. This view shall be used by NCTA to monitor image rejection trends and Contract compliance.
417	Image Transaction Trend Data View: Summary of image-based transactions, image video clips, system logs, and image files, showing counts and percentages of images processed using ALPR or MIR, grouped by jurisdiction with search parameters of start date and end date. This view shall be used by NCTA to monitor image processing performance base on license plate jurisdiction.
418	Maintenance Ticket Detail Data View: List of maintenance ticket identification and all corresponding datapoints listed in the data dictionary. This view shall be used by NCTA to create maintenance activity summary reports to analyze trends and Contract compliance.
419	Maintenance Ticket Summary Data View: Summary of all maintenance tickets grouped by priority and response/repair times with search parameters for facility, Toll Zone, lane, device type, start date/time, and end date/time. This view shall be used by NCTA to analyze maintenance trends and Contract compliance.
420	Equipment Tracking Detail Data View: List of Equipment serial numbers and all associated datapoints listed in the data dictionary. Search parameters for Equipment location, Equipment name, Equipment status and Equipment warranty end date. This view shall be used by NCTA to track and monitor the Contractor's Equipment inventory and Equipment performance.
421	Vehicle Density and Speed Data View: List of MVD data by direction and location that includes speed, density and occupancy by lane and at 5-15-minute intervals. Search parameters include Equipment location, name, status, Toll Zone, toll lane, Express Lane or general-purpose lane, date, direction, speed range from 0 through 999 and density from 0 through 999.
422	Detailed documentation of all data elements listed in this Section 4.3.1.4 shall be provided to NCTA by the Contractor no later than thirty (30) Calendar Days after NTP.

4.3.1.5 Data Warehouse

423	The Contractor shall provide a replicated database environment independent and separate of the host production environment for reporting and analytics to which NCTA will have full access.
424	The Contractor shall provide validation that any and all data replicated between the production database(s) and the replicated database is complete and accurate.
425	The replicated database environment shall be Updated with all non-sensitive data (production data excluding any Personally Identifiable Information (PII) related data) at a minimum once per day.

426	The data warehouse shall house all data elements listed in the Requirements under Section 4.3.1.4 Data Summarization of Part III Scope of Work and Requirements.
427	The Contractor shall support the connection of outside interfaces to the data warehouse for NCTA data collection, management and analysis purposes.

4.3.1.6 External Interfaces and Data Requirements

428	The Contractor shall provide, an Interface Test Plan (ITP) as described in Section 2.6.1.1 of Part III, Scope of Work and Requirements.
429	The Contractor shall provide data through its interfaces in open commercially available toolsets.
430	The Contractor shall provide access to the following data types, at a minimum, as described below: <ul style="list-style-type: none"> a) microservices, webservices or Batch files: includes AVI or image-based transaction data required to meet the Performance Requirements; b) streaming data that may include video from DVAS or CCTV, system monitoring devices used in ITSM or another related diagnostics tool; c) structured data that includes data from DPS that includes TRS displayed data, transaction data, service records or pricing data; d) unstructured data that includes log files, data or other low-level information or unstructured data that can be used for audit purposes or diagnostics of system issues; and e) any additional data types shall be described by the Contractor in its proposal.
431	NCTA anticipates using cloud infrastructure tools and related edge analytics tools to build data pipelines to be able to independently review the results provided by the Contractor for the purpose of audit and compliance. NCTA is migrating to a Microsoft Azure platform for its CBOS modernization project. However, NCTA may also use AWS or GDP cloud infrastructure tools or edge data analytics tools, and ETL's to retrieve such data.
432	The Contractor shall provide read only user access to all databases, data integration services for its provided RTCS required data dictionary for structured and unstructured data. For structured data that is typically in a RDMS or data lake, the Contractor shall include roadside lane transaction data, image review, service management ticket data, Express Lanes pricing and other toll rate data. For unstructured data, NCTA will also have access to real time log files for its independent audit and review of such data using data integration services native to the selected cloud platform.

433	<p>The Contractor shall provide read-only access to its pertinent databases above 30 days prior to the start of FAT and work with NCTA to establish access to its system via temporary access using a cloud storage, VPN or other access point. The Contractor shall make the read-only access available for NCTA to extract structured data from an Open Database Connectivity (ODBC) connection or cloud-based solution (depending on the Contractor’s architecture) for all structured data.</p> <p>For unstructured data including logs, the Contractor shall make such data available using the cloud native data integration services in its raw formats. NCTA plans to create data driven workflows from these endpoints for its audit and data transaction analytics and analysis. The Contractor shall not restrict any tool (custom or COTS) to access any data from the RTCS and shall coordinate access with NCTA at its request through the entire duration of the Contract. NCTA may use multiple cloud storage tiers including S3, Microsoft Azure Blobs, Google Cloud Storage, Web Services, or SFTP to access its data from the RTCS.</p>
434	<p>The Contractor shall describe in the proposal how NCTA can access both structured (RDMS) and unstructured (txt files, log files etc.) and video streams for any data from the RTCS. The Contractor shall provide a list of all data types, brief description and purpose available on how it is used to meet the requirements, and recommended data format and availability. At a minimum, all data shall be retrievable no greater than 24 hours after it is created in the RTCS. NCTA desires that this data is received near real time and expects to use edge analytics tools to capture such data as it is needed in a streaming manner to monitor and audit its system in lieu of just coping all data for post analysis. Depending on the Contractors architecture and data availability, NCTA may retrieve all data or only data available.</p>

4.3.1.7 TRH Disaster Recovery System

435	<p>The Contractor shall provide a system, redundant to the primary TRH, which prevents the loss of any function or data in the event of total or partial failure or loss of the primary TRH. This system will be referred to as the Disaster Recovery System in this Contract.</p>
436	<p>The Disaster Recovery System shall provide all necessary functions to support the Disaster Recovery Plan requirements included in Section 2.9 Disaster Recovery Plan.</p>
437	<p>The Disaster Recovery System shall support the RTCS to meet all functional and performance requirements in Section 4 RTCS (includes RSS and ITS) Functional Requirements and Section 6 Performance Requirements – Operations and Maintenance.</p>
438	<p>The Disaster Recovery System shall be accessible to NCTA and their supporting staff at all times.</p>
439	<p>The hosted location of the Disaster Recovery System must be within the contiguous United States and must be approved by NCTA.</p>
440	<p>The Contractor is responsible to provide all network connectivity required between the Disaster Recovery System and all internal and external interfaces needed to support its operation.</p>

4.3.2 Dynamic Pricing System

4.3.2.1 Dynamic Pricing System Core Function Requirements

441	The DPS shall calculate toll rates, based on configured pricing plans through time of day(calendar) pricing or traffic volume(density) data in the system.
442	The DPS shall provide functionality to support directional tolling, zone based tolling, and tolling segments. Tolling segments is a rate determined between two Toll Zone and toll rates are expected to be charged based on vehicle travel at the Toll Zone. The DPS shall support future trip building. At Go-Live, NCTA anticipates that all toll rates will be calculated for each toll segment. The Contractor shall support changes to the toll scheme including the adoption of zone or trip building pricing.
443	The DPS shall update rates during each pricing interval. A pricing interval shall be from five (5) minutes to one hour, in five (5) minute increments.
444	The DPS shall provide toll rates to the CBOS/OBO via GUI and system for historical purposes. The toll rate schedule shall meet all data retention requirements as specified in Part III, Scope of Work and Requirements .
445	The DPS shall determine average rates for the pricing intervals defined in this Section for each day of the week, based on the most recent 90 days. This may be used for NCTA future toll rate determination. The DPS shall use this as default toll rates if directed by NCTA.
446	The DPS shall either provide the time of day (preconfigured) toll rates to the Toll Rate Sign or the pre-computed toll rates based on traffic volumes and density.
447	The DPS shall include or exclude toll rates for Toll Zones which are not operational or suspended in toll collection.
448	The DPS shall adjust rates as specified by pricing plans from NCTA for different lane modes and events such as toll suspension as directed by NCTA.
449	The DPS shall support at least twenty (20) different pricing plans. The DPS shall load different pricing plans and schedule or make pricing plans active as required.
450	The DPS shall have Software algorithms that can use or filter density information from the ITS devices in order to calculate estimated travel times and toll rates.
451	The DPS shall be capable of consuming and processing traffic volume, speed and density data from the roadway to be used in DPS software algorithms.

4.3.2.2 Toll Rate Sign (TRS)

452	The Express Lanes toll facility shall use dynamic pricing with full matrix TRS modules/signs, integrated with the RTCS and controlled by the Contractor. These are required to inform motorists of the price in effect on the tolled Express Lanes so that motorists can choose their travel option. The Contractor shall provide all equipment necessary to integrate and make the TRS operational to meet all Requirements.
453	The RTCS shall use available data to correlate the rate seen on a TRS by a driver to the corresponding transaction at the downstream toll zone. Possible methods include:

	a) an evaluation of travel times indicated by ITS at the TRS points and the subsequent tolling point (if available), or
	b) an analysis of speed data gathered by roadside traffic sensors.
454	The Contractor shall provide a sign control system which, in normal operations, communicates with the pricing system and controls the TRS display.
455	Authorized personnel shall have access to the TRS through a secure and authorized user network interface to directly control the TRS manually and override system messages. When operating in manual override mode an alarm message shall be generated and sent to ITSM system at configurable intervals. The Contractor shall leverage native functionality (where possible) in the variable TRS boards.
456	The status of the TRS and the data on the TRS shall be displayed on the TRH dashboard/operations monitoring screen in real-time. The Contractor shall also provide a feed to the CBOS/OBO to display this dashboard or other data as NCTA chooses.
457	Loss of communications or failure of any component of the TRS, including the TRS camera shall be detected and reported to ITSM system and be displayed on the operations monitoring screen as a Priority I event.
458	These TRS cameras shall be integrated into the RTCS by the Contractor to record the data displayed on the TRS upon every change in message and at configurable intervals. The recorded frames shall be displayed on the operations monitoring screen and available for review.
459	The TRS and the TRS cameras shall be synchronized to the same time source as the Toll Zone Controllers.
460	The TRS camera shall have fixed view presets and also be able to pan/tilt/zoom to accommodate when the TRS is not functioning and temporary roadside signing is used to communicate temporary toll rates.

4.3.3 Image Verification Services

The Contractor shall provide Image Verification Services that integrates with the RTCS. The Contractor shall transition the IVS to the NCTA OBO at the direction of NCTA. The Contractor shall describe how it will provide Image Verification Services within the RTCS solution. The Contractor shall also describe in writing how IVS will be transitioned to a NCTA provided OBO at the direction of NCTA. NCTA reserves its rights to provide IVS within the OBO and not renew IVS by the Contractor. The Contractor shall provide a RTCS that allows IVS to be conducted by NCTA in the OBO at no additional cost to NCTA. NCTA will provide the Contractor 60 Calendar Days' notice to transition to continue with Image Verification Services.

461	The Contractor shall provide image verification services to return the license plate number (LPN), jurisdiction and plate type according to NCTA Business Policies. Each plate type shall have an assigned code, which could contain up to three (3) digits as agreed to by NCTA and the Contractor during design.
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462	The Contractor shall provide all resources and training needed for review and processing of images throughout the term of the Contract. The Contractor shall provide training materials including plate identification, plate types of repository and training materials provided to its staff or management for image review through the testing period.
463	The Contractor shall provide a disaster recovery environment (multiple locations) and shall expand/reduce processing for image verification services.
464	The RTCS shall create a Region of Interest (ROI) from the image used to determine the license plate data, showing an enlarged view of the license plate with the license plate data clearly readable to the unaided eye. The ROI shall meet the CBOS/OBO ICD specifications.
465	The RTCS shall provide Automatic License Plate Recognition (ALPR) and identify license plate information, including license plate type, alphanumeric characters, stacked characters, vanity plates and jurisdiction of origin, to be included in the lane transaction message.
466	The RTCS shall provide image sets for image-based Toll Transactions which conform to the most recent CBOS/OBO ICD. This shall include the inset or modified version of any image or Region of Interest (ROI) used to create a human readable image that goes on the Bill by Mail invoice.

5. Maintenance Responsibilities and Services

NCTA and Contractor's responsibilities for providing Maintenance Services and associated communications during the Maintenance Phase of the Contract are described herein. Maintenance shall be divided into three Maintenance levels as described below.

1. Level I Maintenance is defined as assignment and triage of incidents and issues and reporting and monitoring.
2. Level II Maintenance means corrective and preventative maintenance that requires minor Software configuration, Equipment replacement and configuration, planned shutdown and minor preventative actions including analysis of log files to ensure that the systems operate in accordance with the Performance Requirements.
3. Level III Maintenance means corrective and preventative maintenance for all patch management, Software changes and major changes to the system functionality. Level III Maintenance also includes 24/7 remote support for Level I and II maintenance staff.

The Contractor shall provide Maintenance Services for all work described below, as applicable to the subject Task Order:

- a) Roadside Equipment;
- b) System Hardware Maintenance (servers, storage, network switches, firewalls, routers, etc.);
- c) System administration;
- d) Software support services;
- e) Network administration;
- f) Database administration;
- g) Monitoring services;
- h) Preventive maintenance.;
- i) Corrective maintenance.;
- j) Security and Confidentiality;
- k) ITS Maintenance; and

- l) Facility Maintenance.

NCTA under a separate contract shall perform the following services, including but not limited to:

- a) Federated IT Service Management system;
- b) Ongoing participation with NCTA’s maintenance staff and involvement in meetings and processes;
- c) Provision of an ample spare parts inventory to meet all Performance Requirements if required by NCTA; and
- d) Level I, II, III CBOS/OBO Maintenance.

NCTA does not reimburse the Contractor for the cost of tolls incurred, nor shall any “non-revenue” Transponders be provided for the Contractor’s use on NCTA toll facilities.

The Contractor shall be responsible for coordinating with the Constructor for any ITS Equipment failures which occur during the manufacturer’s warranty period for ITS elements provided by others.

The Contractor shall provide complete Maintenance Services for:

- a) All maintenance work for a base period of up to 5 years; and
- b) All maintenance work for two optional 3-year periods.

Sample Project Implementation and Maintenance Phases Timeline			
Project Implementation through Operations and Maintenance Period	5-Year Base Maintenance Contract Period Maintenance Year 1 through Maintenance Year 5	3-Year Optional Maintenance Period Maintenance Year 6 through Maintenance Year 8 (1st Optional Maintenance Period)	3-Year Optional Maintenance Period Maintenance Year 9 through Maintenance Year 11 (2nd Optional Maintenance Period)
Contractor Responsible for All Maintenance Work and Costs prior to Go-Live. See Part IV, Terms and Conditions for Additional Details.	Contractor Responsible for All Maintenance Work with Payment Based on Price Proposal. See Part IV, Terms, and Conditions for Additional Details.		

Figure 2: Project Implementation Phases

5.1 Roadway Maintenance Services – General Requirements

467	The Contractor shall provide all maintenance activities associated with the RTCS maintenance and Software support services throughout the term of the Contract as further set forth in this SOW and Requirements.
468	Hardware, Software, and RTCS Maintenance Services shall be provided from GO-Live of RTCS through the end of Contract Term (including extensions) as further set forth in Part IV, Terms and Conditions with full warranties as further set forth therein.

469	The Contractor shall provide a Software license and associated escrow as further set forth in Part IV, Terms, and Conditions .
470	In the Operations and Maintenance Phase, maintenance shall include all services required to maintain the RTCS, including Hardware, Equipment, Software, and components at the required performance levels. NCTA will not be charged any additional amounts beyond those included in the approved price proposal for all services related to maintenance; notwithstanding the foregoing, force majeure events shall be as set forth in the Contract as further set forth in Part IV, Terms and Conditions .
471	All Equipment mounting Hardware and brackets provided as a part of this SOW and Requirements shall be included under Maintenance Services and, as such, shall be warrantied for the life of the Contract.
472	If required by the Contractor, services for fiber-optic/utility location shall be invoiced to NCTA as cost plus \$250 per locate.
473	If required by the Contractor, NCTA approved repair or other services that fall outside the Maintenance Services described herein shall be invoiced at the service rates as defined in Exhibit D-7.

5.1.1 RTCS Warranty Program

474	The Contractor shall be responsible for the development, implementation, and administration of a warranty program for all Hardware, Contractor developed, and third-party Software as further set forth in Part IV, Terms and Conditions .
475	The Contractor shall maintain warranty records and service agreements for all Hardware and third-party Software and shall review and implement Software Upgrades and available patch reports to keep the RTCS current per the approved Management Plan and as further set forth in Part IV, Terms and Conditions .

5.1.2 Detailed Maintenance Requirements

The Maintenance Services shall include monitoring, preventive, pervasive, corrective, security-related and emergency maintenance services, and certain Upgrades and enhancements to be performed on all elements of the RTCS. All Maintenance Requirements are listed as the Contractor shall provide a Maintenance Plan and all other related maintenance Deliverables as specified in this **Part III, Scope of Work and Requirements**.

476	Detailed assignments of levels to incident types shall be in accordance with the requirements and shall be defined and approved during the design of the project.
477	The Contractor shall monitor ITSM system work orders and initiate corrective actions to meet requirements for the response to maintenance events and incidents that are under the Contractor's responsibility.
478	As part of the Software support services, Contractor shall develop and test Software as required to accommodate corrective actions, changes to business rules, or configurations. The scope shall include the provision of evidence packages detailing the planned changes for NCTA's review and approval, including installation of new Software and confirmation of successful installation per the approved Management Plan.

5.1.2.1 Maintenance Requirements

The Maintenance Services shall include monitoring; preventive; pervasive; corrective; security related and emergency Maintenance Services and certain Upgrades and Enhancements to be performed on all elements of the Roadway System. Maintenance scope will be determined with each Task Order.

479	All Maintenance incidents, activities and monitoring include, but are not limited to:
	a) monitoring the RTCS for failures and alarms and confirm an ITSM system work order has been created for each failure as defined in the system design;
	b) acknowledging and responding to work orders assigned to the Contractor;
	c) creation and assignment of a work order in ITSM system if a work order has not been created;
	d) performing the necessary maintenance and closing the ITSM system work order upon confirmation that the failure has been successfully corrected;
	e) monitoring and maintenance of the production, data warehouse, and test environments;
	f) Updates to operating system and Software infrastructure in the production, data warehouse and test environments;
	g) performing preventive maintenance in accordance with an approved Maintenance Plan;
	h) general Equipment and Hardware maintenance, replacement and spare parts inventory in ITSM system;
	i) general inspection and maintenance of roadside infrastructure;
	j) ongoing monitoring, Updates, maintenance tasks related to roadside subsystems, operations, controllers, servers and storage systems;
	k) address and resolve third-party Software issues (OS, third-party, peripheral and infrastructure Software);
	l) backup system monitoring (verification of successful backups), maintaining (applying Updates when needed) and managing (backup media rotation, offsite storage, etc.);
	m) monitoring, updating and general maintenance and troubleshooting of LAN communications and associated devices;
	n) monitoring, updating, and general maintenance and troubleshooting of both active and redundant LAN/WAN communications and associated devices;
	o) deployment of RTCS Software to the production data warehouse and test environments;
	p) maintaining the ongoing relationship (support and maintenance agreements) with third-party vendors;
q) performing Software licensing renewals;	
r) HOV indicator beacon;	

	<p>s) performance of all system administrative functions at regular intervals if not automated and recording and tracking such activities as preventive maintenance work orders through ITSM system;</p> <p>t) continuous monitoring of system operations to verify RTCS is functional; security posture is adequate; processes are being executed as scheduled; files are transmitted as specified, and RTCS is operating to Contract Performance Requirements;</p> <p>u) manual retrieval of data from the Zone Controllers and download of the Transponder status list and toll rate and schedule files in the event of extended communications failure;</p> <p>v) re-establishing or re-installing system files, programs and parameters, as required, following a failure or damage to the RTCS and returning lanes to fully operational condition.</p> <p>w) performing Disaster Recovery procedures as needed and return lanes, host and TRH to fully operational condition when disaster recovery situation is initiated, and;</p> <p>x) analyzing anomalies and periodic, daily, and weekly trends to identify problems and initiating an investigation and subsequent correction.</p>
480	<p>Work orders and alerts assigned to the Contractor, as defined during the design;</p> <p>a) development of defect fixes, security fixes, performance fixes and corrections to the Software and applications as identified during audits;</p> <p>b) Updates to all Software drivers to meet any new standard operating system Upgrades as they become available;</p> <p>c) Software changes that are necessary or required to meet the system requirements, parameter changes, or lane configuration changes;</p> <p>d) source code maintenance;</p> <p>e) perform internal testing prior to releasing fixes to production;</p> <p>f) ongoing Software warranty maintenance as set-forth in the Contract; and</p> <p>g) change management and configuration management tasks prior to Software and Hardware changes.</p>

5.1.3 Upgrades and Enhancements

481	<p>The Contractor shall provide in electronic format all patches and Updates made to the RTCS Software.</p>
482	<p>Upgrades and enhancements shall be proposed by the Contractor or requested of the Contractor in accordance with the change order/extra work order process as set forth in Part IV, Terms, and Conditions. Examples of Upgrades and enhancements include but are not limited to: accommodating major changes to standards, statutes, or interoperability Equipment or the addition of new Equipment or functionality providing demonstrable benefits in performance, costs or productivity.</p>

483	Software modifications required to maintain and support the RTCS as a part of the normal course of business shall not be considered Upgrades or enhancements paid for by NCTA. These modifications include but are not limited to: patches and security Updates, version changes; configuration or parameter changes; minor changes to Software or code, such as changes to the existing ICDs; Software modifications required to ensure RTCS is compliant to existing standards and changes for the Contractor’s benefit that improve the Contractor’s ability and efficiency to maintain and support the RTCS.
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5.1.4 Audits

484	The Contractor shall, upon request, support NCTA in any audit activity relating to NCTA’s RTCS or operations. In addition, the Contractor shall conduct audits in accordance with the Contractor’s QA and QC program. All deficiencies identified through the audit process shall be successfully corrected by the Contractor. These audits may include, but are not limited to, the following: a) internal control procedures; b) revenue/transaction reporting; c) financial audit; and d) system processing and performance.
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5.1.5 RTCS Hardware Maintenance and Software Support Services

The Requirements in this section describe Hardware Maintenance and Software Support Services. The Proposers shall describe how it will perform all Levels of Maintenance Services in its Proposal.

485	Monitoring and troubleshooting of the RSS including, but not be limited to:
	a) Zone Controllers;
	b) AVI system;
	c) AVDC system;
	d) Interface to future VOD system provided by others;
	e) ICPS components and controllers;
	f) OCR/ALPR Software;
	g) Dynamic pricing system;
	h) Card readers;
	i) Image-based transaction alarms;
	j) DVAS cameras and system;
	k) ACSMS cameras and system;
	l) inspection, test, and repair of cables, wiring and terminations;

	m) Contractor supplied network Equipment; and
	n) all Roadside Contractor and third-party Software.
486	The Contractor shall perform automated routine diagnostics on all in-lane peripherals and in-lane subsystems.
487	The Contractor shall provide inspection and maintenance of environmental control devices, UPS, generators, and CEMS monitoring devices specified in the Task Order..
488	The Contractor shall monitor and maintain RSS Software processes, operations, and interfaces to the host, TRH and to NCTA CBOS/OBO.
489	The Contractor shall monitor real-time roadway operations screens and dashboards and responding to issues.
490	The Contractor shall analyze periodic, daily, and weekly trends to identify problems, including but not limited to:
	a) a high number of transactions without Transponder;
	b) a high number of class mismatch transactions;
	c) abnormal changes in traffic counts and class;
	d) a high number of exceptions or unusual occurrences as described in this SOW;
	e) transaction exceptions;
	f) a high number of invalid Transponder transactions;
	g) abnormal changes in Transponder counts and status changes; and
	h) a high number of rejected images.

5.1.6 Monitoring and System Administration Services

The requirements in this Section 5.1.6 describe the monitoring and system administration services.

491	All RTCS administrative functions, if not automated, shall be performed by the Contractor at regular intervals as part of the RTCS preventive Maintenance Services according to the approved Maintenance Plan to ensure system performance is optimized. All such system administrative functions shall be scheduled as preventive maintenance work orders through ITSM system and tracked.
492	Continuous monitoring of system operations shall be performed by the Contractor in conjunction with NCTA to verify that the system is functional, security posture is adequate, processes are being executed as scheduled, files are transmitted as specified, and system is operating to Contract Performance Requirements.
493	Continuous monitoring of operations, including but not be limited to:
	a) confirming and verifying receipt of all the ITSM system messages and alerts;

	<ul style="list-style-type: none"> b) verifying the ITSM system is receiving and processing system events and reporting the correct status; c) evaluating sample transactions data for exception; d) confirming data and image transmission to the host; e) verifying processes, programs and scheduled jobs are successful; f) reviewing comparative reports to identify system degradation; g) confirming the successful transfer of Transponder status list to the lanes; h) reviewing OCR/ALPR or manual image processing results and poor-quality images; i) monitoring the DVAS video and event data; j) verifying security access cameras are operational; k) reviewing sample images from each tolling location; l) monitoring traffic detectors; m) correcting performance issues identified; n) evaluating storage requirements; o) verify time synchronization is occurring as configured and system clocks are not drifting beyond acceptable threshold; and p) reviewing error logs and alerts.
494	Provide continuous 24x7 system administration services coverage on the RTCS to ensure that it is performing and shall continue to perform at a satisfactory level.
495	<p>System administration services shall include monitoring and corrective action to ensure system performance is in accordance with Requirements of this SOW. This shall include but is not limited to:</p> <ul style="list-style-type: none"> a) monitoring host Hardware at the TRH servers, storage devices and backup systems; b) verifying processes, programs, and scheduled jobs are successful; c) all transactions and images are successfully transmitted to the receiving systems; d) all messages described in the ICD are being successfully exchanged between the RTCS, and NCTA CBOS/OBO; e) confirm applications are functional and available to authorized users; f) all scheduled reports are successfully generated and available to authorized users; g) all processes are functioning, and data and images are moving successfully through the queues; h) all third-party interfaces are functioning and successfully exchanging files; i) scheduling of preventive, corrective and predictive maintenance activities;

	<ul style="list-style-type: none"> j) any daily, weekly, or periodic maintenance required to maintain the RTCS at required performance levels (for example: indexing and tuning databases; archiving and purging in accordance with NCTA’s retention policy);
	<ul style="list-style-type: none"> k) maintaining and updating records of all maintenance events and activities in the ITSM system;
	<ul style="list-style-type: none"> l) third-party Software or firmware Upgrades in conjunction with NCTA, as required and to be compliant to security requirements including but not limited to performing security Software Upgrades, database Upgrades, and operating system Upgrades;
	<ul style="list-style-type: none"> m) contact with NCTA, operations and contractors regarding system issues, performance, security posture, Software release, and maintenance scheduling;
	<ul style="list-style-type: none"> n) approved manual actions, adjustments and Updates to the system data based on predefined criteria to correct issues and as authorized by NCTA;
	<ul style="list-style-type: none"> o) re-establishment or re-installation of system files, programs, and parameters, as required, following a failure or damage to the system;
	<ul style="list-style-type: none"> p) monitoring of error logs and system logs;
	<ul style="list-style-type: none"> q) maintenance of up-to-date Software backups (all system Software and data);
	<ul style="list-style-type: none"> r) installation of new Software and confirmation of successful installation;
	<ul style="list-style-type: none"> s) assisting NCTA operations staff as requested by NCTA;
	<ul style="list-style-type: none"> t) troubleshooting RTCS issues;
	<ul style="list-style-type: none"> u) creation of ad-hoc data queries requested by NCTA;
	<ul style="list-style-type: none"> v) generation of queries as requested by NCTA; and
	<ul style="list-style-type: none"> w) analysis of data as requested by NCTA.
496	<p>Software support services shall include monitoring and corrective action to ensure system performance is in accordance with Requirements of this SOW, to include database management and operation. This shall include but is not limited to investigation and analysis of errors and exceptions and taking corrective action, including correcting the problem and reprocessing the data, monitoring of notifications, and initiating corrective actions on application programs to meet the requirements listed below:</p> <ul style="list-style-type: none"> a) Updates to the RTCS and application to support Upgrades to Hardware or third-party Software; b) Updates to the RTCS and application to support all changes to business rules and RTCS configurable parameters, and deploy changes in production; c) attend interoperability meetings as requested by NCTA; d) Updates to the RTCS and application to support minor changes to NCTA interoperable partner and national interoperability ICD; e) Updates to the RTCS and application to support the addition of new interoperable agencies;

	f) Updates to the RTCS and application to support changes to continue its compliance to Updated security requirements; and
	g) Updates to the RTCS and application to support legislative and statutory changes.
	h) As part of the Software support services, the Contractor shall develop, and test Software as required in accordance with NCTA change order process to accommodate corrective action and changes to Business Rules. The Contractor shall include the provision of evidence packages detailing changes for NCTA's review and approval, installation of new Software and confirmation of successful installation.
	i) As part of the network administration, the Contractor shall monitor all network alerts and alarms, as well as to detect intrusion attempts and prevent intrusions.
497	The Contractor shall Upgrade and Update the network security and provide the required Software and monitoring tools to ensure the RTCS is always in compliance with the most recent penetration and vulnerability test requirements.

5.1.7 Types of Maintenance

5.1.7.1 Preventive Maintenance

498	The Contractor shall be capable of providing and performing onsite preventive maintenance on the Roadside System Hardware, RSS Hardware, host Hardware, Contractor LAN/WAN communications Equipment, and Software in accordance with the approved Maintenance Plan.
499	The Contractor shall inspect all Contractor installed Equipment, both major components and support components (fans, cables, connectors, cabinets, Equipment racks, storage units) that constitute the RTCS and shall make such repairs, cleaning, adjustments, and replacements of components as necessary to maintain the Equipment in normal operating condition in accordance with the approved Maintenance Plan.
500	The Contractor shall include in the Maintenance Plan their preventative maintenance program, which includes a schedule of all preventative maintenance activities requiring lane closures for the upcoming month at least five (5) Business Days before the beginning of the month.
501	preventive maintenance shall be performed by the Contractor during the normal working hours when maintenance technicians are scheduled to be onsite. NCTA approved diagnostic aids, tools, and Equipment to perform preventive maintenance Equipment analysis shall be provided by the Contractor, as necessary.
502	Preventive maintenance requiring lane closure shall be scheduled by the Contractor for off-peak travel periods, evenings, Saturdays, and Sundays and coordinated with NCTA, so that the work shall not interfere with normal traffic flow unless otherwise approved by NCTA.
503	The Contractor shall provide changes to the approved Maintenance Plan schedule as soon as changes become known due to weather, contractor availability, or any other reason.
504	In addition to required ongoing Contractor monitoring, the servers and data processing units shall be periodically checked by the Contractor to verify that storage space is not reaching limits, disks are not fragmented or damaged, Software being used is of latest version per the configuration management and data is being processed and transferred in an appropriate manner.

505	Transaction and image processing volumes and times shall be monitored by the Contractor and Systems optimized for performance with NCTA approval to meet all Contractual Requirements.
506	Report generation times, system access times, and system response time shall be monitored by the Contractor to ensure performance meets the Contractual Requirements.
507	The Contractor shall include all Equipment and systems as part of the preventive maintenance in accordance with the original Equipment manufacturer's guidelines. Any variations or exceptions shall be noted by the Contractor and approved in advance by NCTA.
508	The Contractor shall provide a preventive maintenance schedule, to be approved by NCTA, as detailed in the Maintenance Plan.
509	The preventive maintenance schedule shall be entered by the Contractor into the ITSM system, and work orders shall be automatically created to alert Contractor staff of required preventive maintenance. Failure of the Contractor to perform required preventive maintenance in accordance with the approved schedule shall result in monthly fee adjustments, as specified below in the maintenance Performance Requirements.

5.1.7.2 Corrective Maintenance

510	All work performed by the Contractor to correct Software defects or problems to meet the requirements of the Contract shall be considered as corrective maintenance. Such problems include but are not limited to:
	a) failure of subsystem functions and devices;
	b) problems identified by the users, including the TMC, and customers;
	c) interface issues and devices;
	d) failure of processes and programs;
	e) data reconciliation issues;
	f) report issues;
	g) application failures;
	h) RTCS network issues;
	i) inadequate security posture;
	j) degraded RTCS or component performance; and
	k) non-conforming availability or MTBF.
511	Contractor shall notify NCTA before any corrective maintenance is performed.
512	Notwithstanding the foregoing, for the repeated failure of Equipment, components, or systems, the Contractor shall undertake an investigation. If the problem is determined by NCTA to be a pervasive defect, the Contractor shall be responsible for resolution as set forth in Part IV, Terms and Conditions .

5.1.8 Incident and Revenue Loss Reporting

513	The Contractor shall immediately notify NCTA of any incident or event whereby the potential or actual loss of revenue occurred. The Contractor shall take immediate action to rectify the condition and return the RTCS to normal functioning.
514	A monthly incident report shall be provided by the Contractor that includes a breakdown of lost transaction data and revenue by roadway for each incident. If the condition is determined to be due to the fault of the Contractor, damages shall be assessed in accordance with the Part IV, Terms of the Contract .

5.1.9 Spare Parts

This Section 5.1.9 details the Contractor's responsibilities regarding spare part management for the duration of the Maintenance Phase.

515	Contractor shall be responsible for the inventory of all spare parts at the storage facility and shall be insured in this regard as set forth in the Contract. The Contractor shall account for all spare parts and shall provide safeguards against theft, damage, or loss of the spare parts.
516	The spares facility and storage area shall be secured and connected to an up-to-date security network System with alarm notification monitored by the Contractor. Further, it is required that NCTA shall have full and unrestricted access to the Maintenance and or storage facility.

5.1.9.1 Procurement and Control of Spare Parts

517	Thirty (30) Calendar Days prior to placing the RTCS in revenue collection, the Contractor shall have purchased and have on hand, an adequate inventory of spare parts to maintain the system in accordance with all system availability KPIs.
518	The spare parts shall be purchased on behalf of NCTA and shall be owned by NCTA.
519	Any spare parts that are lost or damaged due to the negligence, intentional act, or omission of the Contractor or its employees, Subcontractors, agents, or invitees shall be replaced by the Contractor at its sole cost.

5.1.9.2 Spare Parts Inventory Management

520	Contractor shall be responsible for the inventory of all spare parts at the storage facility and shall be insured in this regard as set forth in the Contract. The Contractor shall account for all spare parts and shall provide safeguards against theft, damage, or loss of the spare parts.
521	The spares facility and storage area shall be secured and connected to an up-to-date security network System with alarm notification monitored by the Contractor. Further, it is required that NCTA shall have full and unrestricted access to the Maintenance and or storage facility.
522	The Contractor shall ensure that only spare parts and Equipment required to service the Roadway System and WAN/MAN/LAN communications spare Equipment are stored at this facility and shall only be used for NCTA Roadway Systems.

5.1.9.3 Spare Part Inventory and Tracking

523	The Contractor shall be responsible for the Maintenance of an adequate spare parts inventory during the Contract Period. The Contractor is responsible for monitoring and identifying the existing spare parts inventory, ordering spare parts as required, and proposing the quantity needed to maintain the required performance and maintaining all applicable data in the ITSM.
524	The Contractor shall also be responsible for tracking of all warranty replacement for Contractor provided Equipment through returned material authorization process. If the replaced part is under warranty, the part shall be immediately replaced with a new part. If the replaced part is out of warranty, Contractor shall make every effort to repair the replaced item to a usable status and place the part back into spares inventory.
525	If the Contractor is unable to repair the part, a new part shall be purchased and placed into spares inventory. The details of the repair efforts, including problem, status, inventory, and repair disposition, shall be included in the ITSM inventory and repair database.

5.1.10 Notifications

526	The entry of a problem (either by the RTCS or an authorized user) into the ITSM system or the presence of a failure notification shall constitute the start of the acknowledgment time for purposes of measuring the Contractor's acknowledgment time and response/repair time.
527	<p>For purposes of measurement of performance and for the development of maintenance policy and procedures, notification of RTCS malfunctions, problems and discrepancies may be provided to the Contractor in three (3) different methods, summarized below.</p> <p>a) Verbal Notification: Defined as an in-person notification or telephone call to the Contractor's designated maintenance personnel. In all cases, the first conversation with, or notification of the Contractor shall signify the start of the response time for purposes of measuring the Contractor's response time. All verbal notifications shall be recorded in ITSM system by the Contractor.</p> <p>b) Written Notification: Defined as a written description of a problem or condition, typically provided by NCTA or its representatives by email. The time of receipt email shall signify the start of the response time for purposes of measuring the Contractor's response time. All written notifications shall be recorded in ITSM system by the Contractor.</p> <p>c) ITSM System Notification: Defined as an automatic notification through the ITSM system identifying a problem within the RTCS that is the maintenance responsibility of the Contractor and sending out an automatic work order message by email or text to a Contractor's maintenance staff to respond to the failure. In addition to the Contractor notification, the work order shall be posted on the ITSM system and available via reports. The presence of an ITSM system notification in the RTCS shall constitute the start of the acknowledgement time for purposes of measuring the Contractor's acknowledgement and response time.</p> <p>d) Generation of Alert: Defined as automatic creation of an alert identifying a problem within the RTCS that is the maintenance responsibility of the Contractor. The generation of the automatic alert in the RTCS shall constitute the start of the acknowledgement time for purposes of measuring the Contractor's acknowledgement time.</p>

528	The Contractor shall provide NCTA TMC with any requests for lane closures to address emergency corrective repairs. The request shall be submitted immediately after the system failure is detected.
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5.1.11 Maintenance and Software Support Records

529	NCTA will have access to all maintenance and Software service records at any time for review and audit, upon reasonable notice. The Contractor shall provide monthly reports generated in the RTCS that permits NCTA to evaluate Contractor's maintenance performance. The Contractor shall provide a template at least 180 Calendar Days prior to Go-Live for NCTA review and approval.
530	The Contractor's maintenance manager shall maintain current, complete, and accurate records for all maintenance and Software support services activities. The Contractor's maintenance manager shall institute procedures that make sure the maintenance staff enters complete information into the ITSM before closing a work order or trouble ticket.
531	All preventive, pervasive, and predictive maintenance activities shall be reported in the same manner as corrective or emergency maintenance activities by the Contractor. The information shall be contained on the ITSM and shall be made available through various ITSM system reports.

5.1.12 Recording of Maintenance Activities

532	The Contractor and NCTA will utilize the ITSM for initiating the work orders. ITSM shall be utilized for recording and tracking all maintenance and Software support services performed on the RTCS. Additionally, all Equipment provided under this Contract shall be tracked through ITSM from the purchase to their disposal.
533	In all cases, the Contractor is responsible for logging all reported maintenance activities into the ITSM. The Contractor 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 ITSM.
534	The work order shall contain as much information as possible in order 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.
535	All Maintenance performance metrics shall be recorded and tracked through the ITSM, and compliance to Performance Requirements shall be validated using ITSM reports.
536	It is the Contractor's responsibility to ensure that its maintenance staff has real-time access to the ITSM and that all the required connections are established and ongoing to ensure that the maintenance staff has secure remote access approved by NCTA. Maintenance staff shall be trained in the use of the ITSM.

5.1.13 Maintenance Staffing and Maintenance Staff Training

5.1.13.1 Maintenance Staffing Requirements

537	The Contractor shall be responsible for maintaining an adequate level of technical staff to perform Maintenance and Software support services on the RTCS. The Contractor shall ensure that sufficient staffing is available to cover all maintenance activities identified in this SOW and Requirements at all times but particularly during the following periods:
	a) weekends;
	b) holidays;
	c) personnel on vacation/sick time;
	d) after regularly scheduled work hours (on-call); and
	e) unexpected emergency or crisis.

5.1.13.2 Maintenance Staff Training Program

538	The Contractor shall provide comprehensive training for the Contractor maintenance staff, including but not be limited to, the following:
	a) a thorough understanding and operating knowledge of the ITSM system is required of all maintenance personnel;
	b) an in-depth understanding of the RTCS, design, and operations, including all Equipment, Software, interfaces, file transfers, and interconnections;
	c) use of maintenance documentation such as maintenance manuals, drawings, Contractor manuals, and parts list;
	d) functions of the RTCS monitoring tools used to manage the system monitoring tasks;
	e) preventive maintenance of all systems and sub-systems;
	f) Troubleshooting, diagnostics, repair, testing, and maintenance follow up;
	g) system logs, errors logs, and processing of exceptions;
	h) system dataflow and workflow queues;
	i) review of the dashboard data and analysis;
	j) discussion on the areas of responsibility;
	k) special use maintenance and monitoring tools; and
	l) queries and reports.

5.1.13.3 Maintenance Staff Training Materials and Ongoing Education

539	Training material shall consist of maintenance manuals, Contractor manuals, and any other documentation that provides for the efficient and effective maintenance of the RTCS and its components.
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540	NCTA will have the right to make recordings and copies of all training program materials. The Contractor shall provide releases from all employees/contractors to allow unlimited, royalty-free use and copies of recordings.
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5.1.14 Security and Confidentiality

541	All Contractor personnel shall be subject to appropriate security and background checks to the satisfaction of NCTA. The Contractor shall obtain written approval from NCTA for all service personnel, and each Contractor personnel shall be required to sign an acceptable use agreement.
542	The Services and Work performed under the Contract are considered highly confidential, and the Contractor personnel shall at all times comply with NCTA security and privacy requirements.
543	NCTA will identify and designate a primary point of contact for the Contractor. Under most circumstances, The Contractor shall limit communication with NCTA authorized staff and to NCTA's designated point of contact unless otherwise directed by NCTA.
544	Discussion by the Contractor of any services or work performed under the Contract with the media, in oral presentations, in written publications, or in any other form, not related to this Contract shall be approved in advance by NCTA. The Contractor personnel shall be required to sign a Non-Disclosure Agreement (NDA) at NTP, or when first beginning work on this Project.

5.1.15 RTCS Hardware Maintenance and Software Support Services

Monitoring and maintenance functions described below shall be performed by the Contractor and tracked in the ITSM.

545	The Operations Center shall monitor the RTCS for failures and alarms and confirm an ITSM system work order has been created for each failure as defined regardless of the Maintenance level.
546	The Contractor shall perform the necessary maintenance and close the work order upon confirmation that the failure has been successfully corrected. The Contractor shall notify network control that the repair action is complete, and the work order has been closed.
547	The Contractor shall perform Maintenance Services for all daily, weekly, and scheduled preventive maintenance on all RTCS Hardware as defined in the Task Order.
548	The Contractor shall inspect and test cables, wiring, and terminations to detect problems and degradation. Any item not in compliance with Contract Requirements shall be replaced by the Contractor at no cost to NCTA unless such failure is considered non-chargeable, as described in Section 6.10 Non-Chargeable and Chargeable Failures of Part III, Scope of Work and Requirements .
549	The Contractor shall maintain the RTCS LAN/WAN that includes all Contractor network connections in the toll Equipment cabinets and interconnections between the toll Equipment cabinets as defined per project in future Task Orders. .

550	The Contractor shall perform any maintenance, daily, weekly, or periodic, required to maintain the RTCS at required performance levels (for example: archival and purging in accordance with NCTA's retention policy).
551	The Contractor shall retrieve data manually from the Zone Controllers and download the Transponder status list and toll rate and schedule files in the event there is an extended communications failure.
552	The Contractor shall re-establish or re-install system files, programs, and parameters, as required, following a failure or damage to the System and return lanes to fully operational condition.
553	The Contractor shall perform DR procedures as needed and return lanes to fully operational condition.
554	As part of the Software support services, the Contractor shall develop and test Software as required to accommodate corrective action, changes to business rules or lane configurations. The scope shall include the provision of evidence packages detailing changes for NCTA review and approval, installation of new Software and confirmation of successful installation.

5.2 Intelligent Transportation System (ITS) Maintenance

The requirements in this Section describe the Services to be provided by the Contractor under the category of Intelligent Transportation System (ITS) Maintenance. The ITS maintenance Scope of Work will be defined in Task Orders. In this Contract, TRS signs are different from Dynamic Message Signs (DMS) which are used by operators to communicate travel conditions and emergencies to customers and are part of the ITS and are maintained by others. Details and associated pricing for ITS Maintenance services will be determined in each project Task Order, as applicable.

5.2.1 General

5.2.1.1 ITS Maintenance Requirements

555	The requirements in Section 5.1.7 Types of Maintenance of Part III Scope of Work and Requirements , shall apply to ITS Equipment and subsystems.
556	The requirements in Section 2.10.7 General MOT Requirements and Conditions of Part III Scope of Work and Requirements , shall apply to ITS Equipment and subsystems.
557	All ITS maintenance activity shall be maintained in RTCS, ITSM system, and inventory tracking systems. NCTA will at its discretion change its ITSM and inventory tracking systems at its own discretion at any time in the Contract. The Contractor shall support by a change order a transition to another ITSM and inventory tracking system.

5.3 System Change and Release Management Process

558	<p>The Contractor shall meet the Release and Change Management process as defined in Attachment II: NCTA Change and Release Management Process. The Contractor shall meet with NCTA and provide documentation to support proposed Contractor changes and Department Changes that affect the RTCS. The Contractor shall participate and provide resources through the testing and release process as defined below and throughout the Term of the Contract.</p> <ul style="list-style-type: none">a) Development and Unit Testingb) Regression Testingc) Performance Testingd) IT Security Testinge) Rollout and backout planf) Post-implementation validation
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The Contractor shall build, provide NCTA (including designated agents) access and maintain the following DevOps pipeline as requested below during the Term of the Contract. The Devops pipeline with configured, tested and available nonproduction environments will streamline release management minimize defects and increase efficiencies to the business and technical operations. The Contractor shall provide the following environments. The Proposer shall describe its Dev-ops approach including how it will meet the requirements below in its Technical Proposal. The minimum required Environments are below, the Proposer shall describe additional environments if required in its Technical Proposal.

Development Environment

The Contractor shall establish and maintain this environment on their own for developers who are responsible for development of software code, unit testing, automation test code, and merge the changes into the release branch once it's peer-reviewed and approved.

Test Environment

The Contractor shall establish and maintain this environment on their own for testers who are responsible for functional and regression (Automation) testing of software build deployed to test environment. This environment will not be integrated end to end and it will be used only to test their own software product. The Contractor should cover both automation and manual testing and produce test results.

Integration Test Environment

The Contractor shall set up and maintain this integration test environment for integration testing of the software package delivered. The software package built and delivered to NCTA will be picked up and deployed using automation. The Contractor shall train NCTA how to use and access releases from this environment.

UAT / Training Environment

The Contractor shall set up and maintain this UAT / training environment to test end to end test transaction flow, all functionalities. The UAT/Training Environment shall be similar configuration with production. The software package built and delivered to NCTA will be picked up and deployed using automation. The contractor QA team certified package will be deployed in this environment.

Production Environment

The Contractor shall setup and maintain the production environment for NCTA. All changes to this production environment are controlled and only approved changes by NCTA should be implemented in the production environment.

Continuous Integration / Continuous Delivery Pipeline:

The Contractor shall create the below pipeline model to assist NCTA migrate to a NCTA DevOps service management organization. The Contractor shall setup environments, provide NCTA (and its designated agents) access to environments and train NCTA (and its designated agents) on the use of its environments. The Contractor shall also work with NCTA to determine how to streamline and refine the DevOps environment to provide efficient releases. The diagram below is intended to provide a DRAFT vision for the Dev-Ops Pipeline. The Proposer shall describe how it will support this DevOps pipeline in its Technical Proposal.

	<p>The diagram illustrates the workflow between a Build Pipeline and a Deployment Pipeline. The Build Pipeline (yellow boxes) starts with a 'Vendor Developer Box' where 'Code Commit / Merge' occurs. This feeds into 'Version Control (Git, Subversion, etc.)', which then triggers a 'Poll for change' to the 'CI Build Server (Maven, Ant, etc.)'. The CI server performs a 'Found Change' and 'Push Artifact (RSS/BOS)' to the 'Repository (Jfrog, Nexus)'. The CI server also performs a 'Deploy Change (RSS/BOS)' to the 'Vendor Test Box'. The 'Repository' is connected to the 'NCTA Integration Test' box in the Deployment Pipeline via 'Poll' and 'Pull' actions. The 'NCTA Integration Test' feeds into the 'NCTA Pipeline', which leads to 'NCTA Pre-Production' and finally to 'Production'. A dashed line labeled 'RSS/BOS Vendor Pipeline' connects the 'Repository' to the 'Production' stage.</p>
560	<p>NCTA uses Service Now IT Service Management System. The Contract shall integrate into the Service Now IT service management system for the creation, updates, and closure of all incidents, change orders, and configuration in the RTCS.</p>
561	<p>The Contractor shall allow NCTA to add agent-based monitoring to the Contractor provided RTCS to monitor its applications, infrastructure, database and network systems including all external interfaces for the RTCS.</p>

5.4 Maintenance Traffic Requirements

562	<p>The Contractor shall conform to all applicable MOT requirements detailed in Section 2.10.7 General MOT Requirements and Conditions and those within the Performance Requirements throughout the entire Maintenance and Operations phase. Location specific requirements will be provided within future Task Orders.</p>
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6. Performance Requirements – Maintenance and Operations

The Contractor shall provide a RTCS that is designed to meet the Requirements set forth in this SOW and Requirements during Maintenance and operations.

NCTA requires the Contractor to continuously maintain and operate the RTCS in accordance with the standards of performance identified in these Performance Requirements and further, that the Contractor fully meets these Performance Requirements beginning with the first month of maintenance and operations. In addition, as part of the Operational and Acceptance Test (OAT), the Contractor shall validate that the RTCS meets the performance identified in these Performance Requirements.

NCTA intends to focus on the outcomes from the RTCS by minimizing the number of Performance Requirements to be tracked, monitored, and reported while still maintaining high confidence in the RTCS performance. This is done by closely aligning performance measurement to the timely transmission of

accurate and complete transactions to NCTA existing CBOS and availability of the RTCS instead of focusing on the intermediate steps in the process.

The Contractor's performance shall be monitored by NCTA and shall be rated based on the Contractor's ability to meet these Performance Requirements. The Contractor shall use the approved measurement and reporting methods developed collaboratively with NCTA during the design, to report on the Contractor's performance against these Performance Requirements.

These Performance Requirements reflect the minimum tolerable performance expected of the Contractor to avoid unnecessary impact to NCTA, customers, or the general public.

NCTA will utilize a points-based performance scorecard to track the Contractor's compliance with the Performance Requirements. If the Contractor fails to meet these Performance Requirements, NCTA will assess non-compliance points for each failure. Non-compliance points shall be summed, the total of which shall determine any performance adjustments to be made to the Contractor's monthly invoice as further detailed below. The Contractor is also subject to direct damages for actual revenue loss.

The Contractor shall use best efforts to minimize the impacts that result from failure to meet the Performance Requirements, regardless of whether invoice adjustments are made. Furthermore, the Contractor shall take corrective action to immediately remedy any failures to meet the Performance Requirements and provide a corrective action plan to NCTA for approval that documents the corrective action taken to prevent future reoccurrence of the problem associated with the non-compliance. The corrective action plan shall identify the problem including root cause analysis, resolution to the issue and when the issue shall be resolved and verified. The corrective action plan shall also include all evidence required to resolve the corrective action. The corrective action plan shall be submitted in the form as shown in the attached file. The Contractor shall add additional fields as required.

A summary of the RTCS Performance Requirements is provided in below in **Table 2**, including measurement frequency and non-compliance points for each Performance Requirement. Additional detailed information about the Performance Requirements is provided in **Part III, Scope of Work and Requirements**.

6.1 General Performance Requirements

The Contractor shall be required to meet all operational Performance Requirements detailed herein and, as part of the monthly invoice, provide reports that show compliance to the defined Performance Requirements including details of failures that resulted in the non-compliance.

563	NCTA will conduct a review of the Contractor's performance on a monthly basis, utilizing a combination of reports generated by the RTCS, including ITSM systems, and other approved reports provided by the Contractor, as determined by NCTA to be necessary. The Contractor shall provide systems, processes and procedures to meet all Performance Requirements.
564	The Contractor shall immediately notify NCTA of any failure observed by the Contractor whereby actual loss of revenue occurred, or the potential for losses exist.

565	If the resolution of any failure is under the Contractor's control and/or responsibility, the Contractor shall take action to correct the failure condition and return the RTCS to normal functioning in accordance with the Contract. If the failure condition is determined to be due to the Contractor's fault and it results in failure to meet the Performance Requirements, NCTA will assess non-compliance points for each failure as described in this performance section and may be subject to other remedies in accordance with the Contract.
566	For failure to maintain spare parts inventory at adequate levels for the month, the Contractor may be subject to monthly fee adjustment of \$500 per month for each failure to maintain spare parts inventory per the counts required.

6.1.1 Performance Measurement

The performance shall be measured in categories that align with the primary functions of the RTCS. These categories are:

- a) Availability
- b) Operations
- c) Response and Repair

Each of these categories represents a group of functions within the RTCS, and each function includes individual Key Performance Indicators (KPIs), which shall be used to measure the Contractor's performance in meeting the Performance Requirements.

The specific method of measuring the Contractor's performance shall vary depending on the KPI being measured but shall generally be measured against the Performance Requirement on a monthly basis. Regardless of how a KPI is measured, the Contractor shall provide reporting for all Performance Requirements monthly.

The amount by which the KPI is missed matters in determining how well the RTCS is performing, so the non-compliance points for a particular failure are increased as the deviation from the KPI increases. For example, if the Express Lane is required to be available 99.9% of the time and the actual availability was measured to be 99.85%, the Contractor would be assessed 1 non-compliance point. If the availability were measured to be 99%, the Contractor would be assessed 10 non-compliance points.

If a KPI exceeds the Requirement, points shall be subtracted from any assessed points for the month. Points do not carry over from month to month. If the points accumulated from exceeding the performance applicable performance KPIs exceed non-compliance points, the score card shall show a 0 non-compliance points. The Contractor shall not be entitled to any bonus payments for exceeding Performance Requirements.

Below, **Table 2: RTCS Performance Requirements** provides a summary of the KPIs for the Contractor. A detailed description of each KPI and its associated Performance Requirements are provided in the subsequent sections.

Table 2: RTCS Performance Requirements

	Category	KPI	Performance Requirement	Measurement Frequency	Points*
1	Availability	AET/Express Lanes	Each lane (travel lanes and shoulders) 99.9% of the time, excluding scheduled and Approved maintenance.	Monthly	1 point for each 0.1% or portion thereof below the requirement for each zone
2	Availability	Toll Reconciliation Host (TRH)	All components of the TRH 99.9% of the time, excluding scheduled and Approved maintenance.	Monthly	1 point for each 0.1% or portion thereof below the requirement
3	Operations	AVI Transaction Complete and Timely Transmission to CBOS or OBO.	Within 4 hours of the transaction date/time for 99.995% of the transactions.	Monthly	1 point for each 0.1% or portion thereof below the requirement
4	Operations	Image Transaction posted to OBO ready for Image Verification Services if IVS is not provided by the Contractor.	Within 4 hours of the transaction date/time for 99.995% of the transactions.	Monthly	1 point for each 0.1% or portion thereof below the requirement
5	Operations	Image Transaction Complete and Timely Transmission to OBO if image verification services are provided by the Contractor.	Within 120 hours of the transaction date/time for 99.995% of the transactions.	Monthly	1 point for each 0.1% or portion thereof below the requirement
6	Operations	Vehicle Detection	Create one transaction for each vehicle that passes through a zone at an accuracy of 99.9% or more	Monthly	1 point for each 0.1% or portion thereof below the requirement
7	Operations	AVI Transaction Capture and Correlation	Capture and correlate AVI transponders at an accuracy rate of 99.90% or more.	Monthly	1 point for each 0.1% or portion thereof below the requirement
8	Operations	Image Capture and Transmission Accuracy	Provide front and rear overview images and ROI for all transactions (AVI and Image-Based) to OBO 99.95% or more.	Monthly	1 point for each 0.1% or portion thereof below the requirement
9	Operations	Image Transaction Accuracy (Only when IVS is included)	Provide accurate and complete license plate information and images at an accuracy rate of 99.80% or more.	Monthly	1 point for each 0.1% or portion thereof below the requirement

10	Operations	Classification Accuracy	Provide vehicle classification at an accuracy rate of 99.80% or more.	Monthly	1 point for each 0.1% or portion thereof below the requirement
11	Operations	Image Rejection Accuracy (Only when IVS is included)	Correctly reject images that cannot be pursued for revenue with an accuracy rate of 98.50% or more.	Monthly	1 point for each 0.1% or portion thereof below the requirement
12	Operations	Image Quality	0.1% or less of the images are rejected for reasons under the Contractor's control.	Monthly	1 point for each 0.1% or portion thereof below the requirement
13	Operations	Tag File Processing	File processing time requirements must be met each day	Monthly	1 point for each day where file processing requirements are not met
14	Operations	OBO or CBOS File Communications	File processing time requirements must be met	Monthly	1 point for each 0.1% or portion thereof below the requirement
15	Operations	Maintenance MOT Notification and Approval by NCTA	Provide NCTA and NCDOT staff with MOT schedules and MOT plans ahead of placement of lane closures for any type of maintenance.	Monthly	1 point for each instance of a MOT that is placed without a documented notification to NCTA and NCDOT and prior Approval from NCTA
16	Operations	Maintenance MOT Setup	All MOT of NCTA facilities shall be in accordance with NCDOT standards.	Monthly	1 point for each instance of a MOT that is placed out of accordance with NCDOT standards
17	Response and Repair	Time to Respond and Repair	All Work Orders shall be responded to and repaired within the response time applicable to the priority level.	Monthly	1 point for each Work Order that fails to meet the applicable Response and Repair Time
18	Response and Repair	Acknowledgement of all priorities	The Contractor shall acknowledge receipt of all priority events within thirty (30) minutes of failure/event notification.	Monthly	1 point for each percentage point less than 95% of failure or priority events shall be acknowledged within thirty (30) minutes of receipt
19	Wrong Way Vehicle	Successful testing of the Wrong Way	The Contractor shall successfully test the	Monthly	1 Point for each Wrong Way Vehicle

	Detection and Notification	Vehicle Detection and Notification Systems	Wrong Way Vehicle Detection and Notification System to ensure compliance to the Functional Requirements.		Detection and Notification test which does not meet the requirements of this Contract. This test must be conducted during every Preventive Maintenance event which requires a lane closure or any time an external WWVD system integrated with the RTCS is tested by others.
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Table 3: Additional Express Lane Performance Requirements

	Category	KPI	Performance Requirement	Measurement Frequency	Points*
20	Availability	Toll Rate Dynamic Message Signs and Cameras	99.95% of the time, excluding scheduled and Approved maintenance.	Monthly	1 point for each 0.1% or portion thereof below the requirement for the aggregate availability of the system
21	Availability	Dynamic Pricing System	Functioning as per system design 99.95% of the time, excluding scheduled and Approved maintenance.	Monthly	1 point for each 0.1% or portion thereof below the requirement

* The point values showing in these Tables reflect the number of non-compliance points assessed for each deviation from the KPI. Additional points shall be assessed for failures in consecutive months and shall escalate as described in the Performance Scorecard.

Each KPI is assigned a weighted point value, as shown in the above **Table 2 and 3**. The value of the non-compliance points (“points”) assigned depends on the severity of the failure and its potential impact on NCTA’s business.

The Contractor shall design and develop performance measurement reports, including the Monthly Performance Scorecard. An example of a Monthly Performance Scorecard is provided in **Table 4**. Failure to comply with the Performance Requirement for each KPI shall result in the KPI’s associated non-compliance points being applied to the Contractor’s Monthly Performance Scorecard. If the accumulated non-compliance points reach a specified threshold, the Contractor’s invoice for the month shall be adjusted by a percentage of the total invoice value, as shown in **Table 2**. The Contractor shall develop a Proposed Contractor’s Monthly Performance Scorecard and include it for NCTA review and approval in the Maintenance Plan.

Table 4: Contractor’s Monthly Performance Scorecard

Reporting Period: mm/dd/yyyy to mm/dd/yyyy

(EXAMPLE ONLY)

Category	Key Performance Indicator	Points	
Availability	Equipment Lanes System	0	
	Toll Rate Dynamic Message Signs and Cameras (if applicable)	0	
	Roadside Systems (RSS)		
	Dynamic Pricing System (if applicable)	0	
	TOTAL No. of Points Assessed	0	
Operations	AVI Transaction Complete and Timely Transmission	0	
	Image Transaction Posted	0	
	Image Transaction Complete and Timely Transmission	0	
	AVI Transaction Accuracy	0	
	Image Transaction Accuracy	0	
	Image Rejection Accuracy	0	
	Image Quality	0	
	OBO/CBOS File Communication	0	
	Wrong-Way Vehicle Detection and Notification	0	
	TOTAL No. of Points Assessed	0	
	Response and Repair	Time to Respond and Repair	0
		TOTAL No. of Points Assessed	0
		TOTAL No. of Points Assessed – ALL CATEGORIES	0
	PERFORMANCE ADJUSTMENT PERCENTAGE BASED ON PERFORMANCE LEVEL	0 %	

6.2 RTCS Performance Requirement Details

These KPIs are based on performance that is measured in calendar hours, days and minutes as applicable. Any issues outside of the Contractor’s control that affects its ability to meet a KPI should be noted, documented appropriately and with sufficient detail and discussed as part of monthly RTCS performance reviews.

NCTA places a great deal of importance on the controls the Contractor has in place for the RTCS and the effectiveness of those controls. NCTA will monitor the Contractor’s performance for compliance with the Performance Requirements. The Contractor shall be required to meet all RTCS Performance Requirements as detailed in these requirements.

6.2.1 AET/Express Lanes Availability

Tolls are collected 24 hours a day, 7 days a week less scheduled maintenance work as approved by NCTA. The Express Toll Lanes are viewed as a function; a combination of Hardware and Software that builds accurate and complete transactions. This requirement shall measure the function; thus, if one of two redundant components are not working, yet the component still performs the function as approved in design, it would not be counted against availability.

567	<p>Each AET or Express Lane within a Toll Zone with all of its subsystems is properly functioning and available to collect revenue and send required transactions and images to the host 99.9% of the time excluding scheduled and approved maintenance.</p> <p>Availability shall be calculated based on the following calculation: $\text{Availability} = 1 - (\text{chargeable downtime min} / (\text{minutes in period} - \text{exception min in period}))$</p> <p>a) RTCS reporting detailing the Express Lane availability along with ITSM and help desk tickets, work orders, and feedback from customers, CBOS staff, NCTA staff, and consultants shall be utilized to identify availability failures.</p> <p>b) For any month in which all components of the Toll Zones are not fully available and operational at least 99.9% of the time excluding scheduled and approved maintenance, The Contractor shall be assessed 1.0 point for each 0.1% or portion thereof below the Performance Requirement.</p>
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6.2.2 TRH Availability

Tolls are collected 24 hours a day, 7 days a week, and as such the TRH must achieve a high degree of availability. The Contractor shall meet all Requirements and design the TRH such that it allows other NCTA staff and contractors access and other transactions to post and be processed on the TRH without degradation. The Contractor shall describe how it meets this requirement in its Proposal.

568	<p>The TRH with all of its devices, Software, applications, and processes are properly functioning and available to the authorized users, successfully transmitting transactions to the existing NCTA CBOS/OBO systems, communicating with the in-lane systems and reporting device health statuses 99.9% of the time excluding scheduled and approved maintenance.</p> <p>Availability shall be calculated based on the following calculation: $\text{Availability} = 1 - (\text{chargeable downtime min} / (\text{minutes in period} - \text{exception min in period}))$</p> <p>a) System reporting detailing the TRH availability along with ITSM and help desk tickets, work orders, and feedback from customers, CBOS staff, NCTA staff and consultants shall be utilized to identify availability failures.</p> <p>b) For any month in which all components of the TRH are not fully available and operational at least 99.9% of the time excluding scheduled and approved maintenance, Contractor shall be assessed 1.0 point for each 0.1% or portion thereof below the Performance Requirement.</p>
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6.2.3 AVI Transaction Complete and Timely Transmission

The Contractor shall be responsible for the timely processing of AVI transactions. NCTA is subject to statutory requirements and is obligated to customers and interoperable agencies to process all transactions in a timely manner. The Contractor’s performance in this area has a direct impact on NCTA’s revenue stream.

569	<p>The Contractor shall process and transmit all AVI transactions to the NCTA provided CBOS/OBO within four (4) hours after the vehicle travels through the tolling point.</p>
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	<p>a) System reporting detailing the transaction date/time and the date/time that the transaction was acknowledged by the CBOS/OBO shall be compared to a matching CBOS Report.</p> <p>b) The CBOS/OBO validates the transactions to ensure that they comply with the agreed-upon ICD, and transactions that do not meet the ICD shall be rejected as incomplete or inaccurate. Unless a rejected transaction is corrected and resubmitted within the four (4) hour transmission period, they shall not meet this KPI.</p>
570	For any month in which 99.995% of the AVI transactions are not transmitted in accordance with the approved ICD to the CBOS/OBO, The Contractor shall be assessed 1.0 point for each 0.1% or portion thereof below the Performance Requirement.

6.2.4 Image Transaction Complete and Timely Transmission without IVS

The Contractor shall be responsible for the timely processing of image transactions. NCTA is subject to statutory requirements and is obligated to customers and interoperable agencies to process all transactions in a timely manner. The Contractor’s performance in this area has a direct impact on NCTA’s revenue stream.

571	<p>The Contractor shall process and transmit all image transactions to NCTA developed CBOS/OBO within four (4) hours after the vehicle travels through the tolling point.</p> <p>a) System reporting detailing the transaction date/time and the date/time that the transaction was acknowledged by the CBOS/OBO shall be compared to a matching TRH Report.</p> <p>b) The RTCS and CBOS/OBO validates the transactions to ensure that they comply with the agreed-upon ICD, and transactions that do not meet the ICD shall be rejected as incomplete or inaccurate. Unless a rejected transaction is corrected and resubmitted within the one four (4) hour transmission period, they shall not meet this KPI.</p>
572	For any month in which 99.995% of the image transactions are not transmitted in accordance with the approved ICD to the CBOS within 4 hours, the Contractor shall be assessed 1.0 point for each 0.1% or portion thereof below the Performance Requirement.

6.2.5 Image Transaction Complete and Timely Transmission with IVR

The Contractor shall be responsible for the timely processing of image transactions. NCTA is subject to statutory requirements and is obligated to customers and interoperable agencies to process all transactions in a timely manner. The Contractor’s performance in this area has a direct impact on NCTA’s revenue stream.

573	The Contractor shall process and transmit all image transactions to NCTA developed CBOS/OBO within one hundred-twenty (120) hours after the vehicle travels through the tolling point. This includes entering all required plate data or rejecting the plate if it meets the criteria to be rejected.
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	<p>c) System reporting detailing the transaction date/time and the date/time that the transaction was acknowledged by the CBOS/OBO shall be compared to a matching TRH Report.</p> <p>d) The RTCS and CBOS/OBO validates the transactions to ensure that they comply with the agreed-upon ICD, and transactions that do not meet the ICD shall be rejected as incomplete or inaccurate. Unless a rejected transaction is corrected and resubmitted within the one hundred-twenty (120) hour transmission period, they shall not meet this KPI.</p>
574	For any month in which 99.995% of the image transactions are not transmitted in accordance with the approved ICD to the CBOS within 120 hours, the Contractor shall be assessed 1.0 point for each 0.1% or portion thereof below the Performance Requirement.

6.2.6 Vehicle Detection Accuracy

The Contract shall be required to generate exactly one transaction for each vehicle which passes through a toll zone. Errors can result in lost revenue or inaccurate billing and customer service disputes.

575	The Contractor shall create a single transaction for each vehicle which passes through a toll zone. A single vehicle may include a vehicle and any additional attachment, such as a trailer. Errors in this metric may be detected through the following.
	a) Detailed audits of toll zone video records (DVR) correlating transactions to vehicles.
	b) Customer feedback for missing or duplicate transactions.
	c) Data analytics used to detect missing or duplicate transactions.
576	For any month in which the vehicle detection transaction accuracy falls below 99.9%, the Contractor shall be assessed 1.0 point for each 0.1% or portion thereof below the Performance Requirement.

6.2.7 AVI Transaction Accuracy

The Contractor shall be required to process AVI transactions accurately. Errors can result in the customers being charged at the incorrect rate or necessitate image review when the Transponder is not read, such errors impact customer service, public perception and NCTA costs.

577	The Contractor shall correctly read and assign properly mounted transponders to the correct vehicle and report the correct transponder status. Errors may be detected through the following:
	a) Detailed audits, potentially using data analytics.
	b) Feedback from customers, CBOS staff, NCTA staff, and consultants shall be utilized to identify inaccurate transactions.
	c) NCTA will utilize trend reporting to identify transactions, or lanes/Toll Zones for further review to identify possibly inaccurate transactions.

	d) Transactions rejected by the CBOS/OBO shall also be reviewed.
	e) NCTA may conduct unannounced controlled testing in live traffic as well.
578	For any month in which the AVI transaction accuracy falls below 99.9%, the Contractor shall be assessed 1.0 point for each 0.1% or portion thereof below the Performance Requirement.

6.2.8 Image Capture and Transmission Accuracy

The contractor must accurately capture and correlate images for all transactions and submit the correct images to the CBOS/OBO for processing.

579	The Contractor shall correctly build transactions by capturing and correlating images as specified in the functional requirements and providing the images to the CBOS/OBO as specified in the ICD(s). OCR data, including license plate number, jurisdiction and plate type must be provided for all image-based transactions. Operational costs for OCR processing will not be provided for transactions determined to have inaccurate OCR data. Errors may be detected through the following:
	a) Detailed audits of transactions.
	b) Feedback from customers, NCTA staff, and consultants shall be utilized to identify inaccurate transactions.
	c) NCTA will utilize trend reporting to identify transactions, or lanes/Toll Zones for further review to identify possibly inaccurate transactions.
	d) Transactions rejected by the CBOS/OBO shall also be reviewed.
	e) NCTA may conduct unannounced controlled testing in live traffic as well.
580	For any month in which the image transaction capture and transmission accuracy falls below 99.95%, the Contractor shall be assessed 1.0 point for each 0.1% or portion thereof below the Performance Requirement.

6.2.9 Image Transaction Accuracy

If Image Validation Services are included in the Contractor scope, this metric will also assess the accuracy of the data produced within that process.

581	The Contractor shall correctly build image transactions by capturing and correlating images as specified in the functional requirements and providing the images to the CBOS/OBO as specified in the ICD(s). If IVR services are included in the contract, this metric also includes the accurate designation of License Plate Number, jurisdiction and Plate Type. This metric also assesses Contractor accuracy in determining whether a transaction is pursuable for collection, based on content within the images. Errors may be detected through the following:
	f) Detailed audits of transactions.

	g) Feedback from customers, NCTA staff, and consultants shall be utilized to identify inaccurate transactions.
	h) NCTA will utilize trend reporting to identify transactions, or lanes/Toll Zones for further review to identify possibly inaccurate transactions.
	i) Transactions rejected by the CBOS/OBO shall also be reviewed.
	j) NCTA may conduct unannounced controlled testing in live traffic as well.
582	For any month in which the image transaction posting falls below 99.8%, the Contractor shall be assessed 1.0 point for each 0.1% or portion thereof below the Performance Requirement.

6.2.10 Classification Accuracy

The Contractor must accurately classify all vehicles for proper fare assignment. Incorrect classification assignment can result in incorrect fare assignment which can impact NCTA's revenues and public trust.

583	The Contractor shall correctly classify all vehicles according to the functional requirements in the Contract. Errors may be detected through the following:
	a) Detailed audits, potentially using data analytics.
	b) Feedback from customers, CBOS staff, NCTA staff, and consultants shall be utilized to identify inaccurate transactions.
	c) NCTA will utilize trend reporting to identify transactions, or lanes/Toll Zones for further review to identify possibly inaccurate transactions.
	d) Transactions rejected by the CBOS/OBO shall also be reviewed.
	e) NCTA may conduct unannounced controlled testing in live traffic as well.
584	For any month in which the transaction accuracy falls below 99.8%, the Contractor shall be assessed 1.0 point for each 0.1% or portion thereof below the Performance Requirement.

6.2.11 Image Verification Services - Rejection Accuracy

If the Contract Scope includes Image Verification Services, the Contractor shall be required to process image transactions accurately. The incorrect rejection of images results in the inability to collect a toll for that transaction and therefore has a direct impact on NCTA's revenues and can impact the reliability of data used to measure system performance and detect issues.

585	The Contractor shall determine the correct reject reason for all images which do not meet the criteria for identification.
	a) The correct reject reason code shall be selected 98.5% of the time.

	b) A statistically significant sample set of rejected image transactions shall be selected by the RTCS (random sample) based on the number of images reviewed that month and provided to NCTA for their review of the image review outputs
	c) Feedback from customers, CBOS staff, NCTA staff, and consultants shall be utilized to identify inaccurate or incomplete transactions.
	d) NCTA will utilize trend reporting to identify transactions, or lanes/Toll Zones for further review to identify possibly inaccurate transactions.
	e) Transactions rejected by the CBOS shall also be reviewed.
	f) NCTA may conduct unannounced controlled testing in live traffic as well.
586	For any month in which the image rejection accuracy falls below 98.5%, The Contractor shall be assessed 1.0 point for each 0.1% or portion thereof below the Performance Requirement.

6.2.12 Image Quality

The Contractor shall be paid for the capture of images of sufficient quality for image review processing. If the image quality is poor, image review shall take longer, and ultimately, images may be rejected. The Contractor's performance in this area has a direct impact on NCTA's revenue stream.

587	The RTCS shall provide images of sufficient image quality to achieve the Contractor's desired automation rate and NCTA's Requirements such that less than 0.1% of the images are rejected for reasons under the Contractor's control. Reject reasons not under the Contractor's control are:
	a) the vehicle has no plate;
	b) the plate is not in the normal camera field of view because it is not mounted in accordance with State laws;
	c) the plate is covered by dirt, a trailer hitch, tailgate, or some other material such that the numbers/letters are not human-readable; or
	d) the plate is damaged so that numbers/letters are not human readable.
588	The number of images rejected for reasons within the Contractor's control shall be compared to the number of images transactions produced at the lane that month to calculate whether or not the Contractor's image quality met the standard.
589	For any month in which the requirement is not met, the Contractor shall be assessed 1.0 point for each 0.1% or portion thereof below the Performance Requirement.

6.2.13 Tag File Processing

NCTA CBOS/OBO shall create daily Transponder Status List (TSL) files. Receipt of files from NCTA CBOS/OBO, their version, time of receipt, and processing status shall also be tracked. The Contractor shall provide NCTA or their designee access adequate to validate the application of Updates to files at locations within the system of their choosing.

590	The Contractor shall receive, process transmit and apply 100% of the TSL files to all Zone Controllers as applicable in accordance to these requirements.
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	a) Daily Full TSL Files – Files transmitted once daily with a full list of transponders and corresponding statuses must be processed in all Zone Controllers within 15 minutes of receipt from the CBOS/OBO.
	b) Incremental TSL Files – Incremental updates to the TSL file will be provided throughout each day according to the project ICD. These files must be processed at all Zone controllers within 10 minutes of receipt from CBOS/OBO.
591	The contractor will be assessed 1 point for each day the system fails to meet the processing requirements for a single Full or Incremental TSL file.

6.2.14 Commercial Back Office System (CBOS) File Communications

NCTA CBOS/OBO shall create daily files such as periodic tolls rate files and transaction disposition files. Receipt of files from NCTA CBOS/OBO, their version, time of receipt, and processing status shall also be tracked. Updates to some or all of these files shall happen at intervals of no less than ten (10) minutes. The Contractor shall provide NCTA or their designee access adequate to validate the application of Updates to files at locations within the system of their choosing.

592	The Contractor shall receive, process, transmit and apply the files and Updates. 99.95% shall be processed within 2 hours and 100% shall be processed within 24 hours.
593	For any month in which the requirement is not met, the Contractor shall be assessed 1.0 point for each 0.1% or portion thereof below the Performance Requirement.

6.2.15 Preventive and Corrective MOT

The Contractor shall be required to notify NCTA and NCDOT of all MOT placed on the projects during the maintenance periods. NCTA must approve all MOT before work commences. For all Priority failures / events that require MOT for repair, the mean time to repair clock shall not start until NCTA Approval for MOT is granted.

594	The Contractor shall notify NCTA and NCDOT of all MOT activities during the maintenance period.
	a) The Contractor shall provide a schedule of all preventative and predictive maintenance MOT activities for the month by the 5th calendar day of the month.
	b) The Contractor shall provide a minimum of twelve (12) hours of notice prior to any changes to the monthly maintenance schedule.
595	The Contractor shall conform to the latest version of the NCDOT Standard Specifications for Roads and Structures for regulations for MOT activities during the maintenance period.

6.2.16 Wrong Way Vehicle Detection and Notification

596	The Contractor shall perform in-lane testing of the WWVD and Notification system as part of all preventive maintenance events involving lane closures by driving a test vehicle through the toll zone opposite the direction of traffic, within the closure, and measure the detection and notification functionality according to the functional requirements.
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	<p>a) The Contractor will be assessed 1.0 point for each Preventive Maintenance event involving a lane closure where WWVD and Notification Testing was not completed.</p>
	<p>b) The Contractor will be assessed 1.0 point for each WWVD and Notification Test that does not meet the functional requirements outlined in this Contract.</p>
597	<p>The Contractor must support any event the provider of an external WWVD system conducts controlled testing and must meet the applicable functional requirements outlined in this Contract. The Contractor will be assessed 1.0 point for each testing event not properly supported by the Contractor or when the test results do not meet the functional requirements outlined in this Contract.</p>
	<p>a) The Contractor will be assessed 1.0 point for each testing event not properly supported by the Contractor</p>
	<p>b) The Contractor will be assessed 1.0 point for each external WWVD test that the RTCS does not meet the functional requirements for notification outlined in this Contract.</p>

6.2.17 Toll Rate Message Signs and Camera Availability

The Toll Signs (TRS) are NCTA’s only direct communication link to the traveling public. Errors or inaction within this subsystem can cause extreme consequences in terms of cost and reputation, thus availability of this subsystem is vital. The TRS audit cameras are key to properly monitoring the TRS.

598	<p>Each TRS and TRS audit camera must be operating and displaying the toll amount accurately 99.95% of the time excluding scheduled and approved maintenance. Availability shall be calculated based on the following calculation:</p> $\text{Availability} = 1 - (\text{chargeable downtime min} / (\text{minutes in period} - \text{exception min in period}))$
	<p>a) System reporting detailing the TRS and TRS audit cameras availability along with ITSM system and help desk tickets, work orders, and feedback from customers, CBOS staff, NCTA staff and consultants shall be utilized to identify availability failures.</p>
	<p>b) For any month in which all TRS and TRS audit cameras are not fully available and operational at least 99.95% of the time excluding scheduled and approved maintenance, Contractor shall be assessed 1.0 point for each 0.1% or portion thereof below the Performance Requirement.</p>

6.2.18 Dynamic Pricing System (DPS) Availability

Toll Rates are determined based density and speed for the general-purpose lanes and Express Lanes. The toll rates are generated based on time-of-day historical volumes or rates or any dynamically created price based on density of general purpose and Express Lanes. The Contractor shall provide dynamically created prices by the Contractor provided Dynamic Pricing System. The Contractor shall support the integration of dynamic pricing by an external system provided by NCTA.

599	<p>The DPS with all of its devices, Software, applications and processes properly functioning and available to the authorized users, successfully communicating with the in-lane systems 99.95% of the time excluding scheduled and approved maintenance.</p> <p>Availability shall be calculated based on the following calculation:</p> <p>Availability = 1 - (chargeable downtime min / (minutes in period-exception min in period))</p>
	<p>a) System reporting detailing the DPS availability along with ITSM and help desk tickets, work orders and feedback from customers, CBOS staff, NCTA staff and consultants shall be utilized to identify availability failures.</p>
	<p>b) For any month in which all required traffic data is not transmitted 99.5% if the time, the Contractor shall be assessed 1.0 point for each 0.1% or portion thereof below the Performance Requirement.</p>

6.3 Non-Compliance Performance Adjustments

The Contractor’s performance score shall be generated and determined each month by adding the points assessed for non-compliance in each performance category, as described below in **Table 5**. A performance adjustment shall be made to the monthly invoice in each month that the Contractor exceeds the allowable number of non-compliance points. The maximum monthly adjustment amount that may be made by NCTA to the Contractor’s monthly invoice is 25%.

Table 5: Non-Compliance Adjustments

Performance Level	Non-Compliance Points	Monthly Adjustment Percentage
Level 1	0 – 25	0%
Level 2	26 – 40	5%
Level 3	41 – 50	10%
Level 4	51 – 60	15%
Level 5	61 – 70	20%
Level 6	> 70	25%

6.4 Escalation

Non-compliance points shall accrue as follows:

The first month that a specific Performance Requirement is not met shall result in the assessment of the initial value of the non-compliance points assigned in **Table 5: Non-Compliance Adjustments**.

- I. If a specific Performance Requirement is not met again for a second consecutive month, the non-compliance points shall be double the points assessed for all failures of that Performance Requirement for that month.

2. If a specific Performance Requirement is not met again for a third consecutive month (and for subsequent consecutive non-compliant months thereafter), the non-compliance points shall be set at quadruple the points assessed for all failures of that Performance Requirement for that month (and assessed quadruple the points for any subsequent non-compliant months.)

The following scenario is provided as an example:

Month	Required KPI	Actual KPI	Missed	Points	Escalation Assessed	Actual Points Assessed
1	99.95%	99.45%	0.50%	5	1x	5
2	99.95%	99.55%	0.40%	4	2x	8
3	99.95%	99.65%	0.30%	3	4x	12
4	99.95%	99.75%	0.20%	2	4x	8

6.5 Direct Damages

The Contractor may be charged with direct damages related to Performance Requirement failures as defined in the Contract Documents.

6.6 Maintenance Priorities, Response and Repair Times

Response and repair time is defined as the combined time from when a failure occurred to when the repair or correction of the failure occurred, the period of time beginning when the failure occurred (failure time) and ending when the fault condition is corrected and returned to normal operations.

600	Response and repair times for every maintenance event shall be recorded in the ITSM system and reported, and such reports shall be provided to NCTA in accordance with the reporting Requirements of this SOW and Requirements.
601	The Contractor shall post a weekly schedule identifying personnel and times for onsite and on-call maintenance. NCTA approval is required for any change in Contractor staff. The Contractor shall provide to NCTA the Updated active personnel list and contact information when there is a change in personnel.
602	Response to calls and repair times shall be determined by priority, as described below. Contractor failure to meet the response and repair time criteria described below shall result in Performance Scorecard Point Assessments, as specified in this Section.
603	Regardless of coverage, onsite or on-call service, the Contractor shall acknowledge receipt of a maintenance issue within ITSM system within thirty (30) minutes after the failure notification was recorded or the problem was reported.
604	The priority of failures shall be defined during the design. Time to respond and complete repair is determined by priority and is defined as below.

605	Priority 1: Defined as any malfunction or fault that results in the immediate loss of revenue; security breach; closure of lanes outside of NCTA lane closure requirements; hazard to personnel or driving public; loss of audit data; loss of functionality that impacts Interoperable Agencies or failure that negatively impacts the RTCS (RSS and ITS) operations. For RTCS (RSS and ITS) maintenance, this priority shall have a two (2) hour time to respond and complete repair.
606	Priority 2: Defined as any malfunction or fault that degrades the RTCS performance but not the operational ability of the RTCS. It includes, but is not limited to, inaccurate reporting, inability to reconcile revenue or loss of system functionality that impacts access to data. For RTCS (RSS and ITS) maintenance, this priority shall have a four (4) hour time to respond and complete repair.
607	Priority 3: Defined as any action or event that has the potential to result in a malfunction or degrading of the System performance but has not impacted performance and is not anticipated to impact performance immediately, including, but not limited to loss of redundancy in any redundant System components. For RTCS (RSS and ITS) maintenance, this priority shall have a twenty-four (24) hour time to respond and complete repair.
608	Outages and tasks performed under the approved preventive maintenance period shall be defined as Priority 4. The RTCS shall be available and fully operational within the approved time schedule for such activities and upon completion of the preventive maintenance period. Delays and problems associated with not completing scheduled preventive maintenance within the window specified may be included in the Performance Requirement calculations. Any failures generated or resulting from preventive maintenance activities shall be accounted for as priorities 1, 2, or 3 and be addressed in accordance with these requirements.

6.7 NCTA Identified Anomalies and Research Requests

In addition to the Contractor's monitoring of the RTCS performance, NCTA will also review system and performance data and perform tests as deemed necessary. NCTA may identify data that may indicate a failure to meet one (1) or more of the Performance Standards. As a result of NCTA's activities, NCTA may request that the Contractor research and/or provide additional data, identify the extent of the problem or explanation related to anomalies or trends identified by NCTA.

609	The Contractor shall respond and fulfill NCTA's requests for research, analysis, and/or explanation and provide feedback/report within one (1) week or one (1) month as agreed to by NCTA.
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6.8 Corrective Actions

Failure to meet a Performance Requirement does not relieve the Contractor of the Requirement to complete the activity associated with the Performance Requirement. The Contractor shall identify the failure condition, take immediate action to remedy the condition, and ensure that corrective action is taken to prevent repeated failures in the future. This shall be documented in an ITSM system knowledge base that includes technical bulletins. The technical bulletins shall be posted and available for NCTA or Contractor staff to review and Update. For example, if the Contractor fails to completely and accurately transmit the transactions to the existing CBOS within the time required by the Performance Requirement, the transactions must still be completely and accurately transmitted and the Contractor must identify the

root cause of the failure, identify the extent of the problem and provide a plan to prevent future occurrences.

610	Any failure to meet a Performance Requirement that requires the completion of a specific action(s), which is not completed in accordance with the requirement, does not relieve the Contractor of the responsibility to perform in accordance with the RTCS requirements. The required specific action(s) must be completed within 48 hours. For example, if the Contractor fails to transmit all transaction files to the agency within four (4) hours, the files must still be sent to the agency.
611	The Contractor shall develop a corrective action plan for each failure to meet a Performance Requirement identifying the root cause(s) and providing a plan to rectify the current situation, if applicable, and prevent future occurrences.
612	The corrective action provided by the Contractor shall be in a format approved by NCTA.
613	The Contractor shall submit a corrective action plan for each failure to meet a Performance Standard for NCTA’s review and approval. Until NCTA approves the corrective action plan, the failure cannot be considered resolved.
614	<p>The corrective action plan shall identify the subsystem(s), component(s), processes, and activities associated with the failure to meet a Performance Requirement in sufficient detail to allow NCTA to understand the issue and why the proposed solution shall prevent future occurrences. The RTCS elements include but are not limited to the elements below:</p> <ul style="list-style-type: none"> a) vehicle throughput rate; b) Transponder capture rate; c) Transponder reporting accuracy; d) vehicle detection accuracy; e) Transponder association accuracy; f) vehicle classification accuracy; g) image capture reporting accuracy; h) license plate extraction (OCR/ALPR) accuracy, if provided; i) image review accuracy j) image quality; k) assignment of the correct toll to the transaction; l) transaction processing requirements; m) false read processing; n) image transaction transmission requirements; o) AVI transaction transmission requirement;

	p) Toll Zone and Toll Facility speed accuracy; and
	q) ITSM system.

6.9 Non-Chargeable and Chargeable Failures

For purposes of calculating Performance Requirements, chargeable, and non-chargeable failures are defined as follows:

- a) **Non-Chargeable Failures** are those failures that are identified in the following Section 6.10. Non-compliance points shall not be assessed for non-chargeable failures.
- b) **Chargeable Failures** are any failures not specifically identified as non-chargeable. Non-compliance points shall be assessed for chargeable failures.

6.10 Non-Chargeable Failures

615	Non-chargeable failures shall include:
	a) Force majeure, as defined in the Contract documents;
	b) vandalism;
	c) RTCS component failures caused by externally applied stress conditions outside of the requirements of this SOW and Requirements;
	d) RTCS component failures caused by environmental or operating conditions outside of the Requirements of this SOW and Requirements;
	e) normal operating adjustments as allowed in the MTP or Maintenance Plan, as applicable;
	f) failures where NCTA have approved to waive a chargeable failure in advance; and
	g) failures that are customer or NCTA user induced or are caused by a third-party service provider not under the contractor’s control as determined by NCTA.

6.11 Performance Reporting

The Contractor shall provide NCTA a monthly RTCS performance report package that includes the Contractor’s performance reports and monthly scorecard. The Contractor’s performance report package shall include a series of reports detailing the Contractor’s performance against each Performance Requirement and details related to the failure events that resulted in the non-compliance. The Contractor’s performance report package shall contain all information necessary for NCTA to verify the Contractor's performance as reported by the Contractor.

616	The Contractor shall describe in detail how the performance against a requirement shall be tracked, tested, and reported, identifying specific reports and data elements. In the case of a KPI which cannot be tracked by the RTCS, the form of manual tracking or testing must be described and included in the Maintenance Plan.
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617	The Contractor shall prepare and submit to NCTA the performance report package on an agreed-upon Day each month as defined in these requirements.
618	The performance report package shall include a performance scorecard calculating the non-compliance points assessed that month, if applicable, a series of reports, one (1) per Performance Requirement detailing the Contractor's performance against the requirement that month supporting the scorecard for each KPI and a historical report detailing the Contractor's performance against each requirement for the most recent twelve (12) months. See Section 6.1.1 Performance Measurement for details on these reports. Copies of all corrective action plans related to failures for that month must be approved and included.
619	The Contractor shall provide the required performance report package to NCTA before an invoice is considered for payment.
620	Performance reporting by the Contractor and any associated adjustments related to Performance Requirements shall begin for the period beginning on the first Day of the Operations and Maintenance Phase and shall continue for the duration of the Contract.

Part IV

Terms and Conditions

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I. Contract Terms and Conditions

I.1 Payment Terms and Conditions

1. Payment terms are net thirty (30) Calendar Days after receipt of a correct invoice. NCTA is responsible for all payments under the Contract. A “correct” invoice is one that contains an accurate description of the amounts due, is in the Approved format, has no errors, includes all required supporting information including payment Approvals, and meets all other Requirements for invoicing set forth in **Part III, Scope of Work and Requirements**.
2. The Contractor shall invoice NCTA for the Implementation Phase based on milestone payments set forth in **Exhibit B, Payment Schedule for each Project**. Exhibit B is provided for references and the Contractor shall not completed Exhibit B in its Price Proposal.
3. The Contractor shall invoice NCTA in the Operations and Maintenance Phase in accordance with the amounts set forth in the Approved Contractor Price Proposal **Exhibit D-7, Forms** for monthly Operations and Maintenance payments. Adjustments to these payments may be made for Contractor performance below required Performance Requirements as further set forth in **Part III, Scope of Work and Requirements**.
4. NCTA may exercise any and all rights of set off as permitted in the Set Off Debt Collection Act (Chapter 105A-1 et. seq. of the N.C. General Statutes) and applicable Administrative Rules. Upon Contractor’s written request of not less than thirty (30) Calendar Days and Approval by NCTA, NCTA may:
 - a. Forward the Contractor’s payment check(s) or other mutually acceptable means directly to any person or entity designated by the Contractor, or
 - b. Include any person or entity designated in writing by Contractor as a joint payee on the Contractor’s payment check(s), however
 - c. In no event shall such Approval and action obligate NCTA to anyone other than the Contractor and the Contractor shall remain responsible for fulfillment of all Contract obligations.

I.2 Contract Term

The term of the Contract will commence on the upon Notice of Award for each Project with a base term followed by an optional Operations and Maintenance Phase extension(s). The phases are further described as follows:

1. Implementation Phase – The Implementation Phase shall begin upon issuance of Implementation Phase Notice of Award for a total of five (5) years.
2. Installation and System Acceptance Phase - The Installation and System Acceptance Phase shall begin after completion of the Onsite Installation Test and shall continue until System Acceptance is complete.

3. Operations and Maintenance Phase – The Operations and Maintenance Phase shall begin upon Go-Live and shall continue through the end of the base Contract Term for a period of up to five (5) years.
4. Options to Extend Maintenance – The Optional Extension Phase includes two (2) three (3)-year optional Maintenance extensions to be executed at the sole discretion of NCTA, with the first extension commencing upon the end of the base Contract Term.

For each Project, the Contractor shall be issued a Notice to Proceed for the Implementation Phase. A second Notice to Proceed will be issued for the Installation and Acceptance Phase and Operations and Maintenance Phase approximately 210 Calendar Days prior to Go-Live based on the Construction Contract schedule. The 210 Calendar Day period constitutes a 90 Calendar Day notice for mobilization and purpose of equipment and a 120-calendar installation period of all Toll Zones to be ready for Go-Live. **Any work including for and not limited Software, Equipment and Services shall be conducted by the Contractor prior to the Installation and Acceptance Phase will be done solely by the Contractor. Any work regarding equipment order planning, maintenance plans, test plans including the Master Test Plan and all documentation shall be completed in the Implementation Phase. The Contractor shall demonstrate in its Project Schedule how it will conduct all work required to prepare for the Installation and Acceptance Phase and Operations and Maintenance Phase during the Implementation Phase.**

Any additional facilities or roadways considered as additions to **Part III, Scope of Work and Requirements** will not change the overall duration of the base term and options to extend, as described above. NCTA shall update the Effective Date after the Contract has been fully executed by the Contractor and by NCTA and all Approvals required by NCTA contracting procedures have been obtained.

I.3 Damages

I.3.1 Liquidated Damages

- I. Liquidated damages per Calendar Day shall be assessed for the Contractor's failure to successfully complete the Factory Acceptance Test described in **Part III, Scope of Work and Requirements** by the Factory Acceptance Test, and the completion of all Toll Zone commissioning for revenue service during Site Installation Test milestone date set forth in **Exhibit A, Project Implementation Schedule each Project**, subject to the limits set forth herein. The total and cumulative amount assessed by NCTA for liquidated damages shall not exceed the grand total cost for the Implementation Phase for each road as identified in **Exhibit D-7 Price Proposal**, Tab one (1) Project Summary, line six (6) Total Implementation Phase price, or as modified by any Change Orders or Extra Work Orders. The amounts reflect an estimate of impacts due to delays in open of toll traffic based on official traffic and revenue estimates. The liquidated damages per Calendar Day shall be \$5,000.

Liquidated damages may be assessed in the form of a Lane Rental Fee for unauthorized lane closures during the Implementation Phase that require general purpose lane closures. Unauthorized lane closures include closures which are outside of closures allowed in the Approved Installation Plan for each Project.

The Lane Rental Fee shall be assessed as \$500 per 15-minute period, per travel lane. The fee will accrue at the start of each 15-minute period (e.g., a 16-minute lane closure will accrue a \$1,000 lane rental fee). The lane rental fee will be deducted from Contractor's invoice or any other monies due to the Contractor for Work performed. The deduction will be based on the applicable rate for any and all closures, whether Work is performed or not. The fee will not be assessed for delays due to conditions beyond the control and fault of the Contractor, including force majeure events.

2. Payment adjustments will be assessed not as a penalty, but as liquidated damages for not meeting the Operations and Maintenance Performance Standard Requirements set forth in **Part III, Scope of Work and Requirements**, Section 7 Performance Requirements for the RTCS and Monthly Fee Adjustments. If in the performance of the Services the Contractor does not meet or exceed the Performance Requirements identified therein, NCTA shall reduce the amount it would otherwise pay to the Contractor for such Services subject to the reduction amounts and limits set forth in therein.
3. NCTA may recover any and all liquidated damages by deducting the amount thereof from any monies due or that may become due the Contractor(s), notwithstanding any liens, Notices of liens or actions of Subcontractors, and if said monies are insufficient to cover said damages, then the Contractor or the Surety shall promptly pay any remaining amounts due on demand.
4. In the event that liquidated damages are disallowed for any reason whatsoever, NCTA shall be entitled its actual damages including any and all consequential or incidental damages.
5. Nothing herein contained shall be construed as limiting NCTA's rights to recover from the Contractor any and all other amounts due or that may become due to NCTA, or any and all costs and expenses sustained by NCTA for improper performance hereunder, or for breach or breaches in any other respect including, but not limited to, defective workmanship or materials.

I.3.2 Actual Damages

1. The Contractor acknowledges that its performance after Go-Live is critical to the operation of NCTA in so much as the Services to be provided pursuant to this Agreement directly involve NCTA's revenue and customer service. The Contractor agrees that the actual damages set forth below are fair and reasonable and shall be incurred by the Contractor in the event of unsatisfactory performance.
2. The Contractor shall reimburse NCTA for toll revenue, which NCTA identifies as having been lost due to the fault of the Contractor and cannot be recovered. NCTA may choose, in its sole discretion, to recover such lost toll revenue that has been demonstrated and documented by NCTA to have been lost due to the sole fault of the Contractor, from the Contractor by deducting such amounts from payments otherwise due and owing from NCTA to the Contractor. Lost revenue includes, but is not limited to, such events as lost transactions; lost images; lost data; transactions that are not able to be collected upon due to delays caused solely by the Contractor in Contractor processing; delays solely caused by the Contractor in escalation or customer notifications that exceed statutory Requirements.
3. The Contractor shall be responsible for any other costs incurred, which are the results of its improper handling of these Services, including such things as special mailings to customers to notify

them of a mistake in their monthly statements due to transaction gathering and processing failures and inaccuracies.

I.3.3 Risk of Loss

The Contractor assumes the following distinct and several risks without limitation, whether they arise from acts or omissions (whether negligent or not) of the Contractor or of any of its Subcontractors and suppliers, excepting those risks which arise from negligent acts or omissions of NCTA:

1. The risk of loss or damage to any property of NCTA arising out of or alleged to have arisen out of or in connection with the performance of Services pursuant to this Agreement; the risk of loss or damage to any property of the Contractor's agents, employees, and Subcontractors arising out of, or alleged to have arisen out of, or in connection with the performance of Services pursuant to this Agreement.
2. The risk of loss for all Equipment until installed by the Contractor, subject to NCTA's Approval of the installed Equipment. Title and ownership of the Equipment (other than the Software), and the right to possess and use the Software pursuant to the rights and licenses granted to NCTA under this Agreement, shall pass to NCTA upon delivery, subject, in the case of such title and ownership, to the Equipment conforming to the Requirements set forth in **Part III, Scope of Work and Requirements**.

I.4 Audits and Financial Reporting

I.4.1 Annual Audited Financial Statements

The Contractor shall submit on an annual basis its current audited financial report, financial statements, and any associated notes for the term of the Contract.

I.4.2 Audit and Examination of Records

1. Definition of Records
 - a. Contract Records shall include, but not be limited to, all information, communications and data, whether in writing or stored on a computer, computer disks, microfilm, writings, working papers, drafts, computer printouts, field notes, charts or any other data compilations, books of account, photographs, videotapes and audiotapes supporting documents, any other papers or preserved data in whatever form, related to the Contract or the Contractor's performance of the Contract determined necessary or desirable by NCTA for any purpose.
 - b. Proposal Records shall include, but not be limited to, any material relating to the determination or application of Equipment rates, home and field overhead rates, related time schedules, labor rates, efficiency or productivity factors, arithmetic extensions, quotations from Subcontractors, or material suppliers, profit contingencies and any manuals standard in the industry that may be used by the Contractor in determining a price.
2. Pursuant to G.S. 147-64.7, NCTA, the State Auditor, appropriate Federal officials, and their respective authorized employees or Agents are authorized to examine all books, records, and accounts of the Contractor insofar as they relate to transactions with any department, board,

officer, commission, institution, or other authority of the State of North Carolina pursuant to the performance of this Contract or to costs charged to this Contract. Additional audit or reporting Requirements may be required by any authority, if in NCTA's opinion, such requirement is imposed by Federal or State law or regulation. The State Auditor and internal auditors of NCTA may audit the records of the Contractor during and after the term of the Contract to verify accounts and data affecting fees and performance.

3. NCTA reserves and is granted the right (at any time and from time to time, for any reason whatsoever) to review, audit, copy, examine and investigate in any manner, any Contract Records (as herein defined) or Proposal Records (as hereinafter defined) of the Contractor or any Subcontractor. By submitting a response to the RFP, Contractor or any Subcontractor submits to and agrees to comply with the provisions of this section.
4. If NCTA requests access to or review of any Contract Documents or Proposal Records and Contractor refuses such access or review, Contractor shall be in default under its Contract with NCTA, and such refusal shall, without any other or additional actions or omissions, constitute grounds for suspension, termination or disqualification of Contractor. These provisions shall not be limited in any manner by the existence of any Contractor claims or pending litigation relating to the Contract. Disqualification or suspension of the Contractor for failure to comply with this section shall also preclude the Contractor from acting in the future as a Subcontractor of another contractor doing work for NCTA during the period of disqualification or suspension. Disqualification shall mean the Contractor is not eligible for and shall be precluded from doing future work for NCTA until reinstated by NCTA.
5. Final Audit for Project Closeout: The Contractor shall permit NCTA, at NCTA'S option, to perform or have performed an audit of the records of the Contractor and any or all Subcontractors to support the compensation paid the Contractor. The audit will be performed as soon as practical after completion and Acceptance of the contracted Services. In the event funds paid to the Contractor under the Contract are subsequently determined to have been inadvertently paid by NCTA because of accounting errors or charges not in conformity with the Contract, the Contractor agrees that such amounts are due to NCTA upon demand. Final payment to the Contractor shall be adjusted for audit results.
6. Contractor shall preserve all Proposal Records and Contract Records for the entire term of the Contract and for a period of three (3) years after the later of: (i) Final Acceptance of the Project by NCTA, (ii) until all claims (if any) regarding the Contract are resolved, or (iii) expiration of the Proposal Records and Contract Records' status as public records.

1.5 Contractor Cooperation

- I. During the course of this Agreement, NCTA may undertake or award other agreements for additional work, including but not limited to separate agreements with different contractors, including the civil construction work and Constructor related to **Part III, Scope of Work and Requirements**, including but not limited to the roadway, gantries and shelters and associated Work. It is critical that close coordination with interfacing contractors occurs throughout the term of this Agreement. Contractor shall fully cooperate with NCTA and the

parties to all other contracts and carefully integrate and schedule its own work with said parties.

2. NCTA will expect all contractors to comply with all technical specifications, special provisions and other terms and conditions applicable to the Contract(s) at all times during the performance of the Contract(s). In the event of a dispute between contractors, clarifications may be sought from NCTA; provided Contract Terms, conditions or obligations shall remain in effect, excepting in instances wherein a Change Order or other Contract modification is duly executed in writing in accordance with this **Part IV, Terms and Conditions**; however contractors shall engage in all efforts to resolve disputes prior to participation of NCTA and further, such participation by NCTA does not imply or represent a NCTA responsibility for resolution or payment of claims that arise out of a dispute between two contractors.
3. Interface Control Document Development and Ongoing Cooperation Requirements
 - a. The Contractor shall fully cooperate with NCTA and its designated contractor(s) as necessary to develop interface control documents (ICDs) as set forth in **Part III, Scope of Work and Requirements**. The ICDs shall specify all specifications, parameters, System Requirements, programming interfaces and all other elements to effectively and completely interface the RTCS components being provided by the various interfacing contractors. The Contractor shall be responsible for its respective roles and responsibilities as set forth in **Part III, Scope of Work and Requirements**.
 - b. In the event that the elements comprising the RTCS do not properly interface with each other, and the Contractor's and the interfacing contractors' collective efforts to correct same are untimely or unsuccessful, or the interfacing contractors fail to cooperate with the other NCTA designated and/or interfacing contractor(s) to the satisfaction of NCTA and as determined at NCTA's sole discretion then, in addition to NCTA's other available remedies, NCTA shall have the right to, in whole or in part, withhold and/or require a refund of payments to the Contractor and/or the interfacing contractors involved in developing the ICD.
4. Additional Coordination and Cooperation Requirements
 - a. It is anticipated that work by one or more contractors of NCTA, may be in progress adjacent to or within the limits of this Project during progress of the Work on this Contract. The Contractor shall work closely with NCTA and any other contractors who will be working for NCTA for the purpose of coordinating any activity which may affect both contractors. Examples of this Work include but are not limited to installation of toll Equipment, Equipment testing, power and conduit installation and Maintenance and protection of traffic.
 - b. Should problems in coordination with other contractors occur the Contractor shall make NCTA aware of these problems immediately and shall take steps to address the problems and mitigate any delays or additional costs. Contractor shall not commit or permit any act that will interfere with the performance of Work by any other contractor or by NCTA.

- c. Contractor shall cooperate with all other contractors or forces performing construction or work of any other nature within or adjacent to the limits of the Work specified in order to avoid any delay or hindrance to the other contractors or forces. NTCA reserves the right to perform other or additional Work at or near the site (including material sources) at any time, by the use of other forces.
 - d. Each contractor shall be responsible to the other for all damage to Work to persons or property caused to the other by their Operations, and for loss caused the other due to unnecessary delays or failure to finish the Work within the time specified for completion. Modifications to the Approved Project Schedule and Time Extensions will be subject to the Time Extensions and Schedule Changes provisions set forth in **Part IV, Terms and Conditions**, Section 2.5.
5. Contractor Responsibility for Design

Upon Approval of the Design, including toll related civil infrastructure design by the Contractor, Contractor shall assume responsibility for the Design to the extent that if the civil work is installed as designed and the RTCS does not meet the Performance Requirements of this Contract, the Contractor shall be responsible for the costs of redesign, civil rework and additional Equipment costs and any other costs associated with the sub-standard performance.

I.6 Warranties

I.6.1 System Warranty during Maintenance Phase

A full System warranty shall be provided by the Contractor on all System Equipment, Hardware and Software for the term of the Maintenance Phase and any extensions thereof. As a result, during the Maintenance Phase NCTA shall not pay any additional charges above the prices set forth in the Contractor's agreed-to Price Proposal for Maintenance Phase Work, other than Work related to agreed-to Force Majeure events or agreed-to out of scope work requested by NCTA, pursuant to **Part IV, Terms and Conditions**, Section 2.3 Change Orders, and Section 2.4 Extra Work Orders. Notwithstanding the foregoing, in the period after installation and prior to Acceptance, all Maintenance and Support Work shall also be at Contractor's sole expense. Such Work shall be at no charge to NCTA and shall include replacement, whether pre-or post-Acceptance, on any unit of Equipment, Hardware or Software, or part or component thereof, which NCTA deems defective or insufficient, or which NCTA deems to have failed to comply with **Part III, Scope of Work and Requirements**. All transportation, labor and fees associated with restocking cancelled or returned orders shall also be the responsibility of the Contractor. All defective Equipment replaced by the Contractor will become the property of the Contractor.

The provisions of this Section I.6.1 shall survive the expiration, cancellation, or termination of this Agreement.

I.6.2 Software Warranties

- I. The Software needed to operate the System shall be as set forth in **Part III, Scope of Work and Requirements**. NCTA's Acceptance of the Software shall occur in accordance with the provisions of **Part III, Scope of Work and Requirements**. The Contractor warrants that,

upon NCTA's Acceptance of and for the Contract Term, including any extensions thereof, the Software and each module or component and function thereof shall:

- a. be free from defects in materials and workmanship under normal use;
 - b. remain in good working order, be free from viruses; trap doors; disabling devices; Trojan horses; disabling codes; back doors; time bombs; drop-dead devices; worms, and any other type of malicious or damaging code or other technology or means which has the ability to interfere with the use of the System by NCTA or its designees, or permit access to NCTA's computing systems without its knowledge or contrary to its system connectivity policies or procedures;
 - c. not interfere with toll collection;
 - d. operate and function fully, properly and in conformity with the warranties in this Agreement, and
 - e. meet the Requirements set forth in sub-paragraphs 2 through 14 of this Section 1.6.2.
2. The Contractor represents and warrants that upon NCTA's Acceptance of and for the Contract Term, including any extensions, the Software will:
- a. operate fully and correctly in the operating environment identified in **Part III, Scope of Work and Requirements**, 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;
 - b. be fully compatible and interface completely and effectively with the Equipment, including other Software programs provided to NCTA hereunder, such that the other Software and Equipment combined will perform and continuously attain the standards identified in **Part III, Scope of Work and Requirements**, and
 - c. accurately direct the operation of the System, as required by **Part III, Scope of Work and Requirements**, and the descriptions, specifications and Documentation set forth therein and herein.
3. During the term of the Contract, including any extensions, the Contractor shall provide Services to maintain the Software provided hereunder in good working order, keeping it free from defects such that the System shall perform in accordance with this Agreement, the **Part III, Scope of Work and Requirements**, and the warranties set forth herein.
4. The Contractor shall provide technical support and shall remedy any failure, malfunction, defect or non-conformity in Software, in accordance with **Part III, Scope of Work and Requirements**, but in any event not later than the deadline(s) in **Part III, Scope of Work and Requirements** for Maintenance Coverage and Repair Times.
5. The Contractor shall provide NCTA the most current release of all Software available on the date of delivery to maintain optimum performance pursuant to this Agreement.
6. The Contractor shall promptly provide Notice to NCTA 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 and shall promptly provide NCTA 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 NCTA, and the cost of such Hardware shall be borne solely by the Contractor.

7. No Updates or enhancements shall adversely affect the performance of the System, in whole or in part, or result in any failure to meet any Requirements of **Part III, Scope of Work and Requirements**.
8. The Contractor shall ensure continued satisfactory performance by the current operating System of the Software in accordance with all provisions of this Section I.6.2.
9. With regard to Software, the Contractor shall provide Software Services in accordance with **Part III, Scope of Work and Requirements**.
10. The Contractor shall obtain Maintenance agreements for third-party Software in accordance with Section I.6.3 Third-Party Warranties. The Contractor shall secure such Maintenance agreements for the same duration and upon the same terms and conditions as the Maintenance provisions between the Contractor and NCTA. All third-party contracts and licenses shall be assignable to NCTA.
11. In the event that the Software does not satisfy the conditions of performance set forth in **Part III, Scope of Work and Requirements**, the Contractor is obligated to promptly repair or replace such Software at the Contractor's sole cost and expense or, if expressly agreed to in writing by NCTA, provide different Equipment or Software, and perform Services required to attain the Performance Requirements set forth in **Part III, Scope of Work and Requirements**.
12. In the event of any defect in the media upon which any tangible portions of the Software are provided, the Contractor shall provide NCTA with a new copy of the Software.
13. Without releasing the Contractor from its obligations for warranty (during an applicable warranty period), support or Maintenance of the Software, NCTA shall have the right to use and maintain versions of the Software provided by the Contractor 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 NCTA's discretion, installation of such Updates or enhancements would interfere with its Operations. The Contractor 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 NCTA that occurs after the Contractor has both (i) offered, by written Notice to NCTA, a suitable correction (by way of Update, enhancement or otherwise) of such error or defect and (ii) provided NCTA 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 System.
14. All provisions of this Section I.6.2 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.

I.6.3 Third-Party Warranties

In addition to the foregoing warranties, the Contractor shall assign to NCTA, and NCTA shall have the benefit of, any and all Subcontractors' and suppliers' warranties and representations with respect to the System and Services provided hereunder. The Contractor's agreements with Subcontractors, suppliers and any other third parties shall require that such parties (a) consent to the assignment of such warranties and representations to NCTA, (b) agree to the enforcement of such warranties and representations by NCTA in its own name, and (c) furnish to NCTA, the warranties set forth herein. At NCTA's request, the Contractor shall provide supporting documentation which confirms that these warranties are enforceable in NCTA's name.

I.6.4 Services Warranties

The Contractor warrants that all Services shall be performed in a high-quality, professional manner by qualified and skilled personnel in compliance with NCTA's Requirements as set forth in **Part III, Scope of Work and Requirements**. In the event NCTA determines that any Services do not conform to the foregoing warranty, NCTA shall be entitled to elect one of the following remedies: (i) reperformance of the Services by the Contractor until NCTA deems them to be in conformity with the warranty in this Section I.6.4, at no charge to NCTA; (ii) refund from the Contractor for all fees paid in connection with the Services, which NCTA deems were not as warranted, subject to the provisions of **Part IV, Terms and Conditions**, Section I.3.1 Liquidated Damages, such that the Contractor is not required to refund fees for non-provision of Services for which Liquidated Damages have been assessed, (iii) reimbursement by the Contractor for NCTA's costs and expenses incurred in having the Services re-performed by NCTA or someone other than the Contractor. Notwithstanding the foregoing, nothing in this Section I.6.4 shall be construed to limit NCTA's rights pursuant to **Part IV, Terms and Conditions**, Section 2.6.2 Termination for Cause.

I.6.5 Data Accuracy

The Contractor acknowledges and understands that the data and/or information it collects, processes and/or provides to NCTA will be relied upon by to NCTA and other persons or entities that are now or will in the future be under Agreement with NCTA. Should information derived and provided by Contractor be inaccurate and cause NCTA to incur damages or additional expenses, NCTA shall notify Contractor and the Contractor shall immediately place any applicable insurance carrier on Notice of a potential claim. This provision shall survive termination of this Agreement and the Contractor agrees to waive any applicable limitation periods consistent with enforcement of this provision.

I.6.6 Additional Warranties

The Contractor warrants the following:

1. All guarantees and warranties made herein are fully enforceable by NCTA acting in its own name.
2. The Equipment and Systems the Contractor installs and places into operation will not result in any damage to existing facilities, walls or other parts of adjacent, abutting or overhead buildings, structures, surfaces, or any physical/mental damage to any individual utilizing any units(s) of Equipment.
3. All provided Equipment is new and unused.
4. Warranties provided in this Section I.6 are in addition to warranties set forth in the General Conditions.

5. UNLESS MODIFIED BY AMENDMENT OR THE SOLICITATION DOCUMENTS, THE WARRANTIES IN THIS SECTION 1.6 ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, OR WHETHER ARISING BY COURSE OF DEALING OR PERFORMANCE, CUSTOM, USAGE IN THE TRADE OR PROFESSION OR OTHERWISE, INCLUDING, BUT NOT LIMITED TO, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND NO OTHER REPRESENTATIONS OR WARRANTIES HAVE FORMED THE BASIS OF THE BARGAIN HEREUNDER.

1.6.7 Pervasive Defects

The Contractor agrees to promptly remedy, at no cost to NCTA, any defects determined by NCTA to be Pervasive, such that if NCTA determines that any Equipment, component, sub-component or Software is experiencing continued or repetitive failure that requires constant replacement or repair, the Contractor agrees that a “Pervasive Defect” shall be deemed to be present in such affected types of Equipment or Software. The Contractor shall perform an investigation of the issues and prepare a report that includes a reason for the failure and their Plan for remedy. Such correction shall be in a manner satisfactory to NCTA and that permanently addresses the problem and corrects the defect so that such defect does not continue to occur.

The obligations set forth in this section shall be in addition to any warranty obligations set forth in this Agreement. The provisions of this section shall survive the expiration or earlier termination of this Agreement.

1.6.8 General Guaranty

Neither Acceptance of the System and Services or payment therefor, nor any provision in this Agreement, nor partial or entire use of the System and Services by NCTA shall constitute an Acceptance of System and Services not performed in accordance with this Agreement or relieve the Contractor of liability for any express or implied warranties or responsibility for faulty materials or workmanship.

1.7 Software and License

A Software license and escrow agreement shall be attached to the final Contract as Exhibit E. The license and escrow agreement shall include the terms and conditions set forth below in this Section 1.7.

1.7.1 Description of License

The Contractor hereby grants to NCTA, for purposes of operating the System, an unlimited, fully-paid-up, royalty-free, perpetual, universal, irrevocable, non-exclusive license: (i) to use, maintain, disclose, modify, adapt, and improve any and all Software and other Equipment; notwithstanding the foregoing, any modifications not made by the Contractor, its Subcontractors or agents shall be subject to Contractor validation in order to continue to maintain applicable warranties. (ii) to use all resulting versions, modifications, adaptations and improvements of any and all Software and other Equipment; (iii) to make, have made, use, distribute and display copies, reproductions, and derivative works of any and all Software and Documentation; and (iv) to permit any other person or entity providing services to NCTA to do any and all of the foregoing (i) through (iii). 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 NCTA) comprised or practiced by the

Equipment or that are necessary or useful to operate the System.

Third Party Software that can be purchased directly from a commercial third-party provider by NCTA and a license can be issued directly to NCTA may be excluded from Software subject to the terms in Section 1.7.1 of this Terms and Conditions. Any custom Software associated with the third party required for NCTA to use the Third-Party Software to meet all Requirements shall be included in the unlimited, fully-paid-up, royalty-free, perpetual, universal, irrevocable, non-exclusive license described in this Section.

1.7.2 Scope of License

All rights and licenses granted to NCTA under this Agreement shall be exercisable at any time by NCTA and each of the persons and entities provided Services by the Contractor. The license shall permit NCTA to add at any time, entities or persons to receive Contractor Services with no additional license fees charged to NCTA. The foregoing shall apply to NCTA, and such persons and entities and their respective successors and assigns. Contractor shall include, without requirement of any payment or provision of any consideration other than or in addition to that which is expressly specified by this Agreement, the right of NCTA and each other person or entity referred to in this subparagraph:

1. to utilize the System (including all Equipment or related Documentation), in whole or in part, in connection with Services provided by or to NCTA or such other persons or entities, without regard to present or future location, including for purposes of technical support, Maintenance or repair;
2. to make multiple copies of the Software and related Documentation for purposes of the exercise of NCTA's rights and licenses hereunder;
3. to use the Software and related Documentation on or in connection with multiple processors, components obtained by or on behalf of NCTA from the Contractor or from third parties, and Systems (including the System) utilized by NCTA or any person or entity providing Services to or on behalf of NCTA;
4. to maintain and modify the Software subject to the Contractor validation set forth in Section 1.7.1. Description of License subparagraph (i) and to use the resulting versions and modifications thereof;
5. to sell or distribute user technology, device, or method permitting public access to and use of the user Interface of the System, to any person or entity, and
6. to exercise any and all such rights and licenses under this Agreement through the services of its employees, agents, independent contractors or Subcontractors, or such other persons or entities as it may employ or engage in its own discretion, and to disclose the Software and related Documentation, in whole or in part, to such persons or entities for such purposes.

For the avoidance of doubt, nothing in this Agreement shall restrict or preclude NCTA from providing to any other person or entity, or any such other person or entity from using, any of the Equipment, Software or other materials provided to NCTA hereunder by the Contractor, in connection with the provision of any products or Services to or on behalf of NCTA, or to any person or entity providing Services to or on behalf of NCTA.

Pre-existing Contractor Software shall remain the property of the Contractor and nothing in this Agreement shall be construed to provide title to such Software to NCTA, subject to the License provided as set forth in Section 1.7.1. Description of License.

1.7.3 Escrow

1. Establishing the Escrow

Upon execution of the Contract the parties shall enter into a Software escrow agreement, prior to depositing the Software and related Documentation into escrow, the Contractor shall submit the name of the escrow agent to NCTA for its Approval. In the event that the escrow agent requires its own form of escrow agreement, the form of escrow agreement used by the escrow agent shall be subject to the prior written Approval of NCTA and if not Approved by NCTA then another escrow agent shall be selected. If the escrow agent's form of escrow agreement is Approved by NCTA, said escrow agreement shall be used.

2. Deposits

Pursuant to the terms of the escrow agreement, the Contractor shall deposit with the escrow agent, without charge to NCTA, all Deposit Materials (as hereinafter defined) necessary or useful to: (i) use, reproduce, modify, repair and maintain the Software; (ii) operate, modify, repair and Maintain the Equipment, and (iii) operate, use, modify, repair and maintain the System in accordance with this Agreement. Access to and rights in the materials in the escrow shall be governed by the terms and conditions hereof and as further defined in the escrow agreement.

Materials so deposited ("Deposit Materials") shall include but not be limited to: all Software programs (including all source and object code with respect thereto); configuration files; ICDs; operator's and user's manuals, and other associated Documentation; reports; control files, utilities, and packages; operating Systems; database Systems; network packages; Maintenance items (including test programs and program specifications); functional Documentation, compilers, instructions for generating the Software, and any proprietary Software tools that are necessary in order to maintain the Software and other Equipment. A list of all deposit materials shall accompany the Deposit Materials.

Contractor shall deposit a complete set of Deposit Materials upon the Acceptance of the first Roadway System Implementation Phase and shall make deposit Updates no less frequently than quarterly or when major Updates are made to Software pursuant to the following paragraph, whichever occurs first.

In the event the Contractor revises or supplements any of the Deposit Materials or creates additional materials related to the System, the Contractor shall deposit a complete set of such revised, supplemented, or additional Deposit Materials with the above named escrow agent within thirty (30) Calendar Days of such revision, supplement or addition and shall indicate with each deposit which documents and which pages have been revised, supplemented or added since the last deposit. Any deposits made pursuant to the two preceding sentences shall become part of the Deposit Materials.

The Contractor shall provide Notice to NCTA confirming and describing the content of any deposits made within thirty (30) Calendar Days of such deposits, certifying that all such deposits are complete and include accurate copies of the required materials.

To the extent the Software includes components developed by third parties, the Contractor shall ensure that the Deposit Materials include copies of license agreements, computer programs, disks and Documentation for all Software obtained by the Contractor from third parties. At the Contractor's expense, the Contractor shall ensure that all third-party licenses are transferable to NCTA at the time of any release of the escrow provided for hereunder.

3. Payment for Costs of Escrow

The Contractor shall be responsible for payment of all costs arising in connection with the establishment and maintenance of the escrow, referred to in this Section 1.7.3, throughout the Contract Term, including any fees of the escrow agent, and NCTA shall not be charged by the Contractor for its time in compiling and depositing Deposit Materials. The Contractor's obligation to maintain the escrow in place shall continue after the expiration or termination of the Contract Term until the Contractor receives Notice from NCTA that the escrow is no longer required, pursuant to paragraph 5 below, Release of Escrow Deposits.

4. Verification of Escrow Deposits

From time to time while the escrow is in place, NCTA may, at its sole discretion, verify directly or hire a firm qualified and mutually and reasonably acceptable to both parties, to provide verification of the applicable escrow deposits at NCTA's expense, and to prepare a report. The agreement between NCTA and such firm will include non-disclosure provisions deemed appropriate by NCTA. Should any deficiencies or differences be noted between the System implemented under this Agreement and the applicable deposits delivered to the escrow agent, NCTA shall provide Notice to the Contractor and shall provide the Contractor with a copy of the audit report. Within thirty (30) Calendar Days after its receipt of such notification and accompanying audit report, the Contractor shall deliver to the Escrow Agent for deposit the applicable Deposit Materials necessary to make the escrow deposits consistent with the System.

5. Release of Escrow Deposits

Except as may be otherwise provided in the escrow agreement, the Deposit Materials are to remain in escrow unless or until the withdrawal of such Deposit Materials is permitted pursuant to **Part IV, Terms and Conditions**, Section 2.6.2 of this Agreement, ~~or upon end of the Contract, whether~~ due to termination for cause or expiration, at which time such Deposit Materials shall be provided to NCTA subject to the limitations contained in the confidentiality provisions, and the terms of the escrow agreement, and shall be incorporated into the licenses granted to NCTA hereunder.

In addition, effective upon any release of the Deposit Materials to NCTA, the Contractor hereby grants to NCTA and its designees a perpetual, irrevocable, universal, non-exclusive, fully-paid-up, royalty-free license to use, reproduce, adapt, modify, enhance and reverse engineer the source code form of the Software and all Deposit Materials for the purpose of supporting and maintaining the System, and for using, making, and having made derivatives of the Software and Deposit Materials in connection therewith. The license granted hereunder shall cover the full definition of Software, including components directly owned, developed or licensed by the Contractor, as well as components owned, developed or licensed by any Contractor affiliates, licensors, Contractor parties, including third-party Software suppliers.

1.8 Authority of the Contractor Project Manager

The Contractor hereby authorizes the NCTA Contractor Project Manager (“Contractor Project Manager”) to determine in the first instance all questions of any nature whatsoever arising out of, under, or in connection with, or in any way related to or on account of, this Agreement including, without limitation: questions as to the value, acceptability and of the Services; questions as to either party’s fulfillment of its obligations under this Agreement; negligence, fraud or misrepresentation before or subsequent to execution of this Agreement; questions as to the interpretation of **Part III, Scope of Work and Requirements**; and claims for damages, compensation and losses.

1. The NCTA Contractor Project Manager shall act as the Designated Representative of NCTA in all matters relating to the Project.
2. The NCTA Contractor Project Manager may give orders to the Contractor to do Work that they determine to be necessary for the Contractor to fulfill the Contractor’s obligations under this Agreement.
3. If requested by the Contractor, the NCTA Contractor Project Manager will promptly provide appropriate explanations and reasons for his determinations and orders hereunder.
4. The Contractor shall be bound by all determinations or orders and shall promptly obey and follow every order of the NCTA Contractor Project Manager, including the withdrawal or modification of any previous order and regardless of whether the Contractor agrees with the NCTA Contractor Project Manager’s determination or order. Orders shall be in writing, unless not practicable, in which event any oral order must be confirmed in writing by the Contractor Project Manager as soon thereafter as practicable.

1.9 Key Team Personnel

The Contractor has designated an individual Project Principal, who is an officer authorized to sign the Agreement and any Amendments to the Agreement and to speak for and make commitments on behalf of the Contractor. The Contractor shall designate a project manager (“Contractor Project Manager”), identified in the Proposal, who shall act as the primary point of contact in all matters on behalf of Contractor. The Contractor Project Manager shall assign other individuals as contacts with regard to specific functional areas of the Work, subject to the Approval of NCTA. NCTA shall have input into determining who shall be assigned as Project Manager for Contractor and the Contractor may not change the Contractor Project Manager without consulting with NCTA and obtaining Approval from NCTA as set forth in the following paragraph.

1. The Contractor’s Proposal identifies certain job categories as “Key Team Personnel” for the Agreement. Key Team Personnel for this Project are identified in the Contractor’s Proposal and shall be Approved as part of the Project Management Plan as set forth in **Part III, Scope of Work and Requirements**. Key Team Personnel shall be required to work in the position indicated in the Proposal and Approved Project Management Plan unless Approval is obtained from NCTA. The Contractor shall obtain NCTA’s prior Approval to any desired changes in Key Team Personnel or any significant reduction in the level of effort for such Key Team Personnel, which consent shall not be unreasonably withheld. Should NCTA determine during the term of the Agreement that the list of Key Team Personnel does not include personnel essential to the

successful performance of the Work, NCTA may require the Contractor to add any existing job category to such list.

2. If NCTA becomes dissatisfied with the performance of any person designated as Key Team Personnel performing under this Agreement, NCTA shall notify Contractor in writing. Within ten (10) Business Days of receipt of such Notice, the Contractor shall either propose a replacement person for evaluation and Approval by NCTA or present to NCTA a Plan for correcting the incumbent's performance deficiencies within a period of thirty (30) Calendar Days thereafter. If either NCTA rejects the Plan presented by Contractor or the incumbent's performance deficiencies are not corrected to NCTA's satisfaction within the thirty (30) Calendar Day plan period Approved by NCTA, then the Contractor shall, within ten (10) Business Days after rejection of the Plan or expiration of the thirty (30) Business Day plan period, propose to NCTA a replacement person for evaluation and Approval by NCTA.

I.10 Phases of the Project and Acceptance

I.10.1 Phases of the Project

The Contractor shall perform all planning, Design and Software development, testing and installation Services and complete and have Approval for all corresponding Submittals, Deliverables and Milestones required in **Part III, Scope of Work and Requirements** for the Implementation Phase for a Project. The Implementation Phase shall begin at Notice to Proceed and shall be continue until completion of Onsite Installation Test. The Installation and System Acceptance Phase shall begin after completion of the Onsite Installation Test and shall continue until System Acceptance is complete, as further defined in this Agreement and in **Part III, Scope of Work and Requirements**.

The Contractor's Operations and Maintenance Phase responsibilities at a typical Project shall begin upon System Acceptance and shall continue until the expiration of the Initial Contract Term, and also shall include any Contract renewals or extensions thereof. Commencement of this Phase shall not relieve the Contractor of any of its responsibilities to complete all Requirements set forth in **Part III, Scope of Work and Requirements** of the Implementation Phase and does not waive any of the rights of NCTA in this regard.

I.11 Acceptance of Implementation Phase and Installation and System Acceptance Phase

Provisional Acceptance for the Implementation Phase of a project will be achieved when NCTA, in its sole discretion, determines that Contractor has complied with the completion Requirements set forth for that Phase under the Agreement, including in **Part III, Scope of Work and Requirements**, pursuant to Section I.10.3 below.

Final Acceptance of the Implementation Phase will be considered by NCTA to have occurred, when NCTA has received and Approved all Project documents, drawings, Software, interface data, test data, manuals and other Deliverables for the Implementation Phase, and Contractor shall have successfully completed the Acceptance Testing and when in NCTA's sole discretion Contractor has met all other obligations under the Agreement, including in **Part III, Scope of Work and Requirements**, pursuant to Section I.10.4 below.

Project Acceptance will be considered to have occurred when NCTA, in its sole discretion, determines that Contractor has complied with all of the completion Requirements set forth for the Project for both the Implementation and Operations and Maintenance Phases, pursuant to Section 1.10.5 below.

NCTA's beneficial use of the Project Deliverables during any phase prior to Project Acceptance shall not constitute Acceptance of any Deliverable, nor shall such use give rise to equitable claim for adjustment.

1.11.1 Provisional Acceptance

NCTA, in its sole discretion, may grant a Provisional Acceptance of the Implementation Phase if it deems that the Work on the Implementation Phase is substantially complete, and the following conditions have been met:

1. Contractor has passed NCTA Commissioning test and Go-Live has been Approved, as set forth in **Part III, Scope of Work and Requirements**;
2. Contractor, in NCTA's sole determination, has substantially passed and has been given Provisional Approval of the Acceptance test; and
3. A punch list of items not yet in compliance with **Part III, Scope of Work and Requirements** has been delivered by the Contractor and has been verified by NCTA and Approved as being complete.

NCTA shall issue a written Notice of Provisional Acceptance upon satisfaction of the conditions listed above in items 1 through 3. The occurrence of Provisional Acceptance shall not relieve the Contractor of any of its continuing obligations hereunder.

1.11.2 Final Acceptance of Implementation Phase and Installation and System Acceptance Phase

Final Acceptance of the Implementation and Installation and System Acceptance Phase shall be deemed to have occurred when all of the following conditions have been met:

1. The Contractor shall provide a Final Acceptance letter Certification to close out the Phase. The Certification shall include but not be limited to: total costs associated with the Phase, date of Work completion and any additional required information contained in item 2 through 8 below, if applicable;
2. Successful completion and Approval of the Acceptance Test(s), as applicable, by NCTA, as defined in **Part III, Scope of Work and Requirements**;
3. Delivery by the Contractor and Approval by NCTA of all Deliverables, including As-Built Documentation/Drawings, as defined in **Part III, Scope of Work and Requirements**;
4. Any and all punch list items have been satisfactorily completed and Approved by NCTA;
5. An Affidavit has been delivered to NCTA signed by the Contractor, stating all debts and claims of suppliers and Subcontractors have been paid and/or settled;
6. All Contractor claims for the Phase are deemed to be resolved by NCTA, and the Contractor has submitted a statement that no such requests or protests will be applied for; any and all claims under this Agreement are resolved, and that no such claims will be made;

7. All of Contractor's other obligations under the Agreement shall have been satisfied in full or waived in writing by NCTA; and
8. NCTA shall have delivered to the Contractor a Notice of Final Acceptance for the Phase.

1.11.3 Project Acceptance of All Phases

Project Acceptance shall mean the Final Acceptance for all Phases, including both Implementation Installation and System Acceptance Phase, and shall be deemed to have occurred when all of the following conditions have been met:

1. The Contractor shall provide a Project Acceptance letter Certification to close out the Agreement. The Certification shall include but not be limited to: total costs associated with the Agreement, date of Work completion and any additional required information contained in item 2 through 9 below, if applicable;
2. The Implementation Phase has been Accepted and closed out in accordance with **Part IV, Terms and Conditions**, Section 1.10.4
3. The Contractor has met all End of Contract and transition Requirements pursuant to **Part IV, Terms and Conditions**, Section 2.7 End of Contract and Transition and **Part III, Scope of Work and Requirements**;
4. The Contractor has deposited all current escrow materials required under this Agreement, including all necessary Documentation and support materials;
5. The Contractor has provided NCTA with all required materials, fixtures, furnishings, Equipment and Software; Documentation and manuals, either owned by or licensed to NCTA, pursuant to this Agreement. All such materials have been verified by NCTA to be in good, working order;
6. An Affidavit has been delivered to NCTA, signed by the Contractor, stating all debts and claims of suppliers and Subcontractors have been paid and/or settled;
7. All Contractor claims for the Phase are deemed to be resolved by NCTA, and the Contractor has submitted a statement that no such requests or protests will be applied for; any and all claims under this Agreement are resolved, and that no such claims will be made;
8. All Requirements identified in **Part III, Scope of Work and Requirements** shall be verified and Certified by the Contractor to be successfully delivered, and shall be Approved by NCTA;
9. All the Contractor's other obligations under the Agreement shall have been satisfied in full or waived by NCTA; and

1.11.4 Project Completion

Project Completion shall be deemed to have occurred when all obligations under this Agreement have been successfully performed by the Contractor, including but not limited to all retentions owed to the Contractor have been released by NCTA and, when NCTA has delivered a Notice of Project completion to the effect of the foregoing.

1.12 Order of Precedence

The Contract is subject to the terms and conditions of this solicitation, which, in case of conflict, shall have the following Order of Precedence:

1. Executed Contract Amendments, including all Exhibits and Attachments
2. RFP **Part IV, Terms and Conditions** Sections 1 and 2, including Addenda
3. RFP **Part I, Administrative**
4. RFP **Part III, Conformed Scope of Work and Requirements**, including all Attachments and Addenda
5. RFP **Part IV, Terms and Conditions**, Section 3 General Terms and Conditions
6. Contractor's Price Proposal
7. Contractor's Technical Proposal, including Exhibits and Appendices other than Price Proposal

1.12 Assurances

In the event that criminal or civil investigation, litigation, arbitration or other proceedings disclosed to the State pursuant to **Part I, Administrative**, Section 3.2 Content of Technical Proposal, or of which NCTA otherwise becomes aware, during the term of the Agreement, causes NCTA to be reasonably concerned about:

1. The ability of the Contractor or its Subcontractor to continue to perform the Agreement in accordance with its terms and conditions, or
1. Whether the Contractor or its Subcontractor in performing Services is engaged in conduct which is similar in nature to conduct alleged in such investigation, litigation, arbitration or other proceedings, which conduct would constitute a breach of the Agreement or violation of law, regulation or public policy, then the Contractor shall be required to provide NCTA all reasonable assurances requested by NCTA to demonstrate that: the Contractor or its Subcontractors hereunder will be able to continue to perform the Agreement in accordance with its terms and conditions, and the Contractor or its Subcontractors will not engage in conduct in performing Services under the Agreement which is similar in nature to the conduct alleged in any such litigation, arbitration or other proceedings.

2. Contract Changes and Termination

2.1 General

The following Contract changes are allowable within the scope of this Contract:

1. Task Orders – NCTA anticipates issuing Task Orders for Work required to provision new systems, enhance Software, Upgrade Equipment, enhance or otherwise improve Operations and Maintenance Services for needed activities in accordance with labor rates proposed and set forth in the Price Proposal.
2. Change Orders – NCTA anticipates using Change Orders to address variances in the original quantities tabulated or scope pursuant to the Task Order.
3. Extra Work Orders –NCTA anticipates issuing Extra Work Orders to address variances in the specifications or **Part III, Scope of Work and Requirements** beyond that of the Approved SDDD and for which there is no appropriate pay item or category. Extra Work Orders will be issued within the sole discretion of NCTA, and such additional Work may be subject to a new competitive procurement as deemed to be in the best interest of NCTA.

4. Time Extensions – NCTA anticipates issuing Time Extensions, as necessary, to modify Project milestones for reasons out of the control of the Contractor. Unless otherwise agreed to by NCTA in writing, the Contractor’s Payment Schedule and Price Proposal, including labor rates identified in the Price Proposal, shall apply to all of the above Contract changes.
5. Cost for Additional Work - Unless otherwise agreed to by NCTA in writing, the Contractor’s Payment Schedule and Price Proposal, including labor rates identified in the Price Proposal, shall apply to all of the above Contract changes discussed in this section. If cost for additional Work and/or Services cannot be established on the basis of the Price Proposal or the Payment Schedule, a catalog or market price of a commercial product sold in substantial quantities, or on the basis of prices set by law or regulation, the Contractor is required to submit to NCTA detailed cost breakdown, including information on labor and materials costs, overhead and other indirect costs.

2.2 Task Orders

- I. NCTA will use Task Orders to provision new systems and Services under this Contract. Task Orders will reference applicable requirements and pricing information within this RFP and provide supplementary information relative to the Project. Examples of this type of work include:
 - a. Implementation and maintenance of a multi-zone RTCS on a new facility.
 - b. Replacement of an existing RTCS on an existing facility.
 - c. Provisioning of Level 1 and 2 maintenance services for RTCS facilities.

2.3 Change Orders

- I. A Change Order will be a change in Design or Work needed to maintain operation of NCTA Roadside Toll Collection System after Acceptance of the original System by NCTA. Examples of this type of work include:
 - a. Software modifications and Upgrades to improve reliability, diagnostics, ITSM, Inventory Management, interfaces to traffic management, or other tasks directly related to toll collection.
 - b. Hardware Upgrades to provide better data storage and handling, such as replaced, improved or expanded hard drives, routers, etc., or prototype new Equipment to test System modifications. This does not include Updates or Upgrades required to meet required System or transaction growth or modifications currently included in the Scope of Work and Requirements.
2. NCTA may elect to have the Contractor perform the Change Order Work. In this case, the Contractor shall provide a detailed Technical and Price Proposal for the order and await Approval and Notice to Proceed from NCTA before incurring any expenses for which the Contractor expects reimbursement.

2.4 Extra Work Orders

An Extra Work Order will ONLY be a change in the Scope of Work and Requirements requiring different functionality, Hardware or Software than that covered by the existing Contract or a change to a Contract Term and condition with an impact. Some examples include:

- I. System change to replace the selected AVI system;

2. System changes to radically alter the vehicle classification structure;
3. Large scale changes in Hardware platforms or operating Systems beyond changes covered in Upgrades or Maintenance Task Orders;
4. Changes to insurance or legal requirements.

2.5 Time Extensions, Schedule Changes and Submittals

2.5.1 Time Extensions and Schedule Changes

1. Within fourteen (14) Calendar Days of Notice to Proceed the Contractor shall submit a Preliminary Project Implementation Schedule for Approval in accordance with the Requirements set forth in **Part III, Scope of Work and Requirements**. The Approved Preliminary Project Implementation Schedule at the time of the execution of the Agreement shall be included as **Exhibit A, Preliminary Project Implementation Schedule**.
2. The Contractor shall clearly label each Update against the Approved Preliminary Project Implementation Schedule, pursuant to the Requirements of the Approved Project Management Plan. Submission of the monthly Updates against the Approved Schedule for the Implementation Phase shall not release or relieve the Contractor from full responsibility for completing the Work within the time set forth in the Approved Implementation Schedule. If the Contractor causes delays and fails or refuses to implement measures sufficient to bring its Work back into conformity with the current Approved Schedule, its right to proceed with any or all portions of the associated Work may be terminated under the provisions of the Contract. However, in the event that NCTA, in its sole determination, should permit the Contractor to proceed, NCTA's permission shall in no way operate as a waiver of its rights nor shall it deprive NCTA of its rights under any other provisions of the Contract.
3. NCTA will Approve Time Extensions ONLY for Force Majeure causes or acts by NCTA which have been documented to have impeded the Contractor's Project progress.
4. Any changes to the Approved Implementation Schedule require Approval and an Amendment to the Contract.
5. Unless otherwise expressly agreed to by NCTA, the Contractor shall not receive extra compensation or damages for any time extension Approved by NCTA for completion of additional and/or altered Work. However, the Contractor shall be fully compensated for such Work as agreed upon by NCTA and the Contractor in the Change Order or the supplemental agreements.

2.5.2 Submittals

Contractor's Submittal requirements and Submittal schedule shall be as set out in Contractor's Approved Program Management Plan, as required in **Part III, Scope of Work and Requirements**. The baseline schedule Approved after Notice to Proceed shall establish accepted dates by which Contractor shall submit required permits, documents, and applications, including all necessary documents in support thereof. NCTA's written Approval will be required for these Submittals. NCTA will Approve or reject such Submittals, providing an explanation of any reasons for rejection in a form agreed to in the Project Management Plan. In any instance where NCTA does not provide Approval, rejection or written notification of an extended review period by the due date specified in the Approved Baseline Schedule, the Contractor shall notify NCTA in writing that NCTA response is due. NCTA's right to extend the

review period is intended to allow flexibility in special circumstances where the nature of the Submittal requires more involved review, and not as a diminution of NCTA's obligation to promptly review Submittals. NCTA reserves the right to reject Submittals that are not complete or correct and to extend the review period accordingly.

Contractor shall not be held responsible for delays in schedule due to delays in Approvals and permits completely beyond the control of the Contractor. Notwithstanding the foregoing, Contractor shall make every effort to work around and mitigate the impact of delay.

2.6 Contract Termination

2.6.1 Termination General Requirements

1. The Contract issued for Roadside Toll Collection Services will terminate at the end of the Contract Term(s) set forth above, inclusive of any Operations and Maintenance and or extension periods as noted in **Part IV, Terms and Conditions**, Section 1.2 Contract Terms.
2. NCTA may terminate the Contract(s), in whole or in part, for default subject to the default provisions set forth below.
3. Any required Notices of termination made under this Contract shall be transmitted via U.S. Mail, Certified Return Receipt Requested, or personal delivery to the Contractor's Representative. The period of Notice for termination shall begin on the Calendar Day the return receipt is signed and dated or upon personal delivery to the Contractor(s) contract administrator.
4. The parties may mutually terminate this Contract by written agreement at any time.
5. NCTA may terminate this Contract, in whole or in part, pursuant to the Terms and Conditions in the Solicitation Documents.
6. NCTA will notify the Contractor(s) at least ninety (90) Calendar Days prior to the termination of the Contract in the absence of cause. This notification will require the Contractor(s) to initiate actions in preparation for leaving the NCTA Project site and handing off Operations to replacement entities. These actions shall include:
 - a. Acknowledgement of receipt of End of Contract notification, and
 - b. Act in accordance with **Part IV, Terms and Conditions**, Section 2.7 End of Contract and Transition.

2.6.2 Termination for Cause

1. In the event any Equipment, Hardware Software, or Services furnished by the Contractor during performance of any Contract Term fails to conform to any material requirement of the Contract, and the failure is not cured within the specified time after providing written Notice thereof to Contractor, NCTA may cancel and procure the Work or Services from other sources; holding Contractor liable for any excess costs occasioned thereby. The rights and remedies of NCTA provided above shall not be exclusive and are in addition to any other rights and remedies provided by law or under the Contract. The Contractor shall not be relieved of liability to NCTA for damages sustained by NCTA arising from Contractor's breach of this Contract; and NCTA may, in its discretion, withhold any payment due as a setoff until such time as the damages are

finally determined or as agreed by the parties. Voluntary or involuntary Bankruptcy or receivership by Contractor shall be cause for termination.

2. “Cause” shall mean a material breach of this Agreement by the Contractor. Without limiting the generality of the foregoing and in addition to those instances referred to elsewhere in this Agreement as a breach, a material breach shall include the following:
 - a. the Contractor failed to transmit and process transactions and data in accordance with this Agreement;
 - b. the Contractor materially inhibited NCTA’s collection of toll revenue;
 - c. the Contractor has not submitted acceptable Deliverables to NCTA on a timely basis;
 - d. the Software/Equipment proves incapable of meeting the functional and/or Performance Requirements set forth in **Part III, Scope of Work and Requirements**;
 - e. the Contractor refused or failed, except in cases for which an extension of time is provided, to supply enough properly skilled workers or proper materials to properly perform the Services required under this Agreement;
 - f. the Contractor failed to make prompt payment to Subcontractors or suppliers for materials or labor;
 - g. the Contractor has become insolvent (other than as interdicted by the bankruptcy laws), or has assigned the proceeds received from this Agreement for the benefit of its creditors, or it has taken advantage of any insolvency statute or debtor/creditor law or if the Contractor’s property or affairs have been put in the hands of a receiver;
 - h. any case, proceeding or other action against the Contractor is commenced in bankruptcy, or seeking reorganization, liquidation or any relief under any bankruptcy, insolvency, reorganization, liquidation, dissolution or other similar act or law of any jurisdiction, which case, proceeding or other action remains undismissed, undischarged or unbonded for a period of thirty (30) Calendar Days;
 - i. the Contractor fails to maintain insurance policies and coverages or fails to provide proof of insurance or copies of insurance policies as required by this Agreement;
 - j. any warranty, representation, certification, financial statement or other information made or furnished to induce NCTA to enter into this Agreement, or made or furnished, at any time, in or pursuant to the terms of this Agreement or otherwise by the Contractor, or by any person who guarantees or who is liable for any obligation of the Contractor under this Agreement, shall prove to have been false or misleading in any material respect when made;
 - k. any intentional violation by the Contractor of the ethics provisions, or applicable laws, rules or regulations;
 - l. the Contractor has failed to obtain the Approval of NCTA where required by this Agreement;
 - m. the Contractor’s Audited Financial Statements or those of its parent company submitted to NCTA do not fairly represent the Contractor or its parent’s true financial position;

- n. the Contractor has failed in the representation of any warranties stated herein;
 - o. the Contractor makes a statement to any representative of NCTA indicating that the Contractor cannot or will not perform any one or more of its obligations under this Agreement;
 - p. the Contractor fails to remedy Pervasive Defects;
 - q. any act or omission of the Contractor or any other occurrence which makes it improbable at the time that the Contractor will be able to perform any one or more of its obligations under this Agreement;
 - r. any suspension of or failure to proceed with any part of the Services by the Contractor which makes it improbable that the Contractor will be able to perform any one or more of its obligations under this Agreement;
 - s. a pattern of repeated failures to meet the performance metric or metrics as defined in **Part III, Scope of Work and Requirements**;
 - t. the suspension or revocation of any license, permit, or registration necessary for the performance of the Contractor's obligations under this Agreement, or
 - u. the default in the performance or observance of any of the Contractor's other obligations under this Agreement and the continuance thereof for a period of thirty (30) Calendar Days after Notice given to the Contractor by NCTA.
3. Cure/Warning Period: Prior to terminating the Contract(s) for cause, NCTA will issue a Notice of cure/warning to the Contractor(s) thirty (30) Days prior to the termination date. The Notice will be transmitted via U.S. Mail Certified Return Receipt Requested or personal delivery to the Contractor(s) Representative, and the period of Notice for termination shall begin on the date the Return Receipt is signed and dated or upon personal delivery to the Contractor contract administrator. The Notice will specify the corrective actions/work required to be taken by the Contractor to come into compliance with the terms and conditions of the Contract(s). If the corrective actions/work is performed within the cure/warning period, in a manner acceptable to NCTA, the Contract will remain in effect in accordance with the terms and conditions thereof.
4. Termination Without Notice of Cure/Warning: If NCTA has issued two Notices of cure/warning to the Contractor, upon the issuance of the third or subsequent Notice, NCTA reserves the right to terminate the Contract without further Notice. The failure of NCTA to exercise this right on any occasion shall not be deemed a waiver of any future right.
5. In case NCTA does not pay within 120 days of invoice receipt and approval by NCTA, the Contractor shall be allowed to inform NCTA that Contractor intends to terminate the Contract if NCTA does not pay all invoices over 120 days late within the next 60 days. The Contractor may request payment for the damage from not receiving compensation for any invoice over 120 days late. The Contractor shall be able to terminate the Contract if it is not paid any amount due for a period of 120 days in order to avoid excessive economic distress.

2.6.3 Termination for Convenience Without Cause

NCTA may terminate the Contract(s) without cause, in whole or in part by giving ninety (90) days prior Notice in writing to the Contractor. The Contractor shall be entitled to sums due as compensation for Deliverables provided and Services performed in conformance with the Contract. In the event the Contract is terminated for the convenience of NCTA, NCTA will pay for all Work performed and products delivered in conformance with the Contract up to the date of termination. This is an incidental item within **Part III, Scope of Work and Requirements**, but without separate compensation.

2.7 End of Contract and Transition

If the Agreement is not renewed at the end of this term or is canceled prior to its expiration, for any reason, the Contractor shall cooperate with NCTA to facilitate a smooth succession to NCTA's selected successor for the Services, whether the successor is NCTA or a third-party. Transition Services provided prior to end of Contract shall be provided as set forth in Section 2.3.12 of **Part III, Scope of Work and Requirements**. The Contractor shall perform such Work without additional compensation.

The Contractor must also provide for up to six (6) months after the expiration or cancellation of the Agreement, all reasonable transition assistance requested by the State, to allow for the expired or canceled portion of the Services to continue without interruption or adverse effect, and to facilitate the orderly transfer of such Services to the State or its designees. Such transition assistance will be deemed by the parties to be governed by the terms and conditions of the Agreement, (notwithstanding this expiration or cancellation) except for those Contract Terms or conditions that do not reasonably apply to such transition assistance. The State shall pay the Contractor for any resources utilized in performing such transition assistance at the most current rates provided by the Agreement for Contract performance. If the State cancels the Agreement for cause, then the State will be entitled to offset the cost of paying the Contractor for the additional resources the Contractor utilized in providing transition assistance with any damages the State may have otherwise accrued as a result of said cancellation.

3. General Terms and Conditions

3.1 Standards

- I. Any Deliverables shall meet all applicable State and Federal requirements, such as State or Federal Regulation, and NC Chief Information Officer's (CIO) policy or regulation. The Contractor will provide and maintain a Quality Assurance system or program that includes any Deliverables and will tender or provide to the State only those Deliverables that have been inspected and found to conform to the requirements of this Contract. All Deliverables are subject to operation, certification, testing and inspection, and any accessibility requirements as required:
 - a. Site Preparation: The Contractor shall provide NCTA complete site requirement specifications for the Deliverables, if any. These specifications shall ensure that the Deliverables to be installed shall operate properly and efficiently within the site environment. The Contractor shall advise NCTA of any site requirements for any Deliverables required by NCTA's specifications. Any alterations or modification in site preparation which are directly attributable to incomplete or erroneous specifications

provided by the Contractor and which would involve additional expenses to NCTA, shall be made at the expense of the Contractor.

- b. Specifications: The apparent silence of the specifications as to any detail, or the apparent omission of detailed description concerning any point, shall be regarded as meaning that only the best commercial practice is to prevail and only material and workmanship of the first quality may be used. Upon any Notice of noncompliance issued by NCTA, Contractor shall supply proof of compliance with the specifications within ten (10) Calendar Days. Contractor shall provide written Notice of its intent to deliver alternate or substitute products, goods or Deliverables. Alternate or substitute products, goods or Deliverables may be accepted or rejected at the sole discretion of NCTA; and any such alternates or substitutes shall be accompanied by Contractor's Certification and evidence satisfactory to NCTA that the function, characteristics, performance, and endurance will be equal or superior to the original Deliverables specified. All alternates or substitutes are subject to Approval by NCTA.

3.2 Acceptance Criteria

- I. NCTA shall have the obligation to notify Contractor, in writing ten (10) Calendar Days following provision, performance (under a provided milestone or otherwise as agreed) or delivery of any Services or other Deliverables described in the Contract are not acceptable. The Notice shall specify in reasonable detail the reason(s) a given Deliverable is unacceptable. Acceptance by NCTA shall not be unreasonably withheld; but may be conditioned or delayed as required for installation and/or testing of Deliverables. Final Acceptance is expressly conditioned upon completion of any applicable inspection and testing procedures. Should a Deliverable fail to meet any specifications or Acceptance criteria, NCTA may exercise any and all rights hereunder. Deliverables discovered to be defective or failing to conform to the specifications may be rejected upon initial inspection or at any later time if the defects or errors contained in the Deliverables or non-compliance with the specifications were not reasonably ascertainable upon initial inspection. If Contractor fails to promptly cure or correct the defect or replace or reperform the Deliverables, NCTA reserves the right to cancel the Contract, contract with a different contractor, and to invoice the original Contractor for any differential in price over the original Contract price.

3.3 Personnel

Contractor shall not substitute key personnel assigned to the performance of the Contract without prior written approval by the NCTA Contract Administrator. The individuals designated as key personnel for purposes of the Contract are those specified in the Contractor's offer. Any desired substitution shall be noticed to the NCTA's Contract Administrator in writing accompanied by the names and references of Contractor's recommended substitute personnel. NCTA will approve or disapprove the requested substitution in a timely manner. NCTA may, in its sole discretion, terminate the Services of any person providing Services under the Contract. Upon such termination, NCTA may request acceptable substitute personnel or terminate the Contract Services provided by such personnel.

1. Unless otherwise expressly provided in the Contract, Contractor will furnish all of its own necessary management, supervision, labor, facilities, furniture, computer and telecommunications Equipment, Software, supplies and materials necessary for the Contractor to provide and deliver the Services and other Deliverables.
2. Contractor personnel shall perform their duties on the premises of NCTA, during NCTA's regular work days and normal work hours, except as may be specifically agreed otherwise, established in the specification, or statement of work.
3. The Contract shall not prevent Contractor or any of its personnel supplied under the Contract from performing similar Services elsewhere or restrict Contractor from using the personnel provided to NCTA, provided that:
 - a. Such use does not conflict with the terms, specifications or any amendments to the Contract, or
 - b. Such use does not conflict with any procurement law, regulation or policy, or
 - c. Such use does not conflict with any non-disclosure Contract, or term thereof, by and between the State and Contractor or Contractor's personnel.
4. Unless otherwise provided by NCTA, the Contractor shall furnish all necessary personnel, Services, and otherwise perform all acts, duties and responsibilities necessary or incidental to the accomplishment of the tasks specified in the Contract. The Contractor shall be legally and financially responsible for its personnel including, but not limited to, any deductions for social security and other withholding taxes required by state or federal law. The Contractor shall be solely responsible for acquiring any Equipment, furniture, and office space not furnished by NCTA necessary for the Contractor to comply with the Contract. The Contractor personnel shall comply with any applicable State facilities or other security rules and regulations.

3.4 Subcontracting

1. The Contractor may subcontract the performance of required Services with other contractors or third parties, or change Subcontractors, only with the prior written consent of NCTA. Contractor shall provide NCTA with complete copies of any agreements made by and between Contractor and all Subcontractors. The Contractor remains solely responsible for the performance of its Subcontractors. Subcontractors, if any, shall adhere to the same standards required of the Contractor. Any contracts made by the Contractor with a Subcontractor shall include an affirmative statement that NCTA is an intended third-party beneficiary of the contract; that the Subcontractor has no agreement with NCTA; and that NCTA shall be indemnified by the Contractor for any claim presented by the Subcontractor. Notwithstanding any other term herein, Contractor shall timely exercise its contractual remedies against any non-performing Subcontractor and, when appropriate, substitute another Subcontractor.

3.5 Contractor's Representation

1. Contractor warrants that qualified personnel shall provide Services in a professional manner. "Professional manner" means that the personnel performing the Services will possess the skill and competence consistent with the prevailing business standards in the information technology industry. Contractor agrees that it will not enter into any agreement with a third-party that might abridge any rights of NCTA under this Contract. Contractor will serve as the prime Contractor under this Contract. Should NCTA approve any Subcontractor(s), the Contractor shall be legally

responsible for the performance and payment of the Subcontractor(s). Names of any third-party contractors or Subcontractors of Contractor may appear for purposes of convenience in Contract Documents; and shall not limit Contractor's obligations hereunder. Third-party Subcontractors, if approved, may serve as Subcontractors to Contractor. Contractor will retain executive representation for functional and technical expertise as needed in order to incorporate any work by third-party Subcontractor(s).

2. **Intellectual Property:** Contractor represents that it has the right to provide the Services and other Deliverables without violating or infringing any law, rule, regulation, copyright, patent, trade secret or other proprietary right of any third-party. Contractor also represents that its Services and other Deliverables are not the subject of any actual or threatened actions arising from, or alleged under, any intellectual property rights of any third-party.
3. **Inherent Services:** If any Services or other Deliverables, functions, or responsibilities not specifically described in this Contract are required for Contractor's proper performance, provision and delivery of the Services and other Deliverables pursuant to this Contract, or are an inherent part of or necessary sub-task included within the Services, they will be deemed to be implied by and included within the scope of the Contract to the same extent and in the same manner as if specifically described in the Contract.
4. Contractor warrants that it has the financial capacity to perform and to continue to perform its obligations under the Contract; that Contractor has no constructive or actual knowledge of an actual or potential legal proceeding being brought against Contractor that could materially adversely affect performance of this Contract; and that entering into this Contract is not prohibited by any Contract, or order by any court of competent jurisdiction.

3.6 Software and Intellectual Property

3.6.1 Internal/Embedded Software License and Escrow

1. This section on Software licenses and Software in escrow applies to any source code developed or modified specifically for NCTA, application customizations and configuration settings, internal embedded Software, firmware and unless otherwise provided in this NCTA RFP, or in an attachment hereto:
2. Deliverables comprising goods, Equipment or products (Hardware) may contain Software for internal operation, or as embedded Software or firmware that is generally not sold or licensed as a severable Software product. Software may be provided on separate media or may be included within the Hardware at or prior to delivery. Such Software is proprietary, copyrighted, and may also contain valuable trade secrets and may be protected by patents.
3. Contractor grants NCTA an unrestricted license to NCTA to use any non-commercial Software provided under this Contract, for any reasonable purpose for NCTA toll Operations. NCTA shall have a worldwide, nonexclusive, non-sublicensable license to use such Software and/or Documentation for its internal use. NCTA may make and install copies of the Software to support any NCTA use on the NCTA System.
4. The Contractor shall provide to NCTA an executable copy of all Software developed for NCTA, to include source code Documentation and application information. Included with the provision

of source code, the Contractor shall demonstrate to NCTA that the provided executables are the correct Software for the Systems as delivered.

3.6.2 Software Maintenance/Support Services

1. This general requirement applies unless otherwise provided in NCTA's solicitation document or in an attachment hereto.
2. For the first year and all subsequent Contract years, Contractor agrees to provide the following Services for the current version and one previous version of any Software provided with the Deliverables, commencing upon installation of the Deliverables or delivery of the Software:
 - a. Error Correction: Upon NCTA verification of an error or defect Software, the Contractor shall use reasonable efforts to correct or provide a working solution for the error or defect Contractor's expense. NCTA shall comply with all reasonable instructions or requests of Contractor in attempts to correct an error or defect in the Program. Contractor and the State shall act promptly and in a reasonably timely manner in communicating error or defect logs, other related information, proposed solutions or workarounds, and any action as may be necessary or proper to obtain or effect Maintenance Services under this paragraph.
 - b. Contractor shall notify NCTA of any material errors or defects in the Deliverables known or made known to Contractor from any source during the Contract Term that could cause the production of inaccurate or otherwise materially incorrect, results. Contractor shall initiate actions as may be commercially necessary or proper to effect corrections of any such errors or defects.
 - c. Updates: Contractor shall provide to NCTA, at no additional charge, all new releases and bug fixes (collectively referred to as "Changes") for any Software Deliverable developed or published by Contractor and made generally available to its other customers at no additional charge. All such Updates shall be a part of the Program and Documentation and, as such, shall be governed by the provisions of this Contract.
 - d. Telephone Assistance: Contractor shall provide NCTA with telephone access to technical support engineers for assistance in the proper installation and use of the Software, and to report and resolve Software errors and defects in accordance with Requirements of this RFP.

3.6.3 Patent, Copyright and Trade Secret Protection

1. Contractor has created, acquired or otherwise has rights in, and may, in connection with the performance of Services for NCTA, employ, provide, create, acquire or otherwise obtain rights in various concepts, ideas, methods, methodologies, procedures, processes, know-how, techniques, models, templates and general purpose consulting and Software tools, utilities and routines (collectively, the "Contractor Technology"). To the extent that any Contractor Technology is contained in any of the Deliverables including any derivative works, the Contractor hereby grants NCTA a royalty-free, fully paid, worldwide, perpetual, non-exclusive license to use such Contractor Technology in connection with the Deliverables for NCTA's purposes.

2. Contractor shall not acquire any right, title and interest in and to the copyrights for goods, any and all Software, technical information, specifications, drawings, records, Documentation, data or derivative works thereof, or other work products provided by NCTA to Contractor. NCTA hereby grants Contractor a royalty-free, fully paid, worldwide, perpetual, non-exclusive license for Contractor's internal use to non-confidential Deliverables originated and prepared by the Contractor for delivery to NCTA.
3. The Contractor, at its own expense, shall defend any action brought against the State to the extent that such action is based upon a claim that the Services or Deliverables supplied by the Contractor, or the operation of such Deliverables pursuant to a current version of Contractor-supplied Software, infringes a patent, or copyright or violates a trade secret in the United States. The Contractor shall pay those costs and damages finally awarded against the State in any such action. Such defense and payment shall be conditioned on the following:
 - a. That the Contractor shall be notified within a reasonable time in writing by NCTA of any such claim; and,
 - b. That the Contractor shall have the sole control of the defense of any action on such claim and all negotiations for its settlement or compromise provided, however, that NCTA shall have the option to participate in such action at its own expense.
4. Should any Services or Software supplied by Contractor, or the operation thereof become, or in the Contractor's opinion are likely to become, the subject of a claim of infringement of a patent, copyright, or a trade secret in the United States, NCTA shall permit the Contractor, at its option and expense, either to procure for NCTA the right to continue using the goods/Hardware or Software, or to replace or modify the same to become non- infringing and continue to meet procurement specifications in all material respects. If neither of these options can reasonably be taken, or if the use of such goods/Hardware or Software by NCTA shall be prevented by injunction, the Contractor agrees to take back such goods/Hardware or Software, and refund any sums NCTA has paid Contractor less any reasonable amount for use or damage and make every reasonable effort to assist NCTA in procuring substitute Deliverables. If, in the sole opinion of NCTA, the return of such infringing Deliverables makes the retention of other items of Deliverables acquired from the Contractor under this Contract impractical, NCTA shall then have the option of terminating the Contract, or applicable portions thereof, without penalty or termination charge. The Contractor agrees to take back such Deliverables and refund any sums NCTA has paid Contractor less any reasonable amount for use or damage.
5. Contractor will not be required to defend or indemnify NCTA if any claim by a third-party against NCTA for infringement or misappropriation (i) results from the State's alteration of any Contractor-branded product or Deliverable, or (ii) results from the continued use of the good(s) or Services and Deliverables after receiving Notice they infringe a trade secret of a third-party.
6. Nothing stated herein, however, shall affect Contractor's ownership in or rights to its preexisting intellectual property and proprietary rights.

3.6.4 Tolls Data Ownership and Security

1. All data, records, and operations history information shall remain property of NCTA at all times during the life of the Contract and after Contract termination.

2. The Contractor(s) shall ensure that no unauthorized personnel will have access to individual facilities, cabinets, data and records, payment histories, any personal information of existing or potential NCTA toll customers. Paper records shall be locked when not in use; Systems shall have secure password and ID controls for any data access. Contractor shall comply with the North Carolina Statewide Information Security Manual. Currently found at <http://it.nc.gov/document/statewide-information-security-manual>, as may be amended from time to time throughout the term of the Contract.

3.7 Other General Provisions

3.7.1 Governmental Restrictions

1. In the event any restrictions are imposed by governmental requirements that necessitate alteration of the material, quality, workmanship, or performance of the Deliverables offered prior to delivery thereof, the Contractor shall provide written notification of the necessary alteration(s) to NCTA. NCTA reserves the right to accept any such alterations, including any price adjustments occasioned thereby, or to cancel the Contract. NCTA may advise Contractor of any restrictions or changes in specifications required by North Carolina legislation, rule or regulatory authority that require compliance by the State. In such event, Contractor shall use its best efforts to comply with the required restrictions or changes. If compliance cannot be achieved by the date specified in the Contract, NCTA may terminate this Contract and compensate Contractor for sums due under the Contract.

3.7.2 Prohibition Against Contingent Fees and Gratuities:

1. Contractor warrants that it has not paid, and agrees not to pay, any bonus, commission, fee, or gratuity to any employee or official of the State for the purpose of obtaining any contract or award issued by the State. Contractor further warrants that no commission or other payment was or will be received from or paid to any third-party contingent on the award of any contract by the State, except as shall be expressly communicated to NCTA in writing prior to Acceptance of the Contract or award in question. Each individual signing below warrants that he or she is duly authorized by their respective Party to sign this Contract and bind the Party to the terms and conditions of this Contract. Contractor and their authorized signatory further warrant that no officer or employee of the State has any direct or indirect financial or personal beneficial interest, in the subject matter of this Contract; obligation or contract for future award of compensation as an inducement or consideration for making this Contract. Subsequent discovery by the State of non-compliance with these provisions shall constitute sufficient cause for immediate termination of all outstanding contracts. Violations of this provision may result in debarment of the bidder(s) or Contractor(s) as permitted by State or Federal law.
2. Gift Ban - By Executive Order 24, issued by Governor Perdue, and G.S. § 133-32, it is unlawful for any vendor or contractor (i.e., architect, bidder, contractor, construction manager, design professional, engineer, landlord, offeror, seller, Subcontractor, supplier, or vendor), to make gifts or to give favors to any State employee of the Governor’s cabinet agencies (i.e., Administration, Commerce, Correction, Crime Control and Public Safety, Cultural Resources, Environment and Natural Resources, Health and Human Services, Juvenile Justice and Delinquency Prevention, Revenue, Transportation, and the Office of the Governor). This prohibition covers those vendors

and contractors who: (a) have a contract with a governmental agency; or (b) have performed under such a contract within the past year; or (c) anticipate bidding on such a contract in the future. For additional information regarding the specific requirements and exemptions, vendors and contractors are encouraged to review Executive Order 24 and G.S. § 133-32.

3.7.3 Equal Employment Opportunity

- I. Contractor shall comply with all Federal and State requirements concerning fair employment and employment of the disabled and concerning the treatment of all employees without regard to discrimination by reason of race, color, religion, sex, national origin or physical disability.

3.7.4 Inspection at Contractor's Site

- I. NCTA reserves the right to inspect, during Contractor's regular business hours at a reasonable time, upon Notice of not less than two (2) weeks, and at its own expense, the prospective Deliverables comprising Equipment or other tangible goods, or the plant or other physical facilities of a prospective Contractor prior to Contract award, and during the Contract Term as necessary or proper to ensure conformance with the specifications/Requirements and their adequacy and suitability for the proper and effective performance of the Contract.

3.7.5 Advertising / Press Release

- I. The Contractor absolutely shall not publicly disseminate any information concerning the Contract without prior written Approval from the State or its Agent. For the purpose of this provision of the Contract, the Agent is the NCTA Contract Administrator unless otherwise named in the solicitation documents.

3.7.6 Confidentiality

- I. To promote maximum competition in the State competitive bidding process, the State may maintain the confidentiality of certain types of information described in G.S. § 132-1 et. seq. Such information may include trade secrets defined by G.S. § 66-152 and other information exempted from the Public Records Act pursuant to G.S. § 132-1.2. Contractor may designate appropriate portions of its response as confidential, consistent with and to the extent permitted under the Statutes and Rules set forth above, by marking the top and bottom of pages containing confidential information with a legend in boldface type "CONFIDENTIAL". By so marking any page, the Contractor warrants that it has formed a good faith opinion, having received such necessary or proper review by counsel and other knowledgeable advisors that the portions marked confidential meet the Requirements of the Rules and Statutes set forth above. However, under no circumstances shall price information be designated as confidential. The State may serve as custodian of Contractor's confidential information and not as an arbiter of claims against Contractor's assertion of confidentiality. If an action is brought pursuant to G.S. § 132-9 to compel the State to disclose information marked confidential, the Contractor agrees that it will intervene in the action through its counsel and participate in defending the State, including any public official(s) or public employee(s). The Contractor agrees that it shall hold the State and any official(s) and individual(s) harmless from any and all damages, costs, and attorneys' fees awarded against the State in the action. The State agrees to promptly notify the Contractor in writing of any action seeking to compel the disclosure of Contractor's confidential information. The State shall have the right, at its option and expense, to participate in the defense of the action through

its counsel. The State shall have no liability to Contractor with respect to the disclosure of Contractor's confidential information ordered by a court of competent jurisdiction pursuant to G.S. § 132-9 or other applicable law.

- a. Care of Information: Contractor agrees to use commercial best efforts to safeguard and protect any data, documents, files, and other materials received from the State or NCTA during performance of any contractual obligation from loss, destruction or erasure.
- b. Contractor warrants that all its employees and any approved third-party contractors or Subcontractors are subject to a non-disclosure and confidentiality agreement enforceable in North Carolina. Contractor will, upon request of the State, verify and produce true copies of any such agreements. Production of such agreements by Contractor may be made subject to applicable confidentiality, non-disclosure or privacy laws; provided that Contractor produces satisfactory evidence supporting exclusion of such agreements from disclosure under the N.C. Public Records laws in G.S. § 132-1 et. seq. The State may, in its sole discretion, provide a non-disclosure and confidentiality agreement satisfactory to the State for Contractor's execution. The State may exercise its rights under this subparagraph as necessary or proper, in its discretion, to comply with applicable security regulations or statutes including, but not limited to 26 USC 6103 and IRS Publication 1075, (Tax Information Security Guidelines for Federal, State, and Local Agencies), HIPAA, 42 USC 1320(d) (Health Insurance Portability and Accountability Act), any implementing regulations in the Code of Federal Regulations, and any future regulations imposed upon the Office of Information Technology Services or the N.C. Department of Revenue pursuant to future statutory or regulatory Requirements.
- c. Nondisclosure: Contractor agrees and specifically warrants that it, its officers, directors, principals and employees, and any Subcontractors, shall hold all information received during performance of this Contract in the strictest confidence and shall not disclose the same to any third-party without the express written approval of the State.
- d. Contractor shall protect the confidentiality of all information, data, instruments, studies, reports, records and other materials provided to it by NCTA or maintained or created in accordance with this Contract. No such information, data, instruments, studies, reports, records and other materials in the possession of Contractor shall be disclosed in any form without the prior written consent of NCTA. Contractor will have written policies governing access to and duplication and dissemination of all such information, data, instruments, studies, reports, records and other materials.
- e. All Project materials, including Software, data, and Documentation created during the performance or provision of Services hereunder that are not licensed to the State or are not proprietary to the Contractor are the property of the State of North Carolina and must be kept confidential or returned to the State, or destroyed. Proprietary Contractor materials shall be identified to the State by Contractor prior to use or provision of Services hereunder and shall remain the property of the Contractor. Derivative Works of any Contractor proprietary materials prepared or created during the performance of provision of Services hereunder shall be subject to a perpetual, royalty free, nonexclusive license to the State.

3.7.7 Deliverables

- I. Deliverables, as used herein, shall comprise all Hardware, Contractor Services, professional services, Software and provided modifications to the Software, and incidental materials, including any goods, Software or Services access license, data, reports and Documentation provided or created during the performance or provision of Services hereunder. Hardware, Custom Software first requested and developed for the State and other Deliverables not subject to owner licensing or leasing are the property of the State of North Carolina. Proprietary Contractor materials licensed to the State shall be identified to the State by Contractor prior to use or provision of Services hereunder and shall remain the property of the Contractor. Deliverables include "Work Product" and means any expression of Licensor's findings, analyses, conclusions, opinions, recommendations, ideas, techniques, know-how, Designs, programs, enhancements, and other technical information; but not source and object code or Software.

3.7.8 Late Delivery, Back Order

- I. Contractor shall advise NCTA immediately upon determining that any Deliverable will not, or may not, be delivered at the time or place specified. Together with such Notice, Contractor shall state the projected delivery time and date. In the event the delay projected by Contractor is unsatisfactory, NCTA shall so advise Contractor and may proceed to procure substitute Deliverables or Services.

3.7.9 Assignment

- I. Contractor may not assign this Contract or its obligations hereunder except as permitted by this paragraph. Contractor shall provide reasonable Notice of not less than thirty (30) Calendar Days prior to any consolidation, acquisition, or merger. Any assignee shall affirm this Contract atoning to the terms and conditions agreed, and that Contractor shall affirm that the assignee is fully capable of performing all obligations of Contractor under this Contract. An assignment may be made, if at all, in writing by the Contractor, Assignee and the State setting forth the foregoing obligation of Contractor and Assignee.

3.7.10 Insurance Coverage

- I. During the term of the Contract, the Contractor at its sole cost and expense shall provide commercial insurance of such type and with such terms and limits as may be reasonably associated with the Contract. As a minimum, the Contractor shall provide and maintain the coverage and limits, as set forth in **Part I, Administrative**, Section I.28, Insurance Requirements.

3.7.11 Dispute Resolution

- I. In the event of any dispute whatsoever arising out of or relating to the Contract Documents, the Work or the Project, the disputing party must furnish a written Notice to the other party, setting forth in detail the dispute. Such Notice must be addressed to the other party's Project Manager. Within five (5) Days after the receipt of the Notice by the receiving Project Manager, the two Project Managers shall meet in NCTA's offices to attempt to resolve the dispute. If the Project Managers cannot resolve the dispute then, within fourteen (14) Days after the date of written Notice by either Project Manager to the Executive Director of NCTA and the Project Principal, the Executive Director of NCTA and the Project Principal shall meet in NCTA's offices to attempt to resolve the dispute. If the Executive Director of NCTA and the Project Principal cannot resolve

the dispute or otherwise agree to extend the time within which to attempt to resolve the dispute, then either Party may pursue those remedies as allowed under this Contract.

3.7.12 Default

1. In the event any Deliverable furnished by the Contractor during performance of any Contract Term fails to conform to any material requirement of the Contract specifications, Notice of the failure is provided by NCTA and the failure is not cured within ten (10) Days, or Contractor fails to meet the requirements of paragraph 3.2, Acceptance Criteria, NCTA may cancel the Contract. Default may be cause for debarment. NCTA reserves the right to require performance guaranties from the Contractor without expense to the State. The rights and remedies of NCTA provided above shall not be exclusive and are in addition to any other rights and remedies provided by law or under the Contract. NCTA allows for ten (10) Days to rectify a problem and thirty (30) Days to cure a termination.
2. If Contractor fails to deliver or provide correct Services or other Deliverables within the time required by this Contract, NCTA may provide written Notice of said failure to Contractor, and by such Notice may require payment of liquidated damages as penalty.
3. Contractor will use reasonable efforts to mitigate delays, costs or expenses arising from assumptions in the Contractor's bid documents that prove erroneous or are otherwise invalid.
4. Contractor shall provide a Plan to cure any default if requested by NCTA. The Plan shall state the nature of the default, the time required for cure, any mitigating factors causing or tending to cause the default, and such other information as the Contractor may deem necessary or proper to provide.

3.7.13 Waiver of Default

1. Waiver by either party of any default or breach by the other Party shall not be deemed a waiver or any subsequent default or breach and shall not be construed to be a modification or novation of the terms of this Contract, unless so stated in a writing and signed by authorized representatives of NCTA and the Contractor, and made as an Amendment in accordance with the terms of this Contract.

3.7.14 Limitation of Contractor's Liability

1. Where Deliverables are under NCTA's exclusive management and control, the Contractor shall not be liable for direct damages caused by NCTA's failure to fulfill any responsibilities of assuring the proper use, management and supervision of the Deliverables and programs, audit controls, operating methods, office procedures, or for establishing all proper checkpoints necessary for NCTA's intended use of the Deliverables.
2. The Contractor's liability for damages to NCTA for any cause whatsoever, and regardless of the form of action, whether in contract or in tort, shall be limited to the total value of each Task Order awarded to the Contractor under the Contract.
3. The foregoing limitation of liability shall not apply to the payment of costs and damage awards referred to in the paragraph entitled "Patent, Copyright, and Trade Secret Protection", to claims covered by other specific provisions calling for liquidated damages or specifying a different limit of

liability, or to claims for injury to persons or damage to property caused by Contractor's negligence or willful or wanton conduct. This limitation of liability does not apply to the receipt of court costs or attorney's fees that might be awarded by a court in addition to damages after litigation based on this Contract.

4. For avoidance of doubt, the parties agree that the liquidated and actual damages provisions and the Warranty Terms set forth in this Contract are intended to provide the sole and exclusive remedy available to NCTA under the Contract for the Contractor's failure to comply with the requirements stated herein.

3.7.15 Contractor's Liability for Injury to Persons or Damage to Property

1. The Contractor shall be liable for damages arising out of personal injuries and/or damage to real or tangible personal property of NCTA, employees of NCTA, persons designated by NCTA for training, or person(s) other than Agents or employees of the Contractor, designated by NCTA for any purpose, prior to, during, or subsequent to delivery, installation, Acceptance, and use of the Deliverables either at the Contractor's site or at NCTA's place of business, provided that the injury or damage was caused by the fault or negligence of the Contractor.
2. The Contractor agrees to indemnify, defend and hold NCTA and the State and its Officers, employees, Agents and assigns harmless from any liability relating to personal injury or injury to real or personal property of any kind, accruing or resulting to any other person, firm or corporation furnishing or supplying Work, Services, materials or supplies in connection with the performance of this Contract, whether tangible or intangible, arising out of the ordinary negligence, willful or wanton negligence, or intentional acts of the Contractor, its officers, employees, agents, assigns or Subcontractors, in the performance of this Contract.
3. Contractor shall not be liable for damages arising out of or caused by an alteration or an attachment not made or installed by the Contractor, or for damage to alterations or attachments that may result from the normal operation and Maintenance of the Contractor's goods.

3.7.16 General Indemnity

1. The Contractor shall hold and save NCTA, its officers, Agents and employees, harmless from liability of any kind, including all claims and losses, with the exception of consequential damages, as normally construed, accruing or resulting to any other person, firm or corporation furnishing or supplying Work, Services, materials or supplies in connection with ~~the negligent performance of this Contract or~~ Contractor's breach of Contract, negligence or willful misconduct. The foregoing indemnification and defense by the Contractor shall be conditioned upon the following:
 - a. NCTA shall give Contractor written Notice within thirty (30) Days after it has actual knowledge of any such claim(s) or action(s) filed; and
 - b. The Contractor shall have the sole control of the defense of any such claim(s) or action(s) filed and of all negotiations relating to settlement or compromise thereof, provided, however, that NCTA shall have the option to participate at their own expense in the defense of such claim(s) or action(s) filed.

3.7.17 Changes

- I. This Contract is awarded subject to shipment of quantities, qualities, and prices indicated in the Contract, and all conditions and instructions of the Contract or Proposal on which it is based. Any changes made to this Contract or purchase order proposed by the Contractor are hereby rejected unless accepted in writing by NCTA. NCTA shall not be responsible for Deliverables or Services delivered other than those specified in the Contract or the Proposal on which it is based.

3.7.18 Time is of the Essence

- I. Time is of the essence in the performance of this Contract. Contractor and NCTA will mutually develop and agree to a schedule of implementation, testing, Maintenance, etc. Contractor and Subcontractors will be required to adhere to the Approved schedule.

3.7.19 Date and Time Warranty

- I. The Contractor warrants that any Deliverable, whether Hardware, firmware, middleware, custom or commercial Software, or internal components, subroutines, and interface therein which performs any date and/or time data recognition function, calculation, or sequencing, will provide accurate date/time data and leap year calculations. This warranty shall survive termination or expiration of the Contract.

3.7.20 Independent Contractors

- I. Contractor and its employees, officers and executives, and Subcontractors, if any, shall be independent Contractors and not employees or Agents of the State. This Contract shall not operate as a joint venture, partnership, trust, authority or any other business relationship.

3.7.21 Transportation

- I. Transportation of Deliverables shall be FOB Destination unless otherwise specified in this RFP. Freight, handling, hazardous material charges, and distribution and installation charges shall be included in the total price of each item. Any additional charges shall not be honored for payment unless authorized in writing by NCTA. In cases where parties, other than the Contractor ship materials against this Contract, the shipper shall be instructed to show the purchase order number on all packages and shipping manifests to ensure proper identification and payment of invoices. A complete packing list shall accompany each shipment.

3.7.22 Notices

- I. Any Notices required under this Contract should be delivered to the Contractor or NCTA. Unless otherwise specified in the Solicitation Documents, any Notices shall be delivered in writing by U.S. Mail, Commercial Courier or by hand.

3.7.23 Titles and Headings

- I. Titles and Headings in this Contract are used for convenience only and do not define, limit or proscribe the language of terms identified by such Titles and Headings.

3.7.24 Amendment

- I. This Contract may not be amended orally or by performance. Any Amendment must be made in written form and signed by duly authorized representatives of NCTA and Contractor in conformance with Contract requirements.

3.7.25 Taxes

- I. The State of North Carolina is exempt from Federal excise taxes and no payment will be made for any personal property taxes levied on the Contractor or for any taxes levied on employee wages. Agencies of the State may have additional exemptions or exclusions for Federal or State taxes. Evidence of such additional exemptions or exclusions may be provided to Contractor by Agencies, as applicable, during the term of this Contract. Applicable State or local sales taxes shall be invoiced as a separate item and not included in the Price Proposal.

3.7.26 Governing Laws, Jurisdiction, and Venue

- I. This Contract is made under and shall be governed and construed in accordance with the laws of the State of North Carolina. The place of this Contract or purchase order, its situs and forum, shall be Wake County, North Carolina, where all matters, whether sounding in contract or in tort, relating to its validity, construction, interpretation and enforcement shall be determined. Contractor agrees and submits, solely for matters relating to this Contract, to the jurisdiction of the courts of the State of North Carolina and stipulates that Wake County shall be the proper venue for all matters.
2. Except to the extent the provisions of the Contract are clearly inconsistent therewith, the applicable provisions of the Uniform Commercial Code as modified and adopted in North Carolina shall govern this Contract. To the extent the Contract entails both the supply of "goods" and "Services," such shall be deemed "goods" within the meaning of the Uniform Commercial Code, except when deeming such Services as "goods" would result in a clearly unreasonable interpretation.

3.7.27 Force Majeure

- I. Neither party shall be deemed to be in default of its obligations hereunder if and so long as it is prevented from performing such obligations as a result of events beyond its reasonable control, including without limitation, fire, power failures, any act of war, hostile foreign action, nuclear explosion, riot, strikes or failures or refusals to perform under subcontracts, civil insurrection, earthquake, hurricane, tornado, or other catastrophic natural event or act of God. Force Majeure events shall not otherwise limit NCTA's rights to enforce contracts.

3.7.28 Compliance with Laws

- I. The Contractor shall comply with all laws, ordinances, codes, rules, regulations, and licensing requirements that are applicable to the conduct of its business, including those of Federal, State, and local agencies having jurisdiction and/or authority.

3.7.29 Severability

- I. In the event that a court of competent jurisdiction holds that a provision or requirement of this Contract violates any applicable law, each such provision or requirement shall be enforced only

to the extent it is not in violation of law or is not otherwise unenforceable and all other provisions and Requirements of this Contract shall remain in full force and effect. All promises, requirements, terms, conditions, provisions, representations, guarantees and warranties contained herein shall survive the expiration or termination date unless specifically provided otherwise herein, or unless superseded by applicable Federal or State statute, including statutes of repose or limitation.

3.7.30 Federal Intellectual Property Bankruptcy Protection Act

- I. The Parties agree that NCTA shall be entitled to all rights and benefits of the Federal Intellectual Property Bankruptcy Protection Act, Public Law 100-506, codified at 11 U.S.C. 365(n) and any amendments thereto.

3.7.31 Ineligible Contractors

- I. As provided in G.S. § 147-86.59 and G.S. § 147-86.82, the following companies are ineligible to contract with the State of North Carolina or any political subdivision of the State: a) any company identified as engaging in investment activities in Iran, as determined by appearing on the Final Divestment List created by the State Treasurer pursuant to G.S. § 147-86.58, and b) any company identified as engaged in a boycott of Israel as determined by appearing on the List of restricted companies created by the State Treasurer pursuant to G.S. § 147-86.81. A contract with the State or any of its political subdivisions by any company identified in a) or b) above shall be void ab initio.

3.7.32 Availability of Funds

- I. Any and all payments to Contractor are expressly contingent upon and subject to the appropriation, allocation and availability of funds to NCTA for the purposes set forth in this Contract. If this Contract is funded in whole or in part by Federal funds, the Agency's performance and payment shall be subject to and contingent upon the continuing availability of said Federal funds for the purposes of the Contract. If the term of this Contract extends into fiscal years subsequent to that in which it is approved, such continuation of the Contract is expressly contingent upon the appropriation, allocation and availability of funds by the N.C. Legislature for the purposes set forth in the Contract. If funds to effect payment are not available, the Agency will provide written notification to Contractor. If the Contract is terminated under this paragraph, Contractor agrees to take back any affected Deliverables and Software not yet delivered under this Contract, terminate any Services supplied to the Agency under this Contract, and relieve NCTA of any further obligation thereof. The State shall remit payment for Deliverables and Services accepted prior to the date of the aforesaid Notice in conformance with the payment terms.

3.7.33 E-Verify

- I. Pursuant to G.S. § 143-133.3, the State shall not enter into a contract unless the awarded Contractor and each of its Subcontractors comply with the E-Verify Requirements of N.C. General Statutes, Chapter 64, Article 2. Contractors are directed to review the foregoing laws. Any awarded Contractor must submit a certification of compliance with E-Verify to the awarding agency, and on a periodic basis thereafter as may be required by the State.

3.7.34 Historically Underutilized Businesses

1. Pursuant to N.C.G.S. §§ 143-48 and 143-128.4 and any applicable Executive Order, the State of North Carolina and NCTA invites and encourages participation in this procurement process by businesses owned by minorities, women, disabled, disabled business enterprises and non-profit work centers for the blind and severely disabled. Additional information may be found at: <http://ncadmin.nc.gov/businesses/hub/>.

3.7.35 No Waiver

1. Notwithstanding any other language or provision in the Contract, nothing herein is intended nor shall be interpreted as a waiver of any right or remedy otherwise available to NCTA under applicable law. The waiver by NCTA of any right or remedy on any one occasion or instance shall not constitute or be interpreted as a waiver of that or any other right or remedy on any other occasion or instance.

3.7.36 Entire Agreement

1. This RFP and any documents incorporated specifically by reference represent the entire agreement between the parties and supersede all prior oral or written statements or agreements. This RFP, any addenda hereto, and the Contractor's Proposal Documents are incorporated herein by reference as though set forth verbatim.
2. All promises, Requirements, terms, conditions, provisions, representations, guarantees, and warranties contained herein shall survive the contract expiration or termination date unless specifically provided otherwise herein, or unless superseded by applicable Federal or State statutes of limitation.

3.7.37 Sovereign Immunity

1. Notwithstanding any other term or provision in the Contract, nothing herein is intended nor shall be interpreted as waiving any claim or defense based on the principle of sovereign immunity or other State or Federal constitutional provision or principle that otherwise would be available to NCTA under applicable law.