Tampa Hillsborough County Expressway Authority

REQUEST FOR PROPOSALS

For

Operational Back Office System

Scope of Work and Requirements

Project Number: T-2325

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Table of Contents

LIST OF FIGURES

LIST OF APPENDICES

1 Introduction

The Tampa Hillsborough Expressway Authority's (THEA or the Authority) Operational Back Office (OBOS) will replace the aging legacy Tolling Operational Back Office System (TOBS) currently used by the Authority. The OBOS will serve as the Authority's System of record for tolls data, functioning similar to the legacy TOBS. The new OBOS is expected to provide a modern, modular, scalable System design and architecture that has high security, high availability and low capital, operational and maintenance costs. The System is expected to provide state-of-the-art Business Intelligence tools to allow the Authority to track, report and develop projections for the Authority's toll Transactional data and information.

The OBOS will receive and validate Transactions from the Authority's Roadside Toll systems (initially the legacy roadside system and eventually the Authority's new Roadside Toll Collection System (RTCS)). The OBOS will send the Transaction data received from the Roadside Toll Systems to the Florida Turnpike Enterprise (FTE) Centralized Customer Service System (CCSS) where the Transactions are applied to prepaid customer accounts or processed on customer invoices. As Transactions are processed by the CCSS, the OBOS receives status updates such as "paid", "invoiced", "no ROV found", etc. Transactions that remain unpaid through the CCSS process may be sent by OBOS to the Authority's collection agency, where the Collections agency will pursue the debt, sending Transaction statuses to OBOS. In a parallel process and concurrent with the Collection agency's pursuit of the debt, OBOS may place a vehicle Registration Stop with the Florida Department of Highway Safety and Motor Vehicles (FLHSMV) on the Florida vehicle registration associated with the unpaid tolls.

As identified in the preceding paragraph, the Authority is also contracting, through a separate process, a new Roadside Toll Collection System. While the OBOS and RTCS projects are initially developed separately, the new RTCS will eventually connect to the OBOS and will require cooperation between both the RTCS Contractor and the OBOS Contractor in the development, testing and implementation of a new RTCS-OBOS Interface.

Several key aspects of the OBOS Project and System are provided below:

- The OBOS Contractor shall be responsible for the end-to-end execution of designing, building, and maintaining the OBOS.
- The Authority will own and have access to all OBOS data.
- The OBOS shall be designed and configured to ensure uninterrupted operation, twenty four (24) hours a day, seven (7) days a week, and three hundred and sixty five (365) days a year.
- The OBOS shall be designed with high security and protection of both the System and data.
- The OBOS shall support multiple Transponder protocols and National Tolling Interoperability (NIOP).
- The Contractor shall provide an established data analytics tool such as Power BI, or Tableau for User research and reporting.
- The OBOS shall be designed and configured to ensure it is a fast, reliable, stable, accurate, timely and scalable System.

- The Contractor shall coordinate with the new RTCS contractor, external entities and agencies as directed by the Authority.
- The Contractor shall ensure a seamless transition from TOBS to OBOS.

1.1 Conceptual Diagrams

It is the Authority's desire for Proposers to propose the most effective and efficient solution that meets or exceeds all Requirements of this Scope of Work. The proposed OBOS solution may be an On-premises, Cloud-based or a hybrid On-premises/Cloud-based approach. For informational and illustrative purposes only, conceptual overviews of the OBOS are shown in Figure 1 (a completely Cloud-based example) and Figure 2 (a completely On-premises based example) below. The salient components of the System are shown in the figures together with a number in a yellow circle (note that non-production elements such as the Development and Test Environments are not shown). The discussion following the figures trace the path of a toll Transaction through each of the numbered components. Note: These figures are meant only to convey the basic functions of the OBOS and external interfaces and should not be considered to dictate the required OBOS architecture. For example, rather than a separate Reporting Database, Proposers may propose a solution for report generation that provides high availability and no impact on Production Database performance.

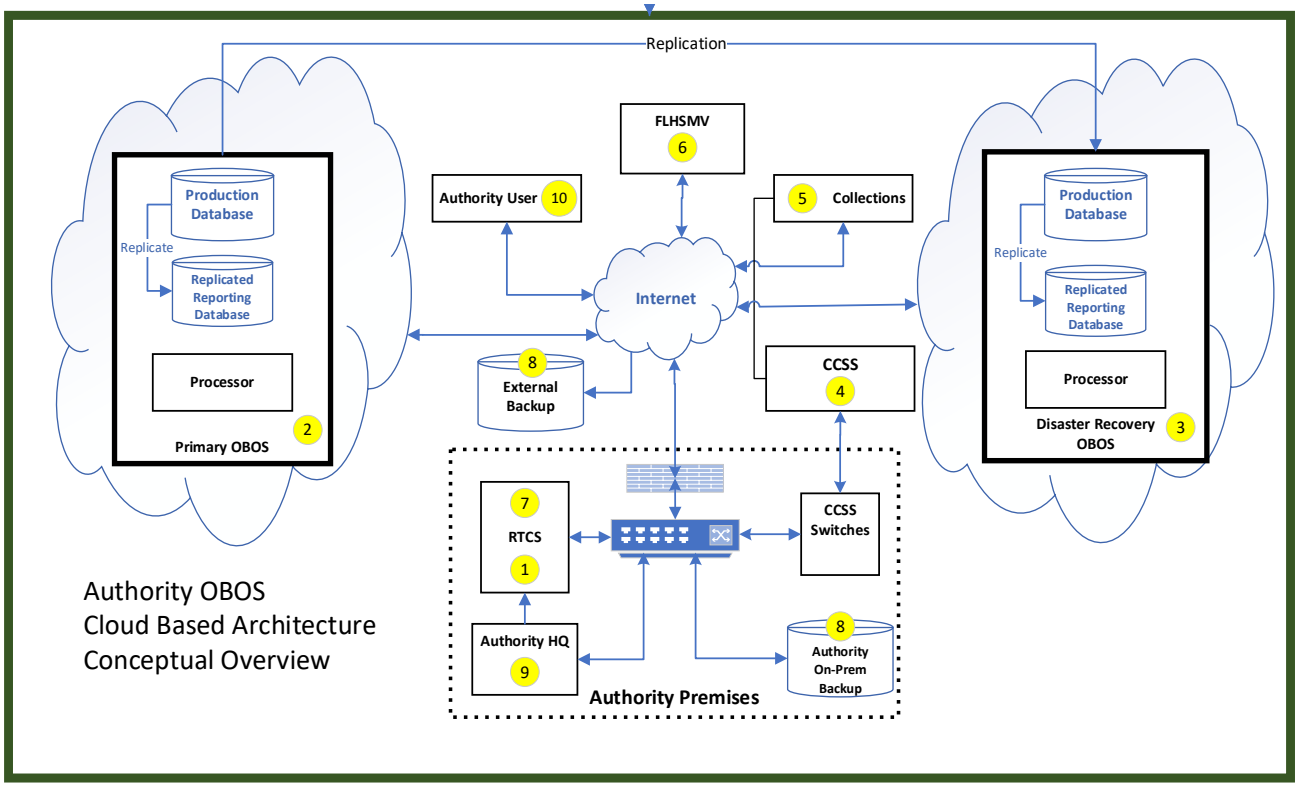

Figure 1 – Authority OBOS - Cloud Based Architecture Conceptual Overview

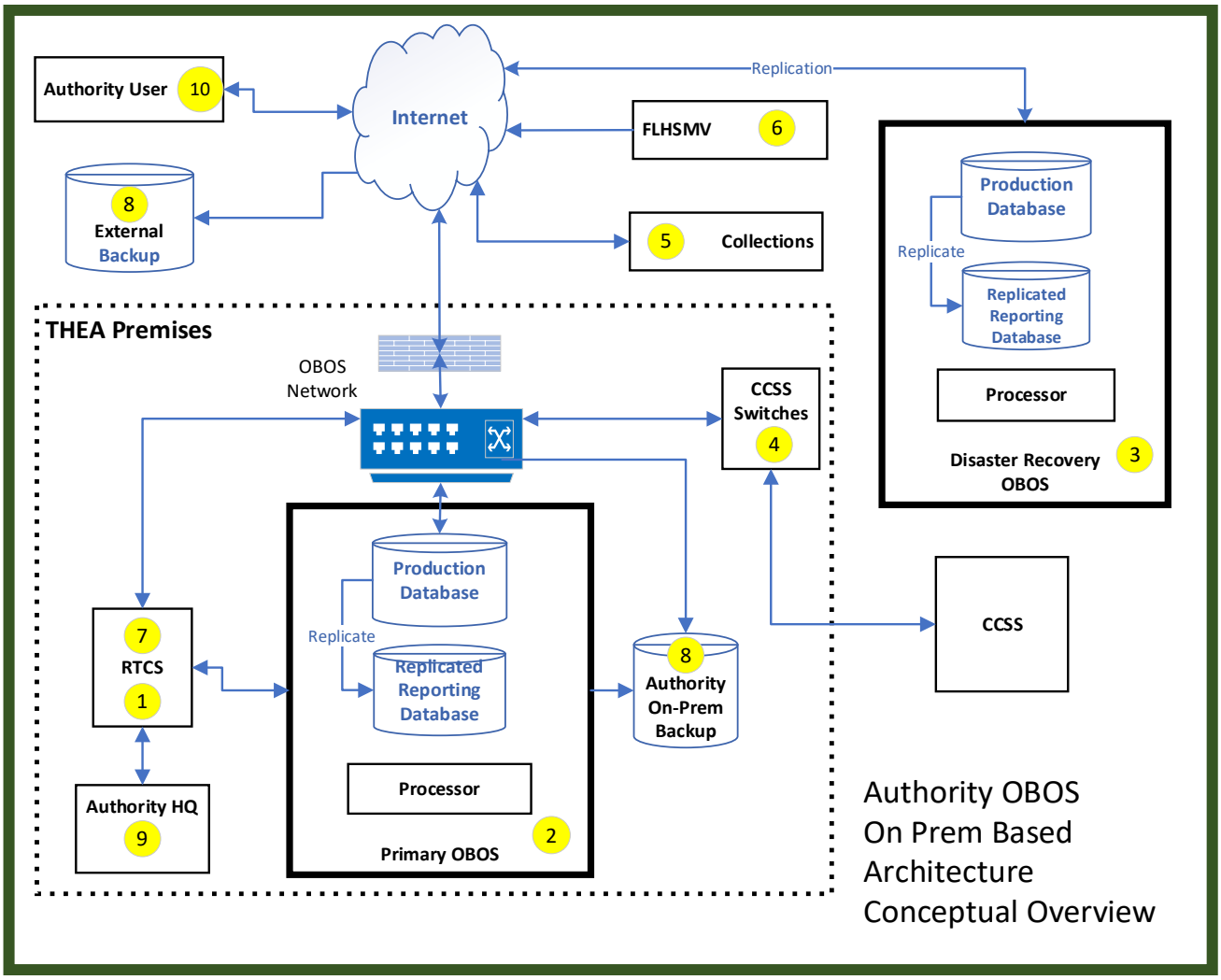

Figure 2 – Authority OBOS - On Premises Based Architecture Conceptual Overview

1 The RTCS will create a Transaction consisting of toll amount, Transponder ID (if available), license plate number (and image), vehicle classification, time, date, and other information for every vehicle passing under a toll gantry. Transactions are either Transponder Based Toll Transactions (ETC) or license plate Image Based Toll Transactions (IBT) and are sent to the OBOS in real time. ETC Transactions, based on valid Transponders as indicated on a POSI list previously sent to the RTCS, are considered "Completed" and are immediately ready for further processing. IBT Transactions are "Incomplete" until the license plate number is extracted by the RTCS image processing system and sent to the OBOS. In addition to the plate number, this second message for IBT Transactions will inform the OBOS of the Image location and if a plate number could not be extracted, i.e., "Uncollectable" thereby completing the Transaction. Upon receiving a license plate number, the OBOS will retrieve and store the license plate Image from the RTCS. All RTCS Transactions are uniquely and sequentially numbered.

2. As RTCS Transactions are received by the OBOS they are stored in the Primary Production OBOS database and replicated to various other locations in the OBOS. Replication of data in all cases shall not impact the processing of Transactions. Completed Transactions fall into two categories as defined by the RTCS: Collectable (potentially) and Uncollectable. This status is indicated by the RTCS in the Transaction messages. Uncollectable Transactions (e.g., no transponder or license plate) are stored in the OBOS database with no further processing. Each Collectable Transaction is packaged as a Universal Financial Message (UFM) and sent, in real time, to the CCSS operated by FTE.

3. The Primary OBOS is continuously replicated to the Disaster Recovery (DR) OBOS located remotely from the production System.

4. The CCSS provides services to support the collection of tolls for the Authority. This includes posting to SunPass accounts, posting to Interoperable accounts, and sending invoices to customers with no ETC tolling accounts or whose toll could not be posted to a local or Interoperable Agency account. During this process, the CCSS will send Amendments to the OBOS indicating the progress (i.e., status) of the Transaction. The Transactions sent to the CCSS by the OBOS are divided by the CCSS into the following categories:

    1. Transactions whose Transponder or plate number matches an existing SunPass account. Barring any exceptions to the Transaction or the account these Transactions will post to the SunPass account and reconcile back to the OBOS within seven (7) Calendar Days.
    2. Transactions whose Transponder or plate number is valid on an Interoperable Agency account. These Transactions could take up to thirty (30) Calendar Days to cycle through the Interoperable Agency's system and reconcile back to the OBOS.
    3. IBT Transactions whose plate number does not match any account or cannot be posted to a valid prepaid account will follow the CCSS customer invoicing process provided the name and address (Demographics) of the vehicle owner can be found. The CCSS continuously searches to obtain Demographic information for the vehicle.
    4. If Demographic information is obtained, and the CCSS cannot collect the toll via the invoicing process, it will notify the OBOS via an Amendment wherein the OBOS will proceed with Collections via the Authority's third-party collection agency.

5. If the CCSS indicates that the Transaction could not be collected via the invoice process, the OBOS will request the Demographic information from the CCSS and send this along with the Transaction information to the Authority's collection agency who will then send notices to inform customers that their toll is due. Payment information is tracked by Collections Amendments that are sent to the OBOS by the collection agency. If the toll has not been collected after two notices and the vehicle is registered in Florida, Collections will request that the OBOS send a Registration Stop to FLHSMV. If the toll is paid in full, Collections will request that OBOS send a Stop Release to FLHSMV. Unpaid tolls remain in Collections until the toll is paid or written off by the Authority management.

6. The OBOS will pass Registration Stops and Releases to FLHSMV as requested by Collections. All payments for Transactions held in Collections are made directly to Collections or a designated Tax Collector's office. OBOS is notified by Collections when a payment is made and OBOS will pass the registration release to FLHSMV as appropriate.

7. To facilitate the detection of lane level errors or trends, the final disposition of every Transaction is fed back to the RTCS. Appendix B – RTCS/OBOS ICD Overview contains an initial list of these dispositions. The final disposition list will be completed in the Design and Implementation Phase.

8. The Contractor shall ~~provide for a periodic~~ backup ~~of~~ all data and all System Software to ~~both~~ an off-premises location ~~and the Authority provided On-premises location~~.
Note: Use of an Authority provided, on-premises storage array is not required for Proposers proposing a cloud-based solution.

9. Access to the OBOS will be granted to various employees and consultants working at the Authority Headquarters. Access will be role based depending on the person's position and need.

10. Some of the Authority employees will be granted external access to the OBOS. All OBOS access, internal and external, will be via a firewall-protected Virtual Private Network (VPN) and Multi-Factor Authentication (MFA).

1.2 Project Phases

The Project will follow the general project phases below.

- **Design and Implementation Phase** – This phase begins at Notice to Proceed and continues through System Acceptance. This phase includes:
  - Schedule development
  - Progress meetings
  - Development of required plans
  - System Design and Documentation
  - Transition/data migration
  - System implementation
  - Testing
  - Training
- **Operations and Maintenance Phase** – The Operations and Maintenance Phase begins upon Go-Live and continues until the end of the Contract. The Authority anticipates that the OBOS will Go-Live before the first RTCS installation. The following stages are based on this assumption, although the Contractor will be expected to support a scenario where the first RTCS installation occurs before the OBOS is ready to Go-Live. The Operations and Maintenance Phase begins when OBOS goes live and is the System of record for Transaction processing and continues until the end of the contract. The Authority anticipates that there will be three (3) Stages that will occur during the Operations and Maintenance Phase as follows:

- Stage 1 - No new RTCS Lanes are operational and OBOS is receiving only Transactions from the legacy Roadside System lanes via TOBS and communicating with all required internal/external interfaces. The current Image review function will continue to interface with the external Image review Contractor via TOBS.
- Stage 2 - The first RTCS Lane is installed and interfaces to OBOS. OBOS is transmitting POSI files to the new RTCS installation and is receiving Transactions and images from the new RTCS installation. With the exception of the new RTCS installation, OBOS continues to interface with TOBS for legacy Roadside System Transactions. All required internal/external interfaces continue to operate through OBOS.
- Stage 3 - All toll sites are operating with the new RTCS System. OBOS is operating with RTCS installations and all required internal/external interfaces. All legacy Roadside Toll System installations and TOBS have been decommissioned.

Because the OBOS will be fully processing Transactions from the legacy Roadside System prior to installation of the new RTCS, the Operations and Maintenance Phase will overlap with the Design and Implementation Phase until System Acceptance. During the Operations and Maintenance Phases, the Contractor is responsible for OBOS monitoring, administration, and Maintenance in its entirety in accordance with the Scope of Work Requirements.

1.3 Organization of SOW Document

This Scope of Work document is part of the OBOS Request for Proposal (RFP) and defines the management and technical Requirements for the development, implementation, and Maintenance of the OBOS. The document is organized into sections as defined below and each section is comprised of Requirements specific to that section. The Requirements are sequentially numbered and match one-to-one the Requirement list found in the Requirement Conformance Matrix (RCM) – Exhibit C6.

Section 1: Introduction – This section provides a high-level overview of the Project and Requirements.

Section 2: Security – This section details the security Requirements that are necessary to ensure a safe environment.

Section 3: Project Requirements – This section details the management Requirements that are necessary to ensure that the OBOS is developed within the scope, budget, and schedule required by the Authority.

Section 4: System Design and Development – This section specifies the criteria under which the OBOS design and development will be implemented and coordinated among the stakeholders.

Section 5: Functional Requirements –This section contains the functional Requirements of the Authority's OBOS Project.

Section 6: Transition, Data Migration and Testing – This section contains the Requirements related to the transition from the existing system to OBOS, migration of Transactions from the existing database to the OBOS database, and testing of all designs, implementations, and operations.

Section 7: Maintenance Requirements – This section details the Contractor's responsibility during the period in which the OBOS is in production and processing Transactions.

Section 8: Succession Requirements – This section details Requirements related to the orderly transfer of responsibility between the Contractor and the Successor at the end of the Contract.

Section 9: Performance Requirements and Key Performance Indicators– This section specifies the metrics for OBOS performance together with Invoice Adjustments if performance standards are not achieved.

Section 10: Document Deliverable Summary – This section consists of a chart indicating the key delivery milestones during the Design and Implementation Phase of the Project.

2 Security

System and data security are of the utmost importance to the Authority. The Contractor shall follow the National Institute of Standards and Technology (NIST) standards and other security Requirements as specified in the Scope of Work.

2.1 General Security

Req. #	Requirement
1	~~The Contractor shall comply with the Authority's security policies during the Contract Term. The Authority will share these policies or portions of these policies as are relevant to the Contractor's Work on this project.~~ INTENTIONALLY LEFT BLANK
2	The Zero Trust security model shall be applied consistently across all components of the OBOS network environment, including all Software applications, network infrastructure, and security controls.

2.2 OBOS Security

Req. #	Requirement
3	The Contractor is required to enforce a uniform security policy across all applications to ensure proper protection. The network architecture shall be designed with multiple layers of defense in accordance with the NIST Special Publication 800-53.
4	The Contractor shall take the sole responsibility for the security of the OBOS applications and data.
5	The Contractor shall establish and implement security policies required for connectivity, storage, data transmission and communication which are in line with NIST standards ~~and the Authority's security policies~~.
6	The OBOS shall follow secure coding practices, such as input validation, output encoding, secure Software development and secure error handling.
7	The Contractor and the OBOS shall be compliant, and remain compliant, with current and future NIST security standards, as applicable to the OBOS and the security of the OBOS, throughout the Contract Term. These standards include, but are not limited to, the following:
7.1	• SP 800-53 – Security and Privacy Controls for Information Systems and Organizations
7.2	• SP 800-63 – Digital Identity Guidelines
7.3	• SP 800-92 – Guide to Computer Security Log Management
7.4	• SP 800-171 – Guidelines for Protecting Sensitive Information
7.5	• FIPS 140-3 – Security Requirements for Cryptographic Modules
7.6	• SP 800-122 – Guide to Protecting the Confidentiality of Personally Identifiable Information (PII)
7.7	• NIST SP 800-160 Vol. 1 Rev. 1. – Engineering Trustworthy Secure Systems
8	The OBOS shall employ an integrated and comprehensive anti-spam and anti-virus protection System.
9	The Cloud Services Provider, if any, proposed for housing the Authority data shall be compliant with the following standards: ISO27001, ISO27017, and ISO27018.
10	The OBOS shall be furnished with Intrusion Prevention Systems on networks with connectivity to the Internet and networks with sensitivity zones and/or trust boundaries.

Req. #	Requirement
11	The OBOS shall provide Intrusion Detection and Prevention (IDP) services, at a network layer, utilizing a Unified Threat Management system (UTM) to Alert system administrators of possible active threats.
12	The IDP Services shall be configured to provide Alerts and take preventative measures such as redirecting questionable source requests.
13	The IDP Services shall log all events and produce Alerts, including Dashboard Alerts.
14	The IDP Services shall include Transmission Control Protocol/Internet Protocol (TCP/IP) and application signature awareness configurable for Alert and/or suppression modes based on services and applications.
15	The OBOS shall be furnished with firewalls and other security features to prevent unauthorized access to any parts of the OBOS from internal or external entities.

2.3 Data Security

Req. #	Requirement
16	The Contractor shall be responsible for all aspects of protecting OBOS data.
17	The OBOS shall employ methods to ensure reliable data communications, file transfer, integrity of the database and tools that detect interruption to these services.
18	The OBOS database shall be encrypted.
19	The OBOS shall utilize encrypted database backup techniques to provide security and prevent unauthorized restoration of the databases.
20	The OBOS shall employ an auditing strategy that maximizes the possibility of detecting unauthorized access attempts and/or activity. This shall include an automated event notification and logging process.

2.4 Encryption

Req. #	Requirement
21	The Contractor shall ensure that all encryption methods for data-in-motion and data-at-rest meet or exceed the encryption standards as per FIPS-140/NIST.
22	The Contractor shall ensure that all data transfers are encrypted.
23	The Contractor shall ensure that the encryption key management system is on a separate platform from the data and the application keys are not stored with data.
24	The Contractor shall ensure that the encryption keys are accessible to the Authority.
25	The OBOS shall implement robust access controls within the encryption management system to ensure secure management and administration of cryptographic keys and encryption configurations.
26	The Contractor and the Authority shall be the only entities with access to encryption keys.

2.5 Network Security

Req. #	Requirement
27	The OBOS shall be furnished and configured with security controls to ensure the integrity and confidentiality of data flowing across the network. Network design and infrastructure shall incorporate secure layers of defense.

Req. #	Requirement
28	The OBOS, along with its supporting network infrastructure components, shall be deployed within a dedicated network segment that is logically and physically separated from other network segments.
29	Dynamic Host Configuration Protocol (DHCP) services shall be disabled on all network devices, including routers, switches, and other network infrastructure components, within the OBOS network environment.
30	The OBOS shall employ automated network monitoring and notification tools.
31	The OBOS shall be furnished and configured with layers of defense for internet security in accordance with industry best practices, including, but not limited to: • Use of firewalls, anti-virus and malware protection, logging Security Information and Event Management (SIEM) and other security features to prevent unauthorized access to the OBOS. • Intrusion Detection • HTTPS • Encrypted network • Security provisioning protocols such as secure sockets layer • SFTP • Internet Protocol Security (IPSec)
32	The OBOS shall be furnished and configured with mechanisms to safeguard data integrity and confidentiality of data traversing over public networks.
33	The OBOS shall be designed to ensure that measures are in place to mitigate any network security risks created by connecting to a third-party network.
34	The OBOS firewall services shall provide:
34.1	• A sustained data throughput sufficient to meet all Requirements
34.2	• Rule based logging and Alerting
34.3	• Log reports on demand
34.4	• High availability
35	The OBOS shall be deployed in a multi-tier firewall segmented network architecture, with an Access Control List (ACL) between each network segment. The network segmentation, at a minimum, shall be as follows:
35.1	• User devices
35.2	• All remote Users
35.3	• Operational application/System servers
35.4	• Systems exposed to external Users or third-party providers
35.5	• Back-up and storage
35.6	• Development
35.7	• QA and testing
36	The OBOS shall be configured to ensure that management of subsystems are restricted through firewall or Access Control Lists (ACL) over secure protocols and networks.
37	The OBOS shall be designed with segmentation and access controls which include replicated data and Disaster Recovery sets.

Req. #	Requirement
38	Data replication between the Primary Data Center (PDC) and Disaster Recovery Data Center (DRDC) shall provide the highest level of available security, utilizing encrypted connections between Systems in a replication topology using industry standard methods, such as VPN, Secure Sockets Layer (SSL), or IP Security (IPSEC).

2.6 Application Security

Req. #	Requirement
39	The Contractor shall ensure that any Software delivered to the Authority adheres to the specific Requirements stipulated in NIST Special Publication 800-171 and SP 800-172, as well as conforms to recognized architectural standardization, secure coding standards, and security testing procedures in line with OWASP and ISO/IEC 27001 standards.
40	The Contractor shall employ threat modeling techniques in the design and assessment of the OBOS and incorporate realistic security scenarios during application security assessment.
41	The Contractor shall perform static analysis scans as part of security-focused reviews and validation of the use of secure coding standards with every Software release.
42	The Contractor shall perform dynamic scans as part of applications testing, production deployment, regular health checks, change management requests and audits.
43	The Contractor shall develop a remediation plan for the Authority's Approval, for any deficiencies discovered during System scans or internal or external audits, and shall implement corrective actions in a timely manner, as Approved by the Authority. This plan shall include steps to ensure that the issues do not occur in the future.
44	The Contractor shall have a notification and Alert process for vulnerabilities, as well as a documented response plan for addressing newly identified vulnerabilities.
45	The Contractor shall ensure that any open-source, third-party, commercial components used as part of the Authority deliverables have been validated through security assessments and remain as such for the Contract Term.

2.7 Logging

Req. #	Requirement
46	The OBOS shall include comprehensive, System-wide logging capabilities (configurable) ensuring every Transaction of any type is logged, including all User access and any changes to any record or Transaction in the OBOS.
47	The Contractor shall comply with the logging standard in accordance with NIST Special Publications 800-53 and 800-92. This encompasses ensuring the availability and the configurability of logging profiles to capture events at different levels, including, but not limited to, purposes such as debugging, verbosity, detection of illegal requests, and identification of failed access attempts.
48	The OBOS shall log application activity in a common log file format, which is searchable, and human readable.
49	The OBOS shall provide authorized System administrators or support personnel with access to view and search log files through a dedicated administrative interface or tool.
50	The OBOS shall provide reports of all logged activity.
51	The OBOS shall log all additions, deletions, and changes to OBOS Users and User roles.
52	The OBOS shall log all User activities on the OBOS.

Req. #	Requirement
53	The OBOS shall log all Users' sign-ins and sign in attempts.
54	The OBOS shall log all changes to System configurations or settings.
55	The OBOS shall generate an Alert when any logs are turned off, or any logs or log data is tampered with.
56	The OBOS shall log changes to applications, databases, and operating System s.
57	The OBOS shall log all Alerts.
58	The information captured by the OBOS logging shall include Username, password (encrypted), originating IP address, date, time and success/failure.

2.8 Access Control

Req. #	Requirement
59	The OBOS shall employ a third-party User authentication and management Software module for all access control functions.
60	A System administrator account shall be provided with the ability to create, modify, or delete User roles and parameters at any time.
61	Virtual Private Networks and Multi-Factor Authentication (VPN) shall be required for all Users accessing the OBOS. This includes Users accessing the OBOS outside of the Authority's local network and Users accessing the OBOS on-site via the Authority's local network.
62	The Contractor shall provide the Authority with full OBOS application administration access rights.
63	The OBOS shall be configured to enforce strong passwords to access the OBOS in accordance with industry standards.
64	The OBOS shall require Users to change their password at configurable intervals (e.g. – every ninety (90) Calendar Days). The OBOS shall provide Users with automatic password change notifications.
65	All OBOS and applications sign-on/access attempts/events, either failed or successful, local or remote shall be recorded, logged and saved for and tracked for security and audit purposes.
66	The OBOS shall include functionality to monitor the OBOS continuously and automatically for unauthorized access attempts. Any access violations shall generate an Alert, be recorded, and immediately reported to the Authority.
67	The OBOS shall be furnished with a commercially available Role Based Access Control (RBAC) module for all OBOS applications.
68	The OBOS shall allow Authority staff to add/remove Users with a System administration account that is separate from the System administrator account used by the Contractor.
69	Access permissions shall be granular and configurable, allowing administrators to define read, write, execute, and other access rights as appropriate for each resource.
70	The Contractor shall, in coordination with the Authority, develop a User Authorization Matrix (UAM) which defines User System rights and roles. This UAM shall be submitted to the Authority for review and approval no later than thirty (30) Calendar Days prior to the scheduled ORT and UAT.
71	The OBOS shall provide access only to Users with Approved access rights as defined within the Approved UAM.

Req. #	Requirement
72	The OBOS shall support up to fifty (50) concurrent Users, simultaneously performing OBOS functions (e.g., accessing System applications, utilizing Dashboards, performing screen searches, running reports, etc.) without experiencing any degradation in OBOS response or operation.
73	The OBOS shall provide controls to lock out Users after a configurable number of unsuccessful login attempts. Locked out Users shall be unlocked either after a configurable time period or by a System Administrator.
74	The Contractor shall follow Authority offboarding and onboarding procedures related to access control.
75	The Contractor shall ensure User accounts that are not accessed for a configurable number of Calendar Days are either automatically disabled or have their passwords expired. This requirement shall be configurable by User role.
76	The OBOS shall support User management functionality including, but not limited to:
76.1	• adding/deleting Users
76.2	• unlocking/locking accounts
76.3	• modifying User email address
76.4	• managing User access/roles
76.5	• Initiating a User password reset
77	The Software shall include a user management interface or tool that allows administrators to disable user accounts with a single step without requiring manual intervention to unassign the user from assigned resources.
78	When an administrator initiates the disabling of a user account, the Software shall automatically identify and remove the user from all resources, permissions, groups, or roles to which they are assigned, including but not limited to folders, files, applications, and System configurations.
79	When a User account is disabled, the OBOS shall ensure that:
79.1	• All active sessions, processes or ongoing tasks assigned to that User in the System are terminated immediately.
79.2	• No data is left in an indeterminate state because of termination of batch processes or such termination.
79.3	• Roll back shall be capable for all records and data associated with that User session.
80	The deletion process shall prompt administrators to confirm their actions and provide warnings or notifications about the potential impact of deleting the User, such as the removal of access permissions or the transfer of ownership for shared resources.
81	Upon successful deletion of the User account, the Software shall update relevant audit logs, User activity records, and Access Control Lists (ACLs) to reflect the removal of the User.

2.9 Customer Information and Privacy

Req. #	Requirement
82	The Contractor shall consider all data as confidential and maintain all data in a secure manner that protects personal identification/identity information in accordance with ~~the Authority's Data Security Policy and~~ NIST 800-122.
83	All customer information is confidential and shall not be disclosed or released unless explicitly directed in writing by the Authority.

Req. #	Requirement
84	The Contractor shall refer all external requests, inquiries, subpoenas, and other official information requests to the Authority. The Authority shall be immediately notified of such requests.
85	The Contractor shall not sell, use, or distribute general or specific Authority, customer, or other Contract-related information and data externally for any reason unless authorized by the Authority.

3 Project Requirements

3.1 Project Management

The Contractor shall utilize industry best practices throughout the Project for Project management.

3.1.1 General Project Management

Req. #	Requirement
86	The Contractor shall be responsible for successfully completing all Requirements, unless specifically revised and Approved by the Authority, in writing.
87	The Contractor shall be responsible for supporting and coordinating its activities with the Authority and entities with which the OBOS shall interface.
88	The Contractor shall provide effective project management throughout the Contract Term, managing the design, development, testing, implementation and Maintenance of the OBOS.
89	The Contractor's Project Manager shall be the primary contact for the Contractor, shall oversee the Project, and shall interact and coordinate with the Authority's Project Manager or other designated Authority staff.
90	The Contractor shall execute the Project in strict accordance with the Contract, this Scope of Work and Approved plans and schedules developed in accordance with the Requirements throughout the Project.
91	The Contractor shall be responsible for monitoring the progress of the Work throughout the duration of the Contract, documenting, and reporting on all aspects of the Project.
92	The Contractor shall cooperate with other Authority-selected contractors to ensure a fully integrated, seamless OBOS.

3.1.2 Project Management Plan

The Project Management Plan (PMP) describes how the Contractor will implement and manage the Project, including staffing, scheduling, communication procedures for controlling all correspondence, Submittals and other communications between the Contractor and the Authority, as well as communications with other third-party entities.

Req. #	Requirement
93	The Contractor shall develop a Project Management Plan which includes separate sections for the Design and Implementation Phase and the Operations and Maintenance Phase of the Project. The Design and Implementation Phase section shall address the Contractor's strategy and management during design, development, testing, and transition. The Operations and Maintenance Phase section shall address management of the on-going OBOS operations, administration, and Maintenance.
94	The Contractor shall develop the PMP and submit the PMP to the Authority for review and Approval no later than thirty (30) Calendar Days from Notice To Proceed (NTP).
95	The Contractor shall ensure the PMP addresses the following areas:
95.1	• Scope and Deliverables – identify the tools, products and processes to be utilized by the Contractor to ensure the Project scope and all related Deliverables are in accordance with the Requirements.

Req. #	Requirement
95.2	• Organization Structure - a project organization chart that is a graphic representation of the Contractor's staff hierarchy and indicates functional areas of responsibility, including any Subcontractor responsibilities. This section shall include the identification of all Key Personnel, shall describe the Contractor's policies and practices with selection of qualified staff, the performance of background checks and the assignment of staff to handle sensitive information.
95.3	• Reporting - a description of the reporting methods to be utilized by the Contractor.
95.4	• Security – describe how all aspects of the OBOS are secured against unauthorized access, data loss, and data integrity loss (while in transit and while at rest), and describe the methods by which unauthorized access, data loss and data integrity loss will be detected and include controls to maintain the confidentiality, integrity and security of information.
95.5	• Incident Management – include a guide for the response and recovery process in the event of a security breach, System issues and/or other potential risk issues. The narrative shall include how the Contractor will communicate incidents to the Authority.
95.6	• Change Control and Change Management - defines the change control, testing, and deployment procedures for all modifications to the OBOS and its associated Hardware, Software, firmware, configuration parameters, etc. and the process to mitigate negative impacts of change related to people, processes, data and technology
95.7	• Coordination - identify stakeholders (e.g. agencies, Subcontractors, and interface entities) and the Contractor's approach to coordinating critical activities
95.8	• Communications – the Contractor's approach and process related to the escalation and resolution of Project issues
95.9	• Project Schedule - a description of the process for reporting and tracking adherence to the Project schedule as well as the Contractor's approach to mitigating schedule delays
95.10	• Key Performance Indicators (KPI) - a description of the process to ensure compliance with KPIs as well as the process for monitoring, tracking and reporting KPIs
95.11	• Invoicing – document the invoice submission process including invoice back-up information.
95.12	• Project Management Tools - identify the tools and products used to manage the Project and the internal controls instituted by the Contractor to guarantee the successful delivery of the Project.
95.13	• Document Version Control – identify the document versioning system that will be used to ensure that all document versioning is consistent and easily understood.
96	The Contractor shall ensure that the PMP is updated and submitted to the Authority for Approval whenever there are material changes to any element of the Contractor's Project Management approach and process.
97	Unless otherwise agreed to in writing by the Authority, changes to the PMP shall not relieve the Contractor from liability to the Authority for any damages resulting from the Contractor's failure to perform its obligations under this Contract.

3.1.3 Software Development Plan

Req. #	Requirement
98	The Contractor shall develop a Software Development Plan that describes the Contractor's approach, methods and process for ensuring the successful design, development, implementation, on-going operation and Maintenance of the OBOS.
99	The Software Development Plan shall include separate sections for the Design and Implementation Phase and the Operations and Maintenance Phase of the Project.
100	The Contractor shall submit the Software Development Plan to the Authority for review and Approval no later than thirty (30) Calendar Days from NTP.
101	The Software Development Plan shall address the following areas: • Identification of resources specifically for the Software development (developers, System engineers, test engineers, Quality Assurance and Control staff, etc.) • Identification of adherence to coding standards such as OWASP • Software development methods to be utilized (e.g., agile, waterfall, etc.) • Software code Maintenance • Software configuration and configuration management • Change management • Version control • Updates and patches • Code reviews • Software Code documentation • Source control • Environments • Testing • Regression testing • Software Quality Control process • Management and control of development efforts • Authority involvement in the development process • Issue identification process • Risk identification and management

3.1.4 Quality Assurance and Quality Control Program and Plan

Req. #	Requirement
102	The Contractor shall establish and maintain a Quality Assurance (QA)/Quality Control (QC) Program throughout the Contract Term. The QA/QC program shall include, but not be limited to the following:
102.1	• preventing, detecting, notifying, tracking and correcting deviations from any Requirement
102.2	• assuring the accuracy, completeness, efficiency and timeliness of OBOS processes
102.3	• The use of reasonableness checks that evaluate accuracy and efficiency such as analyses of abnormal deviations in quantity, volume, dollar amounts, elapsed time and address items as needed.
103	The Contractor shall be responsible for ensuring that the QA/QC program is followed by all Subcontractors.

104	The Contractor shall develop and provide a QA/QC Plan which shall be submitted to the Authority for review and Approval no later than sixty (60) Calendar Days from NTP.
105	The Contractor's QA/QC Plan shall include, but not be limited to the following areas: • QA/QC staff • OBOS design • Software development • Installation • Transition and data migration • Equipment purchase, delivery and validation • Testing • Configuration management • QA/QC of subcontractors • Handling of Personally Identifiable Information • Quality review and verification • Reporting and metrics • Documents/Deliverables • Defect management • Continuous Improvements: lessons learned, regular audits to identify opportunities for process improvements

3.1.5 Risk Management Plan

Req. #	Requirement
106	The Contractor shall develop and submit to the Authority for review and Approval, a Risk Management Plan no later than thirty (30) Calendar Days from NTP.
107	The Risk Management Plan shall include separate sections for the Design and Implementation Phase and the Operations and Maintenance Phase of the project.

Req. #	Requirement

108	The purpose of the Risk Management Plan is to identify, assess, and mitigate potential risks associated with the OBOS project. By effectively managing risks, the Contractor shall ensure the successful execution of the Project within scope, schedule, and budget. The Risk Management Plan shall include:
	• A risk assessment strategy
	• A risk register that documents project risks as they are identified throughout the life of the Project. The risk register shall include the following information:
	  ○ Risk description
	  ○ Risk severity
	  ○ Impact and likelihood assessment
	  ○ Mitigation strategies
	  ○ Responsible parties
	  ○ Current status
	  ○ Action plans and timelines
	• A risk monitoring and control strategy
	• Contingency plans for all high-impact risks with the potential to disrupt the Project or the collection of the Authority tolls. The level of the contingency plan shall be commensurate with the likelihood of the risk occurring, as Approved by the Authority, and shall be kept up to date.
	• A description of how the Authority and designated stakeholders are informed about Project risks, risk management and mitigation activities.
	• How lessons learned will be collected, documented and presented to the Authority.

109	The Contractor shall review the risk register with the Authority, at a minimum, monthly during the Project and the risk register shall be kept up to date.

3.1.6 Disaster Recovery Plan

Req. #	Requirement
110	The Contractor shall provide a comprehensive DR Plan detailing the process for continued OBOS operations and performance of OBOS and business functions in the event of an unplanned service disruption. The DR Plan shall be provided to the Authority for review and Approval no later than ninety (90) Calendar Days prior to the scheduled DR Test.
111	The DR Plan, at a minimum, shall include the following: • Events and situations that will trigger the DR process • Process for ensuring that the Recovery Point Objective (RPO) and Recovery Time Objective (RTO) targets are met (See Appendix J – Key Performance Indicators). • Contact list and notification process • Plans/alternatives for resuming external interfaces and communications • Off-site storage of all OBOS Software, Documentation, agreements and data • Technical and operations support • Routine off-site backup • Disaster Recovery procedures: step by step instructions for initiating the recovery process, roles and responsibilities, communication channels and escalation procedures. Data recovery/restoration to the Primary OBOS after a DR event • Testing and validation of return to normal operations

Req. #	Requirement
	• Description of the processes after event recovery in order to analyze and report on recovery success, or recommend modifications to the recovery process to improve future performance • Vendor and supplier management – ensure contracts and service level agreements include DR. • Annual testing of the DR System.
112	The Contractor shall update the Disaster Recovery Plan and submit the updated version to the Authority for review and Approval at least once per year or no later than thirty (30) Calendar Days from any major OBOS Hardware or Software change and/or after a disruption in business.

3.1.7 Security Management Plan

Req. #	Requirement
113	The Contractor shall provide a comprehensive Security Management Plan detailing the Contractor's approach to providing security for the OBOS, demonstrating compliance with the System security Requirements outlined in Section 2, Security above, and the Contractor's approach to managing System security for the OBOS. The Contractor shall develop the Security Management Plan and submit it to the Authority for review and Approval no later than one hundred and twenty (120) Calendar Days from Notice To Proceed (NTP).

114	The Security Management Plan, at a minimum, shall include the following:
	• Roles and responsibilities for Contractor staff related to security management
	• The Contractor's approach to implement, manage and comply with all Scope of Work security Requirements, including:
	  ○ General security
	  ○ OBOS security
	  ○ Data security
	  ○ Encryption
	  ○ Network security
	  ○ Application security
	  ○ Logging
	  ○ Access control
	  ○ Customer Information and Privacy
	• Risk identification and management/mitigation
	• Malware and Intrusion Detection and Prevention
	• Incident response and implementation of modified procedure due to lessons learned
	• Security awareness and training
	• Security audits
	• Tools and processes to be used in the management of System security
	• Contractor's approach to data privacy, confidentiality, integrity and availability
	• Procedures associated with managing security for the System and mitigation of security-related events
	• ~~Compliance with the Authority policies and the Contractor's approach to managing and implementing modifications to those policies~~
	• Approach to monitoring and implementing modifications to NIST standards

Req. #	Requirement
	• Approach to monitoring and managing System security for on-premise and hosted Environments
115	The Contractor shall be required to comply with the Security Management Plan, the security-related Scope of Work Requirements, and applicable policies for the duration of the contract.
116	The Contractor shall be required to update and submit the Security Management Plan bi-annually a**nd** upon the Authority's request after a security-related event.

3.1.8 Internal Controls

Req. #	Requirement
117	The Contractor shall establish and the OBOS shall include internal controls to minimize risks, safeguard assets, ensure the accuracy of records and data and promote the efficiency of the System and operations. The Contractor shall follow all applicable NIST standards.
118	The OBOS shall include functionality to prevent and detect revenue loss, errors, omissions, irregularities, and improper actions.
119	The Contractor shall report, in writing, to the Authority any potential or actual revenue loss, errors, omissions, irregularities, and improper actions immediately upon identification.
120	The Contractor shall ensure that the OBOS remains current, and in compliance with, all federal and state applicable laws and regulations.

3.1.9 Project Communications

Req. #	Requirement
121	The Contractor and all Key Personnel shall participate in a project kick-off meeting which shall be held no later than fourteen (14) Calendar Days from NTP.
122	The Project Manager shall conduct a progress meeting with the Authority at least every two weeks during the Design and Implementation Phase. The specific schedule for these meetings shall be determined during the Project kick-off meeting.
123	The Project Manager shall be responsible for conducting a project status meeting with the Authority at least monthly during the Operations and Maintenance Phase of the Contract.
124	The Contractor shall establish and maintain effective communication with the Authority throughout the Project. The Contractor shall clearly communicate the scope of work, schedule, deadlines, Deliverables, and other Project Requirements to the Contractor's staff and Subcontractors.
125	The Contractor shall utilize Microsoft Teams to enable all meeting attendees to share and view documents in real time during meetings, whether attendees are virtual or in person.
126	The Contractor shall develop meeting agendas for all Project meetings and shall provide agendas to all requested attendees at least two (2) Business Days in advance of the scheduled meeting.
127	The Contractor shall record minutes of all meeting discussions and shall distribute copies of the draft notes to attendees within two (2) Business Days of the meeting for the Authority's review and Approval.
128	At a minimum, the Contractor shall include in all meeting notes a complete list of attendees, whether present or virtual (web/phone), descriptions of issues discussed, any decisions made, direction given, remaining open issues, and action items.

3.1.10 Monthly Implementation Progress Reports

Req. #	Requirement
129	During the Design and Implementation Phase, the Contractor shall submit a Monthly Implementation Progress Report (MIPR) by the tenth (10th) Business Day of each month that provides a status report for the preceding month and a lookahead for the upcoming month. The initial MIPR shall cover the first full calendar month following NTP.
130	The Contractor shall include the following in each MIPR: • Progress for the prior month for all Project activities including, but not limited to: milestone completion dates, procurement and delivery of Equipment/materials, third-party services, Hardware installation, Design Development, Testing, dependencies, Migration, Training and Documentation. • A risk register that identifies Project risks, the potential impacts on the Approved, Baseline Project Schedule, and actions taken by the Contractor to address these risks. The risk register will follow the format Approved in the Risk Management Plan. • Electronic copies of the updated Project Schedule. • The Updated Project Schedule shall be provided in both MS Project and PDF. • Progress on activities requiring coordination with third-parties. • Deliverable status, including a schedule for Submittals to take place within the next month. • A 30-day look-ahead on all activities scheduled. • Any issues and their status/resolution that occurred during the prior month.

3.1.11 Monthly Maintenance and Performance Progress Reports

Req. #	Requirement
131	During the Operations and Maintenance Phase, the Contractor shall submit a Monthly Maintenance and Performance Report (MMPR) for the Authority's review and Approval by the tenth (10th) Business Day of each month and provide a summary of the activities of the preceding month and a look ahead for the current month. The initial MMPR shall cover the first full calendar month following Go-Live.
132	Prior to Go-Live, the Contractor shall coordinate with the Authority to define the format and content to be included within each MMPR. At a minimum, each MMPR shall include: • Issues and resolutions from the prior period • Issues and resolutions from the current period • Key Performance Indicator results for the prior month • All potential delays and problems in addressing outstanding issues or Software Updates • 30-day look-ahead on activities • Other items as deemed noteworthy by the Authority or the Contractor • A Risk Register that identifies any Project risks and actions taken by the Contractor to address these risks. The risk register will follow the format Approved in the Risk Management Plan. • Any release/updates that occurred in the prior month or which are planned in the next month • Patch Management Updates • System Operations reports and Maintenance reports • Preventative Maintenance activities planned for the upcoming month and completed Preventative Maintenance activities for the prior month

Req. #	Requirement
133	At the sole discretion of the Authority, on-going Maintenance progress reports may be required more frequently than monthly if conditions or progress require more timely discussion.

3.2 Project Schedule

3.2.1 Project Schedule - General

Req. #	Requirement
134	No later than thirty (30) Calendar Days after receiving NTP, the Contractor shall provide the Authority, for review and Approval, a detailed critical path Project Schedule, including all identifiable activities and tasks to be accomplished and related critical dates throughout the Design and Implementation Phase of the Contract. This Project Schedule shall be an updated and more detailed version of the Preliminary Project Schedule provided by the Contractor as part of their Proposal. **Note**: Stage 2 and Stage 3 schedules shall be coordinated with the Authority and the RTCS contractor, and because they are not in the sole control of the Contractor, Stage 2 and Stage 3 dates do not need to be included in the Project Schedule provided to the Authority by the Contractor.
135	The Project Schedule shall show that a fully functional OBOS, meeting all specified Requirements, will be delivered, and successfully implemented by the Go-Live date.
136	The Project Schedule shall include all detailed steps and security elements that are required to accomplish the major Project sequences, such as System Design, System development, testing, interfaces, and data migration.
137	The Project Schedule shall clearly identify all critical paths and shall include all milestones and dependencies or any required interaction with the legacy contractor, the Authority, or other parties.
138	The Project Schedule shall not contain hidden lag durations, and the schedule shall display any available slack.
139	The Contractor shall include Submittals of all Deliverables and their review and update cycles on the Project Schedule. The Project Schedule shall contain the Authority review times in accordance with the Requirements.
140	The Contractor shall prepare the Project Schedule using Microsoft Project, in adequate detail to coordinate and control the Project. The Contractor shall submit the Project schedule to the Authority in both Microsoft Project and PDF.
141	Once the Project Schedule has been reviewed and Approved by the Authority, it shall become the Approved, Baseline Project Schedule and used as the official schedule against which the Project's progress will be measured.
142	The Contractor shall monitor the Approved, Baseline Project Schedule as the Project progresses and provide a monthly Updated Project Schedule to the Authority along with a thirty (30) day look-ahead. The Contractor shall report all progress against the Approved, Baseline Project Schedule displaying baseline start and end dates as well as actual start and end dates
143	Submission of the monthly Updated Project Schedule shall not release or relieve the Contractor from full responsibility for completing the Work within the time specified in the previous Approved, Baseline Project Schedule.

Req. #	Requirement
144	The Contractor is responsible for adhering to the Approved, Baseline Project Schedule. All Requirements, Key Performance Indicators and Liquidated Damages shall be measured against the Approved, Baseline Project Schedule.

3.2.2 Schedule Delays

Req. #	Requirement
145	The Contractor shall identify and report to the Authority all potential and actual delays related to the Approved, Baseline Project Schedule as soon as the Contractor becomes aware of the possibility of a delay.
146	In the event of any delay, the Contractor shall develop and submit a recovery schedule (in the form of a proposed, Updated Project Schedule) which includes reasons for the delay, the effect on milestones and Deliverables, how lost time may be recovered and proposed schedule changes. The Updated Project Schedule shall be submitted to the Authority for review and Approval within five (5) Business Days of the identification of a delay in the Approved, Baseline Project Schedule.
147	The Authority's Approval of any changes to the Approved, Baseline Project Schedule shall not release or relieve the Contractor from full responsibility for completing the Work within the time specified in the Approved, Baseline Project Schedule.

3.3 Documentation

Req. #	Requirement
148	The Contractor shall be responsible for Documentation supporting all Project activities in accordance with the Contract and Requirements.
149	The Contractor shall submit all Documentation in English unless otherwise directed by the Authority.
150	Throughout the Contract Term, the Contractor shall provide updated versions of any Approved Contractor developed plans, manuals, design documents, training materials, or any other documents developed under this Contract no later than (30) Calendar Days from any significant changes.
151	The Contractor shall develop and maintain all Documentation utilizing Microsoft Office Software, where appropriate.
152	All documents shall be submitted in native format (e.g., MS Word, MS Excel, MS Visio, etc.) and searchable PDF.
153	The Contractor shall include headers, footers, and page numbers on all Submittals. As appropriate, the Contractor shall also include a table of contents, title sheet, list of illustrations/figures, list of tables, version number and revision histories.
154	The Contractor shall store all Project Documentation electronically on a secure SharePoint site and it shall be readily accessible to the Authority throughout the Contract Term. Appropriate backup procedures shall be established and maintained as Approved by the Authority.
155	The Contract shall not remove any Documentation from the SharePoint site without approval by the Authority, in writing.
156	All changes to documents shall be tracked via SharePoint on the System.
157	The Contractor shall submit all Documentation formatted for printing on 8.5" x 11" and/or 11" x17" pages (e.g., for large figures and graphics), as required. Documentation shall be

Req. #	Requirement
	formatted such that printed material can be placed into a manageable three-ring binder for end User reference, as required.
158	The Contractor shall ensure that all Documentation submitted and included in Submittals only pertains to the Authority Project.
159	The Contractor shall ensure that any Documentation references/cross references, including those to other Project documents, are kept up to date and accurate throughout the term of the Contract.
160	All Documentation submitted to the Authority shall become the property of the Authority who shall have the right to reproduce any portion of the Documentation in part or whole.
161	Contractor logos or other such markings shall not be included on any Project Documentation submitted to the Authority, without prior written approval by the Authority.
162	The Contractor shall utilize a document versioning system for all documents so that all document versioning is consistent and easily understood. Any changes to a document, once submitted to the Authority, shall create a new version utilizing the document versioning system.

3.3.1 Submittal Reviews and Approval

Req. #	Requirement
163	All Deliverables and Work products submitted, including but not limited to design documents, planning documents, manuals and test results, shall require the Authority's Approval before being Accepted as final.
164	The Contractor must have the Authority's Approval on all Deliverables tied to a milestone payment before payment will be released by the Authority for the given milestone. The Authority shall have the ultimate determination as to whether or not a Deliverable is Approved and final.
165	The Contractor shall schedule at least two review/revision cycle iterations for each document submitted by the Contractor for the Authority's review, comment, and Approval.
166	The Contractor shall allow and schedule at least ten (10) Business Days for the Authority's review and Approval of each document Submittal which is seventy five (75) pages or less.
167	The Contractor shall allow and schedule at least fifteen (15) Business Days for the Authority's review and Approval of each document Submittal which is more than seventy five (75) pages.
168	The Authority review periods for multiple, simultaneous, or overlapping document Submittals shall be scheduled consecutively, not concurrently.
169	The Contractor shall provide written responses to the Authority's comments (utilizing the same comment matrix provided containing the Authority's comments) no more than ten (10) Business Days after the comments are provided to the Contractor for documents that are seventy five (75) pages or less.
170	The Contractor shall provide written responses to the Authority's comments (utilizing the same comment matrix provided containing the Authority's comments) no more than fifteen (15) Business Days after the comments are provided to the Contractor for documents that are more than seventy five (75) pages or more.
171	The Contractor shall submit an empty, multi-column comments matrix with each document. The Authority will enter its comments into the matrix, and the Contractor shall respond to the Authority's comments and track the status of all comments through resolution of each comment and Approval of the document.

Req. #	Requirement
172	Upon receipt of the Authority comments, the Contractor shall review the comments and deliver written responses to the comments addressing the issues, as necessary.
173	The Contractor shall provide to the Authority, two versions of all edited/revised versions of documents; a red-lined version showing all comments, responses and edits/revisions and a clean version with all edits/revisions accepted.
174	The Authority reserves the right to reject Submittals prior to performing a detailed review due to the Documentation failing to meet the purpose and intent of the Deliverable. In the event a Deliverable is rejected, the Authority will notify the Contractor of the basis for rejection in writing. Rejection of a Deliverable will not constitute a delay caused by the Authority.
175	The Contractor shall update and resubmit documents to address comments submitted by the Authority in sufficient time to maintain the Approved, Baseline Project Schedule.
176	After the Contractor receives and reviews the initial set of comments on each document, and after the Contractor has addressed the Authority's comments and produced a new version of the document, the Contractor shall then be responsible for coordinating with the Authority to schedule a document review and comment resolution workshop if requested by the Authority. The Contractor shall ensure all key decision makers and subject matter experts are available during the workshop so that all remaining open comments can be resolved. The Contractor shall then be responsible for producing and submitting a final document for the Authority's review and Approval.
177	The Authority's Approval of documents shall not relieve or limit the Contractor's responsibility to provide an OBOS compliant with all Contract provisions and Requirements unless otherwise Approved in writing by the Authority.
178	The Contractor shall address the Authority's comments and shall resubmit the Deliverables until the Authority Approves the document. Any need for re-submittal shall not be considered a delay caused by the Authority.
179	Deviations from the Requirements that may be contained within Contractor submitted documents, even though the document may be Approved by the Authority, shall not have the effect of modifying any Requirement specified in the Contract unless such deviations are explicitly disclosed by the Contractor and explicitly Approved by the Authority. Only formal requests to the Authority, from the Contractor, for waivers or specification changes that are formally Approved by the Authority shall modify the Requirements.
180	The Contract shall not proceed with any Work related to a document Submittal without written Approval of the document from the Authority.

3.4 Requirements Traceability Matrix

The Contractor shall adopt the Requirement Conformance Matrix (RCM) which was submitted as part of the Contractor's Proposal to create and maintain the Requirements Traceability Matrix (RTM). The RTM shall be submitted with both the System Design Document and Test Documentation for each Formal Test to validate that the design supports all Requirements and that all Requirements are tested. The RTM shall be updated to include requirements from the appendix documents and any additional functionality from the Contractor's Proposal as described in the detailed Requirements below.

Req. #	Requirement
181	The Contractor shall create the Requirements Traceability Matrix based on the Requirement Conformance Matrix (RCM) with the addition of Requirements derived from the text of this SOW, the referenced appendices and the Contractor's Proposal and any changes which are Approved by the Authority. The initial version of the RTM shall be provided to the Authority for review and Approval with the System Design Document (SDD).
182	The Contractor shall develop the RTM using Microsoft Excel and coordinate with the Authority on the design, layout and overall format of the RTM.
183	The RTM shall show the origin of Requirements, any changes to Requirements, and the source of Approval for those changes.
184	The RTM shall be submitted to the Authority for review and Approval with each version of the System Design Document (SDD).
185	The Contractor shall update the RTM as needed to verify compliance throughout OBOS design, development, transition, testing, and deployment phases, and into ongoing Maintenance and operations. Any changes to the RTM shall be submitted to the Authority for review and Approval.
186	The Contractor shall include on the RTM, the reference data for each Requirement such as references to specific sections of the SDD where the Requirement is addressed as well as references to each test area and specific test scripts where the Requirement is tested, and the date when the test results are Approved by the Authority.
187	The RTM shall identify and map Requirements to the test phases and shall be used to verify and document compliance with Requirements.
188	The Contractor shall update the RTM to cross reference specific test plans and test scripts and submit an updated RTM with every submission of any Formal Test plan and test scripts ahead of Formal Testing.

3.5 Staffing

Req. #	Requirement
189	The Contractor shall provide qualified personnel sufficient in quantity, expertise, and experience to meet all Requirements in accordance with the Project Schedule and the Requirements.
190	The Contractor shall manage Key Personnel, notify the Authority of any changes to Key personnel and propose replacements for Key Personnel in accordance with the Contract.
191	The Authority shall have the right to reject, in its sole discretion, any replacement Key Personnel proposed by the Contractor.
192	All staff members who will be interacting with the Authority shall be able to communicate in the English language.

3.6 Training

Req. #	Requirement
193	The Contractor shall provide a training program to the Authority staff and/or designated representatives which includes comprehensive OBOS operation and navigation, including but not limited to System administration, System Maintenance, System operation, reporting, screen searches, Dashboards and Business Intelligence tools.
194	The Contractor shall develop and submit to the Authority for Approval a Training Plan that documents the Contractor's training program and processes for the initial training of the

Req. #	Requirement
	Authority, as well as addressing periodic training that may be necessary whenever there are material changes in OBOS functionality or features and/or changes to key Authority staff throughout the Contract Term.
195	The Training Plan shall be submitted to the Authority for review and Approval no later than sixty (60) Calendar Days prior to the scheduled training in accordance with the Approved, Baseline Project Schedule.
196	The Training Plan shall address and describe how the Contractor will meet the training Requirements and shall include a detailed training schedule outlining the specific courses, for recommended attendees based on topics, User profiles, User access and/or roles including dates and duration.
197	The Contractor's training program shall be conducted on site at the Authority offices and shall include hands-on training modules and demonstrations of all OBOS features, tools, screens, and reports as well as other topics determined to be of utility to the Authority staff. All training sessions shall be recorded by the Contractor and made available to the Authority for future use.
198	The Contractor shall develop and provide all materials, supplies and Equipment necessary for training. The Contractor shall provide both electronic and hard copies of the training materials for each person being trained.
199	The Contractor shall submit for the Authority's review and Approval, all training materials, including a comprehensive training manual and individual lesson plans, no later than thirty (30) Calendar Days in advance of the scheduled training in accordance with the Approved, Baseline Project Schedule. Training manuals shall include both User and Instructor guides.
200	The Contractor shall coordinate with the Authority to develop a list of the Authority staff and/or their designees who will require training.
201	The Contractor's training program shall include "train the trainer" training to allow the Authority to train new Authority staff as needed.
202	The Contractor shall establish a process to obtain feedback on the training process and make appropriate updates to the training program and materials.
203	The Contractor shall provide updated training based on discrepancies, errors or omissions found during initial training, as identified by the Authority.
204	The Contractor shall provide updated training content and materials after major System changes.
205	The Authority and their representatives shall have the right to attend any training sessions. The Contractor shall video record all training sessions and provide copies of all training materials in electronic format for future use by the Authority.

4 System Design and Development

This section outlines the OBOS Design and Implementation Phase of the Project which includes Software Design, development, testing, cyber security characteristics, transition, data migration, backup, and Disaster Recovery. These tasks will involve the Authority's participation and Approvals throughout the process. The design and development process shall also identify how the Hardware and Software meet the functional, technical, security, operational, and Maintenance Requirements.

4.1 System Design Documentation

Req. #	Requirement
206	The Contractor shall schedule and hold design workshops with the Authority. The purpose of these workshops includes, but is not limited to the following: • To review, discuss and refine (if necessary) the Requirements with the intent of ensuring that the Contractor has a complete understanding of all Requirements. • To discuss and document the Contractor's methodology and approach and to review in detail areas such as: ○ Hardware/Cloud architecture ○ Communications architecture ○ Software architecture - Encapsulation - Abstraction - Containers - Third-party Software - Cloud or other support Services ○ Database - Transaction structure and status review - Replication - Stored procedures - Partitioning - Encryption - Access controls - Security audits/penetration test - Database hardening ○ Data Migration - Mapping and source destination of Transactional data - Inclusion and approach to Transaction statuses ○ System and data backup ○ Data recovery and timing scenarios ○ Disaster Recovery ○ Network ○ Security
207	Any change, refinement or optimization of a Requirement shall be submitted to the Authority, in writing, for review and Approval. The Contractor shall clearly identify the implications that any proposed changes have on cost, performance, risk, schedule, System constraints or agility, and long-term Maintenance and Operations.

Req. #	Requirement
208	Should modifications to Requirements be necessary, based on the outcome of Requirements refinement workshops and at the Authority's sole discretion, the Scope of Work and Requirements shall be updated to develop a Conformed Scope of Work and Requirements Document. Once Approved and finalized by the Authority, the Conformed Scope of Work and Requirements Document shall become a Contract Document and be the governing document for the Contact Scope of Work and Requirements. The Contractor shall be responsible for updating the RTM to be in compliance with the Conformed Scope of Work and Requirements Document.
209	Following the design review workshops, the Contractor shall deliver to the Authority for review and Approval a System Design Document (SDD) in accordance with the Approved, Baseline Project Schedule and Conformed Scope of Work and Requirements Document (if applicable) that addresses all applicable Requirements. The SDD shall address all Requirements in the RTM. An updated RTM shall be submitted to the Authority for review and Approval with each version of the SDD.
210	The SDD shall include a comprehensive description of the OBOS design, including but not limited to, the following: • Description of the System and Equipment including overall design and specific features with descriptive drawings, screens shots and reports as needed. • Software Design Documentation • Hardware, including the physical location of Hardware (e.g., server room rack layouts) • A comprehensive description of the database, including all tables, fields, views, and other database object names. The Database Documentation shall include the following: • Entity relationship diagram • Database schema • Data dictionary • Partitions • Third-party Software modules, including version numbers and Documentation • Required licenses • External interfaces and the secure method used to protect these interactions • Configurable parameters • Subsystems • System Alerts • Development processes, including logical data design, physical data design and interface development. • ICDs for all external interfaces. This includes API Documentation that outlines all functional aspects and web-service endpoints within which data will flow to and from external interfaces • Data storage methodology including encryption methods for all types and status of data including at rest, in transit and active i/o. • Data integrity safeguards to ensure data quality (e.g. duplicate filters, file integrity, address validation) • Reporting/Dashboard Documentation • Business Intelligence Tools • Implementation and installation of Software and Hardware components • Configuration tables

Req. #	Requirement
	• Workflow diagrams • Use cases to identify functionality and to be used for testing • Network architecture design diagrams • Access control management (i.e. – User roles and requirements for permissions, etc.)
211	The Contractor shall incorporate the Authority's comments and the results of any working sessions into the SDD and resubmit the System Design Document and RTM as appropriate.
212	Upon the Authority's approval of the SDD, the Contractor shall update the RTM to reflect any changes in Requirements Approved during the design process.
213	As part of the System Acceptance Test (SAT), the Contractor shall submit for the Authority's Approval an As-built SDD, RTM and the OBOS configuration document that reflects the OBOS as developed. The As-built SDD, RTM and OBOS configuration documents shall be submitted to the Authority for review and Approval no later than sixty (60) Calendar Days after completion and approval of the SAT.
214	Authority-Approved changes to the as-built design that occur during the Contract Term shall be reflected in an updated version of the SDD. The updated SDD shall be submitted no later than thirty (30) Calendar Days after implementation of the change.

4.2 System Attributes – On-premises and Cloud Architectures

Req. #	Requirement
215	The OBOS shall include the following System architecture attributes: • Security – Highly secure • Availability – High availability (See Appendix J – Key Performance Indicators) • Performance – High service capacity and throughput for continuous Transaction processing • Efficiency – Highly efficient reporting, GUI interaction, and database design for fast queries and processing • Durability –– Features within the System design that ensure the System is performing as expected over time, even when unexpected events occur. • Capacity – Sufficient storage and replication Services to support the Authority tolling • Scalability – Ensuring the System can seamlessly accommodate varying workloads and evolving demands. • Flexibility – Support changes, new functionality, faults tolerate, new concepts over the lifetime • Sustainability – Modular, backward compatible design and System adaptations over the lifetime. • Maintainability – Proactive monitoring, preventive and remedial Maintenance

4.2.1 On-premises

The following Requirements apply to any portion of the System which is On-premises based.

Req. #	Requirement
216	The Contractor shall furnish and install all Hardware, Software, and all components necessary to provide a complete OBOS, including but not limited to servers, storage, switches, firewalls, cabling, communication/networking gear, conduits, Hardware and other ancillary Equipment.

Req. #	Requirement
217	The Contractor shall provide the Authority with detailed Documentation/Plans related to any facility build-out including rack details for all OBOS Equipment, no later than sixty (60) Calendar Days after NTP.
218	The OBOS architecture shall include all Hardware needed to provide a complete and comprehensive OBOS that meets the Requirements.
219	It is preferred that OBOS server Hardware and associated peripheral Hardware/components be supplied from the same manufacturer. All OBOS Hardware Equipment performing similar functions shall be of the same manufacturer, if possible.
220	All devices will have the manufacturer's passwords changed as soon as received and installed.
221	All physical Hardware shall be labeled with asset tags and asset identification numbering noting all Hardware as property of the Authority, and all wiring and connectors shall be labeled per industry standards. The format for the asset tags and asset identification numbering shall be submitted to the Authority for review and Approval.
222	The Contractor shall create and retain an asset tracking repository. Components of the repository shall include manufacturer, make, model, and location. The repository schema shall be submitted to the Authority for review and Approval. The final repository shall be reviewed and Approved by the Authority during the Design and Implementation Phase.
223	The Contractor shall track all On-premises assets in the Authority's ArcGIS database. This database shall be maintained by the Contractor with any Updates throughout the Contract.
224	The Contractor shall ensure all OBOS Equipment is installed in accordance with the National Electric Code (NEC) and any applicable local and state codes.
225	The Contractor shall coordinate with the Authority and follow industry best practices to ensure all Contractor-installed cabling and wiring is appropriately labeled for easy identification by the Authority or Contractor personnel and is kept neat and bundled separately from other Authority Equipment and wiring. Industry best practices include: • Identify cables using color to create a quick and reliable identification system for OBOS cabling and/or differentiate types of cables from one another (e.g. power and communications). • Apply clear, concise labels (e.g. self-laminating, wrap-around, heat-shrink) to both ends of Equipment cables (e.g. network, patch and power). • Separate and bundle "like" cables (e.g. keeping power and communication cables bundled separate from one another. • Use only the length of cable needed to prevent excess cabling. • Wrap bundled cables with fasteners (e.g. velcro) to provide a clean, neat look. • Document all cables and cable tray runs. • Support cable runs with trays and/or baskets.
226	The Contractor shall maintain a current inventory of all OBOS Hardware electronically on a secure SharePoint site, and provide updated serial numbers, models, manuals, and Warranty information. The information shall be provided to the Authority and shall be updated as components are replaced.
227	When disposing or decommissioning assets, the Contractor shall ensure all sensitive data is properly sanitized or destroyed before disposal, and Documentation of disposal shall be performed.
228	The Contractor shall be responsible for evaluating and verifying the available infrastructure of each location where Equipment will be installed by the Contractor.

Req. #	Requirement
229	The Primary OBOS shall be located in a server room provided by the Authority at their office located at 1104 East Twiggs Street, Tampa, Florida, 33602.
230	The Contractor shall be responsible for connecting to the Authority's network edge device. In the case of an On-prem solution, this means providing the necessary connection to Authority's network edge, while in the case of a Cloud solution, the Authority will provide the ISP connection, and no Contractor Hardware will be required at Authority HQ. The Contractor will need to coordinate with the Authority for network configuration (IP addresses).
231	The Contractor shall identify minimum bandwidth requirements for the ISP in the case of an edge solution.
232	The following will be provided by the Authority at the Authority's location: • One Equipment rack with secure locking mechanisms • Electrical power with UPS and backup generators • Server room environmental controls • Storage Hardware and associated Equipment/components – this will be used for backup, not as the primary storage.

4.2.2 Cloud

The following Requirements apply to any portion of the Contractor System which is Cloud based.

Req. #	Requirement
233	The Contractor shall procure, provision, and make ready all necessary Cloud infrastructure, Software, storage, etc.
234	The Contractor shall ensure the physical location of all Systems storing/warehousing the Authority data remains within the continental United States.
235	The OBOS shall be hosted at a Tier 2 or higher facility and by a Cloud Service Provider that has Fedramp IaaS Certification. The Cloud Services implemented for this Project need not be in a Fedramp environment.
236	The OBOS shall provide network connectivity from the Cloud to the Authority and third-parties required for the OBOS. These connections shall be secured with multi-layers of protection.
237	The Contractor shall provide any master agreements/contracts, service level agreements, licensing, or other agreements between the Contractor and the Cloud Service Provider to the Authority.

4.3 System Design - General

Req. #	Requirement
238	The Contractor shall work in partnership with the Authority staff and their designees to provide a comprehensive, fully tested, and integrated solution that meets or exceeds all Requirements.
239	The Contractor shall coordinate meetings with third-parties (i.e., changes in IP addresses, firewall settings, etc.).
240	Where available, all Software, Hardware, Equipment, devices, and any associated materials/peripherals shall be new, commercially available off-the-shelf, commonly used for similar system solutions and include extended warranties.

Req. #	Requirement
241	The OBOS shall be highly configurable and shall have appropriate interactive screens to allow authorized staff to manage the various configuration parameters required for proper OBOS operation.
242	The Contractor shall provide an OBOS architecture that is fully redundant, eliminating opportunities for a single point of failure.
243	The OBOS redundancy design shall ensure that there is no loss or corruption of data.
244	The Contractor shall provide the following Environments:
244.1	Primary OBOS – This Environment shall be used for on-going Transaction processing and the Authority operations. This includes a Production Database and a replicated Reporting Database
244.2	Disaster Recovery OBOS – This Environment shall be used in the event of a loss of the Primary OBOS due to a disaster. The DR is a full replication of the Primary OBOS.
244.3	Development OBOS – This Environment shall be to be used by the Contractor's software developers to create OBOS functionality.
244.4	Test OBOS – This Environment shall be to be used to verify functionality prior to deployment to the Primary OBOS. The Test OBOS shall replicate the Primary OBOS environment in software versioning, database structure, etc. so that it is a valid test for how the OBOS will operate in production. The OBOS Test Environment shall be capable of load testing both from a processing and storage capacity.
245	The Contractor shall keep the Development, Test and Disaster Recovery environments separate and distinct from the Production environment.
246	The Test and Development environments shall be available as needed.
247	The Test environment shall be utilized to verify the initial development as well as changes to the OBOS Software prior to deployment to the Production environment. This environment shall also be used by the Contractor for informal demonstrations.
248	The Contractor shall maintain the Development and Test Environments to the latest version of the OBOS Software running on the Production environment. The purpose of this is to ensure that any Software modifications have been tested on the current Software version before deployment to the Production environment.
249	The Contractor shall maintain data within the Test environment such that OBOS development and changes can be adequately tested, and their performance verified.
250	The Contractor shall be responsible for the installation, configuration/tuning, and testing of all OBOS Software.
251	The Contractor shall obtain, monitor, maintain and manage all Software license and subscription renewals.
252	The Contractor shall provide Hardware and Software test tools necessary for simulating Transaction and other data transfers as defined by the ICDs.
253	All databases shall be designed and configured to protect against the possibility of data loss and corruption. This includes at a minimum, protection against the following: • Data loss/data corruption caused by Hardware and/or Software issues • System failure • Inadequate data storage capacity • Communication loss • Power outages, voltage drops or surges, extreme temperatures • Deletion by unqualified and unauthorized Users

Req. #	Requirement
	• Cyber Attacks (i.e., rogue Users/hackers, virus attacks, ransomware, etc.)

4.4 Version Control

Req. #	Requirement
254	The Contractor shall select and implement a version control system (VCS) suitable for managing Software development code.
255	The Contractor shall establish a centralized code repository within the selected version control system to store all Software development code.
256	The version control system shall support access control mechanisms to restrict access to code repositories based on User roles and permissions.
257	The version control system shall provide versioning capabilities to track changes made to code files over time, including the ability to view and compare different versions of files.
258	The version control system shall support branching and merging workflows to facilitate parallel development efforts and integration of code changes from different branches.
259	Developers shall be required to provide descriptive commit messages when making changes to code files, including details such as the purpose of the change and any related issues or ticket numbers.
260	The Contractor shall implement backup and Disaster Recovery procedures to ensure that code repositories are regularly backed up and can be restored in the event of data loss or system failure.
261	The Contractor shall define and implement a retention policy agreed to by the Authority specifying the duration for which code repositories and version history shall be retained before archiving or purging.
262	The version control system shall maintain audit logs of all User actions and changes made to code repositories, including User identities, timestamps, and details of the actions performed.
263	The version control system shall comply with the Requirements outlined in the National Institute of Standards and Technology (NIST) Special Publication 800-171, to ensure the secure storage and management of Software development code.
264	The Contractor shall document procedures and guidelines for using the version control system effectively, including instructions for code repository setup, branching and merging workflows, and access control management.

4.5 Scalability, Capacity, and Performance

Req. #	Requirement
265	The OBOS architecture design, including all Hardware and Software, shall be modular to support future interfaces, upgrades to processors, memory, storage, the operating System, and databases without revision to the OBOS architecture.
266	The OBOS design shall prioritize modularity, flexibility, and compatibility with emerging technologies and standards to ensure long-term scalability, adaptability, and readiness for future technological advancements.
267	The OBOS shall accommodate changes in technology given anticipated upgrades, growth, and technology advances during the Contract term.
268	The OBOS shall be capable of accommodating increases related to additional facilities which may be added to the Authority's operational environment.

Req. #	Requirement
269	The OBOS architecture shall support the storage of all required Transaction data, images, and all data exchange interface files in accordance with the Authority Data Retention Policy – see Appendix L – Data Retention Schedule.
270	Throughout the life of the Contract, the OBOS shall be capable of processing/storing at least 200% of a typical day's worth of data including during peak volume times without experiencing System slowness or degradation. Current volumes for the Authority Transactions are provided in Appendix K – Authority Volumes for reference.

4.6 Data Retention

Req. #	Requirement
271	The Contractor shall retain data in accordance with Appendix L – Data Retention Schedule.
272	All data maintained on the OBOS shall be available to authorized Users.
273	Archived data shall exist in ~~both~~ a System isolated from the OBOS ~~and On-premises in an Authority provided storage array~~ indefinitely. **Note**: Use of an Authority provided, on-premises storage array is not required for Proposers proposing a cloud-based solution.
274	The OBOS shall be capable of retrieving archived data within seventy-two (72) hours from the time of the request.
275	As requested by the Authority in writing (and only as requested by the Authority), the Contractor shall securely destroy the Authority specified OBOS data in all formats (e.g., Server, Disk, CD/DVD, backup tape, and paper). Deleted data shall be permanently deleted and be unrecoverable. Certificates of destruction shall be provided to the Authority.
276	The Contractor shall not destroy any data or records without specific Approval of the Authority in writing except as identified for deletion in Appendix L.
277	The OBOS shall employ a systematic method for archiving data.
278	The Contractor shall provide a Plan for how archived data is retrieved.

4.7 Backup and Restore

The Contractor shall establish a backup System retaining all data, images, Software and System information required to fully restore the production OBOS. The backup and restore process shall ensure that no data is lost in the event of an OBOS malfunction, disaster, or malicious interference with the OBOS.

Req. #	Requirement
279	The Contractor shall ~~provide for a periodic~~ backup ~~of~~ all data and all System Software to ~~both~~ an off-premises location ~~and the Authority provided On-premises location~~. **Note**: Use of an Authority provided, on-premises storage array is not required for Proposers proposing a cloud-based solution.
280	The OBOS shall log all backup and recovery activities.
281	The Contractor shall simulate backup and recovery annually. The method of this verification will be defined during the Design and Implementation Phase.
282	In the event of backup failure, the OBOS shall immediately alert and notify the Authority.
283	System Backup: The Contractor shall provide and utilize a System backup that replicates all System provisioning, configuration, User access, custom and third-party Software as well as all other files and modules necessary to complete the OBOS.

Req. #	Requirement
284	The System Backup process shall consist of a full System backup at least monthly and incremental backups each time a change is made to any of the parameters defined above.
285	The System Backup shall exist in ~~both~~ a System isolated from the OBOS ~~and On-premises in an Authority provided storage array~~. **Note**: Use of an Authority provided, on-premises storage array is not required for Proposers proposing a cloud-based solution.
286	The System Backup shall provide for selective restoration of any OBOS functions.
287	Transactions Backup: The Primary OBOS Production Database shall be replicated to the Primary OBOS Reporting Database and the Disaster Recovery Production Database (see the section below on Disaster Recovery).
288	In addition to the above replication Requirements, the Primary Production Database shall be stored in a secondary off-site database ~~and in the Authority on-site storage array~~. This storage may be accomplished via replication, snapshots or other techniques recommended by the Contractor. **Note**: Use of an Authority provided, on-premises storage array is not required for Proposers proposing a cloud-based solution.
289	The Contractor may utilize other backup and replication techniques offered by System and/or Cloud Service Providers subject to the Authority's Approval.

4.8 Disaster Recovery

Req. #	Requirement
290	THE DR site shall be off-site, a meaningful distance from the Primary OBOS (at least 100 miles) to prevent correlated failures.
291	The DR OBOS shall always be a complete duplicate (e.g., data, Software, configuration, size, applications, third party modules, and processing power of the Primary OBOS subject to the Recovery Point Objective (RPO). See Appendix J – Key Performance Indicators
292	Failover to the DR System shall be accomplished via a direct action (not automatically) by the Contractor with the Authority's Approval.

4.9 Time Synchronization

Req. #	Requirement
293	The OBOS shall utilize the Network Time Protocol (NTP) to maintain accurate time.
294	The OBOS shall include time synchronization to ensure that all OBOS components maintain time synchronization with each other. The Contractor shall coordinate with the RTCS Contractor on time synchronization.
295	The OBOS shall include a minimum of two network time servers each synchronized to a minimum of three independent stratum 1-time servers.
296	The OBOS shall support both a primary and backup NTP time source.
297	The OBOS shall automatically switch between primary and backup NTP time sources, as necessary.
298	All time stamps in messages and stored in the database shall be UTC (ISO 8601 extended format), formerly called Greenwich Mean Time (GMT). The format is: YYYY-MM-DDTHH:MM:SSZ. The OBOS shall provide the appropriate conversions for daylight savings, time zones, month boundaries, year boundaries, and day of the week for human readable displays and reports.

Req. #	Requirement
299	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.

4.10 Database

Req. #	Requirement
300	The Primary OBOS shall retain transactional data for approximately six (6) years, from the original lane Transaction date, within the Production Database. Upon reaching the end of the sixth (6^{th}) year the System shall automatically archive the oldest year's data for long-term storage and retrieval. Data organization within the Production Database should allow for efficient retrieval based on Transaction date. Non-transactional data shall not be subject to automatic archiving.
301	The database design shall incorporate field-level validation whenever possible to limit the possibility of incorrect data entry.
302	The database design shall support the integration of transactional data from multiple sources, including migrated Transactions, existing lanes, and RTCS lanes. It should provide clear indicators within the data to distinguish the source of each Transaction.
303	All databases shall be designed and configured to support future Hardware and Software upgrades.
304	All database Software shall be kept current. Current is defined as within one patch release of the database manufacturer's most current general production version.
305	All databases shall be furnished with tools for investigating and adjusting the database performance, session-level activity, scheduled jobs, alert notification, and configuration parameters.
306	Update and use of the Reporting Database (or equivalent) shall, at no time, impact the performance of the OBOS.
307	The Reporting Database (or equivalent) shall be replicated from the Production Database in near real time.
308	The OBOS shall allow database Users to request query processing time prior to running the query.
309	The OBOS Reporting Database (or equivalent) and related indexes shall be optimized for reports/Dashboards and the use of Business Intelligence.
310	The OBOS shall allow for storage of current, past, and pending Authority toll rate schedules.

4.11 OBOS Interfaces

The OBOS shall exchange data with four external entities. Three of these (CCSS, Collections, and FLHSMV) are currently being used by the TOBS system. The fourth interface (RTCS) shall be refined concurrently by the Authority and the OBOS/RTCS Contractors during the Design and Implementation Phase.

In addition to the above interfaces, there will be a fifth interim interface, to the TOBS Interim Database between the TOBS and the OBOS to facilitate Go-Live. This interface will operate with the production TOBS in either a test mode prior to Go-Live or a live production mode during Stage 1 and Stage 2. Appendix M will contain more information on the TOBS Interim Database Design, Transaction API, and ICD, and it will be provided to shortlisted Proposers.

Req. #	Requirement
311	The OBOS shall interface with the following external systems in accordance with the interfaces described and specified in the appendices and outlined below:
311.1	• Roadside Toll Collection Systems (RTCS) ○ Appendix B – RTCS/OBOS ICD Overview – This Interface Control Document (ICD) provides an overview of the data sent from the RTCS to the OBOS (Transactions and images) as well as requests sent from the OBOS to the RTCS. The ICD shall be refined during the Design and Implementation Phase. This ICD contains an overview of the POSI List. The POSI List informs the RTCS of all valid transponders that are acceptable at the Authority for payment of tolls. A full POSI List file is sent to the RTCS once per day followed by incremental POSI List files indicating changes in transponder status that are sent to the RTCS periodically throughout the day. Note that the POSI List is a pass-through of the POSI List received by OBOS from the CCSS. The OBOS shall send Approved toll fare tables to RTCS as outlined in Appendix B – RTCS/OBOS ICD Overview.
311.2	○ During the Design and Development Phase, the Contractor shall work in cooperation with the RTCS Contractor to finalize the details of the data content and messaging protocol as well as the expected behavior of each respective System related to these communications. This document will include details on communication protocols, transport mechanisms, data types, data fields, URL's, endpoints, error response and processing, VPN and security as well as other applicable details identified in the development of this document. The OBOS Contractor shall be responsible for submitting a final OBOS/RTCS ICD to the Authority.
311.3	○ The OBOS shall communicate with the RTCS in conformance with the ICD.
311.4	○ The Contractor shall provide all network infrastructure, including network security and bandwidth, required to support all RTCS/OBOS communications. The communications and the interconnects between RTCS/OBOS and TOBS are all provided in Figure 1 for a Cloud based OBOS implementation and Figure 2 for an On-prem based Architecture.
311.5	• CCSS – The following list identifies the current CCSS interfaces. The Proposer shall be responsible for incorporating the latest version(s) of the interfaces at the time of Design and testing. ○ Appendix C1 – CCSS Away Agency ICD V 6.19– This ICD defines the Transactions sent from the OBOS to the CCSS (outbound) as well as the Amendments sent from the CCSS to the OBOS (inbound) in response to each Transaction. It also covers Amendments sent from the OBOS to the CCSS in the event a Transaction must be modified. This entire package is called the Universal Financial Message (UFM). Note that Transactions are not batched but are sent individually to the CCSS in the UFM. ○ Appendix C2- ICD – UFM Data Source Table – This table shows the relationship of RTCS Transaction data to the data required by the UFM. ○ Appendix C3 – CCSS Interoperable Agency ICD - Get Image Request v1.1 – When the CCSS determines that an invoice must be sent for payment of the

Req. #	Requirement
	toll, it will request the license plate Image from the OBOS. This ICD defines that request and response. ○ Appendix C4 - POSI List – This ICD defines sending the full POSI List from the CCSS to the OBOS once per day followed by incremental POSI List files throughout the day. ○ Appendix C5 - CCSS Vector – FLDOT Get Demographics Interface _v4.0 – When the CCSS cannot collect on an invoice, it notifies the OBOS. The OBOS will then use this ICD to retrieve the registered owner's name, address, and other Demographics to pass on to the Authority collection agency. ○ Appendix C6 - CCSS Recall File – This is a daily file created by the OBOS to inform the CCSS of Transactions that must be recalled. The file is populated both manually and via communication of incorrect license plate numbers from the RTCS.
311.6	• Collection Agency ○ Appendix D – THEA Collections/OBOS ICD – This ICD defines the following: ▪ The information (Demographic and Transaction) that the OBOS will send to the Collections Agency to initiate the collection process. It also defines the feedback (Amendments) from the Collections Agency to the OBOS indicating the payment state of the collection account. ▪ The data exchange between the Collections Agency and the OBOS to initiate a Registration Stop and Release on a vehicle registered in Florida for which the Authority toll could not be collected. This ICD also describes the exchange of requests and acknowledgments between the OBOS, and the FLHSMV required in the Registration Stop and Release process. ▪ The method to allow Collections to retrieve images from the OBOS for noticing.
311.7	• TOBS -Appendix M TOBS Interim Database (IDB) Design, Transaction API, and ICD ○ The production TOBS will send real time transactions to the OBOS as specified in Appendix M. Note that this includes to the following data exchanges. ▪ Transactions - Transaction record sent by TOBS to OBOS in real time. ▪ Images – Image retrieved by OBOS based on Transaction ID and URL path. ▪ POSI list as a pass-through of full and incremental files received from CCSS.
312	All OBOS interfaces shall be through a VPN connection and shall be encrypted.
313	The OBOS shall perform validations on all data and files received via the external interfaces.
314	The Contractor shall ensure that all ICDs under their control are kept current and accurate over the Contract Term.
315	The OBOS shall be updated to adhere to any changes to ICDs over the Contract Term. Minor changes, including coordination and testing, shall be incidental to the Contract and shall not be at any additional costs to the Authority.
316	All messages between the OBOS and external interfaces including expected CCSS Amendments and requests shall be included in the System Design Document together with a description of required processes when the message is accepted or rejected. The System

Req. #	Requirement
	Design Document shall also include Alerts and actions to be taken if a response is not received within a configurable time.
317	The OBOS shall utilize secure protocols for all external interfaces to ensure the safe transmission of data between external systems. REST Protocol is preferred unless an alternative protocol is deemed more suitable and is Approved by the Authority.
318	The OBOS shall support regeneration and retransmission of files and data, as necessary.

5 Functional Requirements

5.1 Transaction Processing

The definition of a Transaction, from an OBOS perspective, depends on the context but it always starts with a vehicle passing a tolling point on the roadway. In the first case, a Transaction is defined as a message sent to or from the OBOS containing the information related to parameters such as vehicle characteristics, date/time, amount and current status. In the second case, a Transaction is the collection of information from Transaction messages that are stored in the database. At any point in time, as appropriate, a database Transaction may consist of the following:

- RTCS data including associated image(s) required for IBT Transactions
- Universal Financial Message data (UFM)
- Amendments (CCSS and Collections, including Registration Stop/Release)
- Transaction status

The following Requirements relate to the various processes necessary to ensure accurate and timely collection of tolls and information to the Agency.

Req. #	Requirement
319	The OBOS shall support Transaction processing as detailed in the Lifecycle Flowcharts (see Appendix A1 – OBOS Transaction Lifecycle Flow and Appendix A2 – OBOS Transaction Lifecycle: A to Z).
320	The OBOS shall process all Transactions accurately and in a timely manner in accordance with Approved ICDs, Approved System Design Documents and all Requirements.
321	The OBOS shall process all information received from and sent to external interfaces in real time without causing a “bottleneck” at any point in the process.
322	The OBOS shall process Transaction data as it is received.
323	The OBOS shall interface with the following entities: • TOBS • RTCS • CCSS • Collection Agency • FLHSMV
324	The OBOS shall accept and process both ETC and IBT Transactions.
325	The OBOS shall track, update, and maintain a current and historical record of the status (including Amendments) of each Transaction as it progresses through the OBOS. This includes the date, time, reason, and status each time there is a change in the status of a Transaction. Following is a preliminary list of suggested Transaction statuses that shall be finalized during the Design and Implementation Phase. **Transactions Statuses** **Include Date/Time with all statuses** • ETC Transaction • IBT Transaction • Complete IBT (set following receipt of plate number) • Plate Number Received from RTCS

Req. #	Requirement
	• Image Received from RTCS • Transaction Uncollectable • Sent to CCSS • CCSS Response Amendments (see Appendix C1 – CCSS-Away Agency ICD v6.19) • Sent to Collections • Collections Response Amendments (see Appendix D – THEA Collections/OBOS ICD) • Registration Stop • Registration Release • Corrected Plate • Changed from ETC to IBT • Recalled from CCSS • Recalled from Collections • Open/Closed (to facilitate reports) • Closed Reason (CCSS, Collections, DMV OBOS (Auto, Manual, Timeout) **Note: When a Transaction status is updated, the new status does not replace an existing status, it is appended to the list of statuses.**
326	The Contractor and the Authority shall finalize the current list of Amendments and statuses during the Design and Implementation Phase.
327	The OBOS shall be capable of receiving, processing, and storing any new Amendments that may be developed.
328	All Transactions, images, and messages transferred between the OBOS and its subsystems, all applications and internal and external interfaces shall have data validation controls to confirm the complete, accurate, and timely transfer and receipt of data.
329	The OBOS shall include the functionality, via an automated process using an outbound revenue-based Amendments to CCSS, for a rejected ETC Transaction to be changed to an IBT Transaction. The process shall include the request for the license plate Image from the RTCS. The OBOS shall allow for this functionality to be turned on and off globally, as needed.
330	The Software shall accurately track and update Transaction statuses in real time. The approach must ensure timely and accurate updates to Transaction statuses, ensuring that changes to and from CCSS and Collections are immediately available for reports and research.

5.1.1 Transaction Controls

Ideally, transactions require no human intervention or interaction and flow automatically from the RTCS to the OBOS and to the external entities as shown in Appendix A1 – OBOS Transaction Lifecycle Flow and described in Appendix A2 – OBOS Transaction Lifecycle: A to Z.

Req. #	Requirement
331	The OBOS shall provide automatic functions and interactive (manual) screens to support audit and adjustment functionality to Transactions, including but not limited to: • Fare Adjust • Convert ETC to IBT • Transaction Recall

Req. #	Requirement
332	Manual Fare Adjust - The OBOS shall provide the User with the ability to manually adjust the fare, either directly or using a designated fare table, of any selected transaction or group of transactions. For this function, the OBOS shall utilize the CCSS FARE ADJ outbound amendment in accordance with the rules associated with that amendment.
333	Manual Convert ETC to IBT - The OBOS shall provide the User with the ability to convert a rejected ETC transaction to an IBT transaction. The following sub-requirements apply: • The ETC to IBT function shall utilize the CCSS "ETC to VIOLATOR MOP" outbound amendment to resend rejected ETC transactions back to the CCSS as image-based transactions. • The User may select a range or single transaction ETC to IBT eligible transactions and convert them or change their status to ineligible.
334	• Manual Transaction Recall - The OBOS shall provide the User with the ability to recall any selected transaction or group of transactions from the CCSS or Collections.
335	The OBOS shall automatically determine the current location of the transaction (CCSS or Collections) and apply the recall accordingly.
336	The OBOS shall use the daily CCSS Recall File to recall transactions from the CCSS. The CCSS Recall File is defined in Appendix C6.
337	The OBOS shall use the Collections Recall API message to recall transactions from Collections.

5.1.2 Collections

The Authority contracts with a third-party collection agency for the recovery of outstanding debt.

Req. #	Requirement
338	The OBOS shall include configurable logic related to when a Transaction is sent from the OBOS to Collections. This configurable criterion includes, but is not limited to the following: • Amount owed (toll, fee, toll and fee) • License plate, state and plate type • Number of previous invoices issued to the customer per CCSS Amendment • Transaction date • CCSS Amendment type/reason

5.1.3 Discount Program

The OBOS will be required to support the Authority's MacDill Discount Program, outlined in Appendix F, as well as future discount programs. Requirements related to the Authority discount program include the following.

Req. #	Requirement
339	The OBOS shall implement the MacDill discount program as defined in Appendix F.
340	The OBOS shall provide the capability to process a CSV file, or other interface/mechanism that would enable uploading and processing of a future list via file containing the eligible participants of the Discount Plan. Format and interface to be determined during the Design Phase of the Project.

Req. #	Requirement
341	The OBOS shall include a function to send emails to Discount Plan customers informing them of applied discounts.
342	The OBOS shall be designed to support the capability for future discounts and special programs that are based on parameters such as the number of trips in a month, travel location, zip codes, specific dates, specific eligibility (e.g., military background), time of day, for specific dates, or other Authority parameters.
343	The OBOS shall be designed to support the capability for future discount and special programs with the following functionality: tracking of usage for usage-specific plans, periodic re-validation of qualifications, calculation of customer discount amount, new APIs, new workflow logic and reporting.
344	The OBOS shall have the capability to calculate the discounts based on different Business Rules including the minimum number of trips by location, based on Transaction Date and/or Posting Date.
345	The Discount Program shall utilize the "CCSS FARE ADJ" outbound amendment, and/or other Amendment(s) as identified during the design of the program, in accordance with the rules associated with that Amendment.

5.2 Configuration

Req. #	Requirement
346	The Contractor shall prepare and maintain a Configuration Table that shows the current and historical values of table-driven variables in the OBOS. This includes a history of effective start and end dates of all configurable OBOS values.
347	The Contractor shall submit a configuration table to the Authority for review and Approval no later than thirty (30) Calendar Days prior to the scheduled Operational Readiness Test and User Acceptance Test.
348	The Contractor shall update any configurable System values within two (2) Business Days of a request by the Authority.
349	The Contractor shall provide an updated configuration table to the Authority for review and Approval within five (5) Business Days before any proposed changes to the configuration table.

5.3 Graphical User Interface and User Input Screens

Req. #	Requirement
350	The OBOS shall be furnished with a Graphical User interface (GUI) for all User interactions.
351	The OBOS GUI shall be capable of handling large data sets such as Transaction searches and shall provide flexible User pagination.
352	The OBOS GUI shall be User friendly, intuitive, easily navigable, and configurable.

353	The Contractor shall work with the Authority during the Design and Implementation Phase to complete the list of GUI functions. A preliminary list of functions that must be included is outlined below:
	• Access Management
	  ○ VPN Management
	  ○ Groups and Rights
	  ○ Password Management
	  ○ Users
	  ○ Add/Remove Users

Req. #	Requirement
	- Lock/Unlock Accounts - Modify a User's Email Address - Manage User Access/Privilege - Reset a User Password • System Management ○ System Configuration - Variance checks/Exception reporting - Collections criteria - Tax Collector criteria - Tag ID/Agency Chart - Fare Table ○ User Configuration - Report criteria - Dashboards - Default menu • Transaction Control ○ Fare Adjust ○ Convert ETC to IBT ○ Transaction Recall • Fare Table Management (as outlined in Appendix B – RTCS/OBOS ICD Overview v4.0) ○ The UI shall have the ability to load, view, submit and approve the toll fare entries (toll fare table) for different vehicle types based on an effective start and end date combination. • Maintenance Management ○ Alarms/Warnings ○ Open Items ○ System Logs
354	The OBOS GUI shall be browser based supporting the current and future versions of Microsoft Edge, Google Chrome, Apple Safari, and Firefox. The GUI shall also be backward compatible to support browser versions that are still supported by the manufacturer.
355	The OBOS GUI shall make full use of the GUI components provided by a browser such as drop-down lists, check boxes, buttons, hot keys, etc. to minimize the number of keystrokes required to interact with the OBOS.
356	The OBOS shall allow Users to open multiple GUI/web browser windows simultaneously (e.g., a User shall be able to view real time Dashboard data in one GUI window/instance while simultaneously examining Transaction level data or associated reports in another GUI window/instance).
357	The OBOS GUI shall have full on-line help screens that are formatted for both viewing and printing.
358	The OBOS GUI help screens shall be context sensitive such that when a help screen is requested, it shall present help for the currently viewed application screen.
359	The OBOS GUI shall utilize Hover-text for all selectable parameters.
360	The OBOS GUI shall incorporate seamless access to Business Intelligence Software such as Power BI, Jaspersoft or Tableau.

Req. #	Requirement
361	The OBOS GUI shall allow each User to configure their own default views, Dashboards, and reports within their access rights. This configuration shall persist until changed by the User.
362	The web-based application shall support HTTPS (Hypertext Transfer Protocol Secure) protocol for secure communication between clients and the application server.
363	SSL/TLS (Transport Layer Security) encryption shall be used to encrypt data transmitted over the network, including login credentials, personal information, and sensitive transaction data.
364	SSL certificates shall be obtained from a trusted Certificate Authority (CA) and configured on the application server to establish secure connections with clients.
365	The application server shall enforce the use of SSL encryption for all web traffic, redirecting HTTP requests to HTTPS to ensure secure communication by default.
366	SSL encryption settings, including cipher suites, key exchange algorithms, and protocol versions, shall adhere to guidelines provided by the National Institute of Standards and Technology (NIST) Special Publication 800-52 or equivalent, to mitigate vulnerabilities and ensure robust encryption.
367	The OBOS GUI shall be capable of capturing, storing, and displaying all relevant data efficiently and accurately in accordance with industry best practices and the Requirements.
368	The OBOS GUI shall provide a robust search and research function allowing authorized Users to obtain and view Transaction information based on searches of various attributes and search criteria such as license plate number and transaction date.
369	The OBOS GUI shall allow Users to filter and sort data displayed on the screen, such as date and time range, transponder number, toll agency where the Transaction occurred, and other attributes that appear on the screen.

5.4 Reporting, Dashboards and Business Intelligence

System Reports, Dashboards and Business Intelligence Tools are critical elements of the Operational Back Office System. As the Authority's System of Record for Toll Transactions, Reports, Dashboards and Business Intelligence Tools provide the insights and analytics into all aspects of the OBOS condition, Maintenance and operations, toll transaction status, revenue collection and reconciliation, special programs, and operations. Refer to Appendix I – Reports and Dashboards for a list and brief description of reports, currently used and/or desired by the Authority in the OBOS. Appendix I – Reports and Dashboards is not intended to be a complete list of all required reports but rather to provide the Contractor with a sample of the types of reports that the Contractor will be expected to provide.

Req. #	Requirement
370	The OBOS shall offer robust reports and Dashboards that offer a comprehensive selection criterion allowing Users to generate desired output without the need for special database analysis skills.
371	During the Design and Implementation Phase, the Contractor shall schedule, manage, facilitate, and conduct report and Dashboard workshops with the Authority. The specific reports/Dashboards, formats, data, and selection criteria will be finalized during these workshops. The workshops shall also cover the use of Business Intelligence Tools and include the development of standard Business Intelligence reports and graphics. The workshops shall be a well-planned collaborative activity with the result being the design of standard reports and Dashboards and the GUIs for the generation of ad-hoc reports and Dashboards.

Req. #	Requirement
371.1	• The GUI associated with report or Dashboard generation shall be intuitive and User friendly.
371.2	• The workshops shall include the development and design of the GUIs used for the generation of ad-hoc reports, queries, and Dashboards.
371.3	• The Contractor shall clearly identify any limitations associated with the generation of ad-hoc reports and Dashboards, including but not limited to the fields that can be used in the data selection for the generation of reports and Dashboards.
371.4	• The Contractor shall employ an effective and productive methodology for Designing and finalizing the reports and Dashboards identified in the Scope of Work through the workshops.
371.5	• The reports and Dashboards and GUI Design process shall be iterative, and the Contractor shall conduct multiple workshops with the Authority's stakeholders, and the Contractor shall bring subject matter experts to the meeting.
371.6	• The Contractor's subject matter experts shall explain each report, Dashboard and GUI, its intended purpose, columns, fields and components and its connection with other reconciling and validating reports and Dashboards.
371.7	• The Contractor's report, Dashboard and GUI templates shall be submitted and changes to meet the Authority OBOS Requirements and needs shall be noted. The reports and Dashboards shall have correct and accurate data and shall reconcile across other reports and Dashboards.
371.8	• Upon receiving feedback from the Authority and Authority stakeholders, the Contractor shall modify the report, Dashboard and GUI templates and the reports and Dashboards identified in the scope of work and shall resubmit the updates for review by the Authority and Authority stakeholders.
371.9	• The modified and new reports, Dashboards and GUI shall be demonstrated to the Authority using accurate and reconciled data. Reports and Dashboards that are expected to reconcile to one another shall be demonstrated together.
371.10	• The iterative series of workshops and demonstrations shall continue until reports and Dashboards specified in the scope of work and the reports, Dashboards and GUIs templates are Approved by the Authority.
371.11	• At the conclusion of the workshops, the Contractor shall document the results of the meetings and incorporate the reports, Dashboards, GUI, and Design decisions into the SDD.
372	The OBOS shall allow Users to perform ad-hoc queries and reporting.
373	The OBOS shall restrict access to data selection criteria based on User credentials.
374	The OBOS shall have controls in place that ensure report and Dashboard data tie and reconcile as required, such that data requests for the same information agree to one another and that roll-ups of lower-level detail sum correctly.
375	The OBOS shall allow Users to browse selected User screens and apply selection criteria from pull-down menus, calendar controls and text entry as appropriate and generate reports and Dashboards on demand through a clearly displayed, intuitive, and User-friendly GUI.
376	Format for similar fields shall be consistent across GUI screens.
377	The OBOS shall allow authorized Users to save selection criteria as a template.
378	The OBOS shall properly format numerical data with decimals and commas, as appropriate.

Req. #	Requirement
379	The OBOS shall provide drill down capabilities for both reports and Dashboards, allowing authorized Users to directly select information from the data returned on the User's screen via a link or drill down and be brought to additional detail, as defined during the Design and Implementation Phase
380	The OBOS shall provide User-selectable timeframes as parameters for reports and dashboards. The timeframes shall include hourly, daily, weekly, monthly, quarterly, calendar year, Fiscal Year, prior day, User-defined date and time range. Date-time format shall be proposed by the Contractor and Approved by the Authority.
381	For reports and Dashboards that include IBTs, the transaction view shall include a link to view the license plate image. ~~For reports and Dashboards that include either IBT or ETC Transactions, the transaction view shall include a link to view the DVAS video.~~
382	The OBOS shall allow for wildcard searches and support logical operators (e.g. - AND, OR, NOT).
383	Where appropriate, reports, screens and Dashboards shall indicate the name of the Transponder issuing agency which can be found in Appendix E1 – NIOP ICD Appendix-B-Released-20220916 and/or Appendix E2 – NIOP ICD Appendix C - Released 20240223.

5.4.1 Business Intelligence

Req. #	Requirement
384	The Contractor's OBOS solution shall include Business Intelligence Software such as Power BI or Tableau. This Software shall aid Users in Transaction monitoring, research, and reporting to identify trends and gain further insights into OBOS data. The Business Intelligence functionality shall include, but not be limited to the following:
384.1	Allow Users to examine and analyze data to identify and understand trends, patterns and issues
384.2	• Share data, reports and visualizations from the Business Intelligence tool with other Users
384.3	• Provide data in an accessible and understandable manner
384.4	• Retrieve, analyze, report and present data in User-friendly, informative views such as reports, charts and graphs.
384.5	• Provide graphical representations of data
384.6	• Provide data analytics
384.7	• Allow single-screen views of metrics divided into panels to show related data points
384.8	• Utilize both current and historical OBOS data
384.9	• Utilize data that is external from OBOS and imported into OBOS to complete comparative analytics, reporting, and generation of Business Intelligence
384.10	• Enable side-by-side comparisons of data under different scenarios
384.11	• Provide drill-down and drill-up features
384.12	• Provide data querying
384.13	• Perform predictive analytics

5.4.2 Reports

Req. #	Requirement
385	During the reports, Dashboards and Business Intelligence tools workshops, the Contractor shall design and develop all reports identified in Appendix I – Reports and Dashboards, as well as other reports as requested by the Authority during the Design Phase of the Project. Comparable Dashboards to all of the reports in Appendix I – Reports and Dashboards shall also be developed during the workshops. Up to an additional 30 reports or Dashboards shall be developed by the Contractor as identified by the Authority during the workshops or at any point of time in the Contract.
386	The OBOS shall allow authorized Users to configure reports to be automatically saved and generated on a scheduled or recurring basis for a given selection criteria and the output, in a User selectable format, shall be sent via e-mail to a User-defined distribution list or User-specific repository.
387	The OBOS shall include functionality to allow Users to immediately terminate report and query generation which is in process.
388	The OBOS shall provide the User with a screen display of any report generated and shall also allow the following output options: • Export to industry standard formats including MS Excel, CSV, PDF, and HTML • Send to Printer • Send via Email • Be saved by the User locally and/or on a User-specific repository (the Authority shared drive)
389	The OBOS shall format exported reports for their destination format and the output shall not require the User to manipulate the format to perform analysis. For example, reports exported to Excel or CSV should not have their header information repeated on multiple pages, all report columns should be in-line, and merged cells (Excel) should be kept to a minimum.
390	The OBOS shall identify table headers (i.e., top row of an excel table) with these headers being printed on the top of the table.
391	The OBOS shall include a standard report header and/or footer on all reports containing: • The ID of the User executing the report • The date/time the report was executed • The name of the report • The page number in the format of “Page X of Y” • The selection criteria used to generate the report
392	Configurable default start and end dates for reporting periods (for example, when running a monthly report, the OBOS shall automatically populate the start date and end date of the previous month). Users may override these dates for individual reports.
393	The OBOS shall notify Users if a required report or query will produce results that are more than a configurable size and/or will take longer than a configurable amount of time and shall require confirmation from the User to generate the report or query.
394	The System shall provide the ability for Users to generate, save and schedule ad-hoc reports based on the User’s selection of criteria.
395	The Contractor shall be responsible for making minor changes to reports (e.g., formatting, adding or deleting totals and subtotals, etc.) throughout the Contract Term at no additional cost.

Req. #	Requirement
396	The Contractor shall be responsible for assuring the accuracy and completeness of all OBOS reports throughout the Contract Term.

5.4.3 Dashboard

Dashboards provide a visual overview of data trends to aid Users in quickly identifying areas that require attention.

Req. #	Requirement
397	The OBOS shall be furnished with browser-based GUI Dashboards that provide Users with a visual overview via real time or near-real time indicators or panels. These indicators shall provide information related to the health of the OBOS and various processing and operational statistics, including but not limited to System performance health, KPI's, toll transaction statistics and internal/external interfaces and provide real time status and recent historical information in graphical formats
398	The OBOS Dashboards shall provide information with a dynamic graphical display of key operational workflows, statuses, and other key operations components to be determined during the Design and Implementation Phase.
399	The OBOS's Dashboard shall visually present real time OBOS status, OBOS and operations workflows, and performance information and shall dynamically highlight issues or backlogs as they occur, allowing Users and the Authority management to instantly identify items in need of corrective actions.
400	The OBOS's Dashboard shall maintain historical benchmarks for comparison to current performance and/or operations workflows, and timeframes and shall provide a notification when actual real time conditions deviate from the benchmarks. Parameters for Historical benchmarks include but are not limited to the time period such as prior ninety (90) day average, day of week, same day prior week/prior year. Historical benchmarks will be defined during the reporting workshops.
401	The OBOS Dashboard shall include an overview of OBOS processing including the status of Transactions (current and historical).
402	The OBOS Dashboard shall provide drill-down capabilities to provide the details of the displayed parameter.
403	The Contractor shall provide Dashboard indicators, each with User selected data and presentation mode. User settings shall be saved between sessions. The Dashboard window shall be appropriately sized based on the number of indicators selected. Dashboard indicators shall be defined and developed during the Design and Implementation Phase.
404	The OBOS shall allow Users to establish configurable indicator thresholds for monitoring System and operational performance.
405	The OBOS's Dashboard shall display Alerts in a clear and conspicuous manner. Specific required Alerts will be defined during the reporting workshops.
406	Dashboards shall allow Users to export data to the following file types: Comma-separated text, flat file .txt, CSV, PDF, Excel spreadsheet and Image file (e.g., jpeg, png, bmp, etc.).
407	Dashboards shall render within three seconds of opening the Dashboards screen or signing into the System.

5.5 Manuals

5.5.1 User Manual

Req. #	Requirement
408	The Contractor shall develop and provide to the Authority for review and Approval a comprehensive User Manual to support all functions, features, and tools of the OBOS. The OBOS User Manual shall be provided to the Authority for review and Approval no later than sixty (60) Calendar Days prior to the scheduled Operational Readiness Test and User Acceptance Test.
409	The User Manual shall address all User types and groups such as supervisors and managers, the Authority program administrators, auditors, and accounting/financial staff, etc.
410	The User Manual shall be intuitive, easy-to-follow, and contain detailed instructions for the use and operation of the OBOS and all OBOS functions. It shall include navigation flows, flow diagrams and application screenshots.
411	The User Manual shall include an explicit section on reports (including ad hoc reporting), Dashboards and Business Intelligence. This section shall include a list of all reports and Dashboards, descriptions, tutorials, selection criteria, definitions, and the method of saving and accessing reports.
412	The Contractor shall keep the User Manual current and shall provide updated versions of the User Manual to the Authority for Approval no later than thirty (30) Calendar Days from any material change, or as requested by the Authority.

5.5.2 System Administration Manual

Req. #	Requirement
413	The Contractor shall develop and provide to the Authority for review and Approval a comprehensive System Administration Manual which shall address the tasks and responsibilities for maintaining and monitoring the OBOS so that it continuously operates and performs in accordance with the Requirements. The System Administration Manual shall be submitted to the Authority for review and Approval no later than thirty (30) Calendar Days prior to the scheduled Operational Readiness Test and User Acceptance Test.
414	The System Administration Manual shall include all steps and procedures necessary to ensure proper and secure administration of the OBOS.
415	The System Administration Manual shall include all items required for proper Maintenance of the OBOS and include such things as Maintenance, Maintenance schedules, procedures for the application of patches and Software Updates, detailed instructions on emergency responses and how to orderly shutdown and restart the OBOS and specific applications, back up procedures, and actions to be taken when a service does not stop or start.
416	The System Administration Manual shall provide detailed processes and procedures for monitoring, maintaining, and renewing all licenses to ensure uninterrupted OBOS usage, avoiding any disruptions due to expired licenses.
417	The System Administration Manual shall include a complete System Configuration Table and all related policies.
418	The Contractor shall keep the System Administration Manual current and shall provide updated versions of the System Administration Manual to the Authority for Approval no later than thirty (30) Calendar Days of any material change, or as requested by the Authority.

6 Transition, Data Migration and Testing

6.1 Data Migration and Verification

Data Migration is the process of duplicating all necessary data from the TOBS into the OBOS. In support of the migration, an interim database consisting of all TOBS Transaction data will be made available to the Contractor. The Contractor shall be responsible for the complete and accurate migration of data from the interim database to OBOS. The details of the interim database and its use is described in Appendix M.

Req. #	Requirement
419	Data migration consists of copying Transactional data and any necessary associated data from the interim database to the OBOS prior to OBOS going live. For each Transaction, this shall include: • UFM data • Additional RTCS Information (e.g., vehicle characteristics) • License plate images (if applicable) • CCSS Amendments • Data exchanged with Collections (if applicable) • Registration Stop and Release data (if applicable)
420	The Contractor shall provide a Data Migration Plan that describes the complete transition/data migration approach and process in accordance with the Approved, Baseline Project Schedule. The Data Migration Plan shall be submitted to the Authority for review and Approval no later than one hundred and twenty (120) days from NTP. The Data Migration Plan shall include: • Data migration approach and process • An appropriate roll-back scenario • Data conversions (as necessary) and mapping of fields migrated from the interim database to OBOS. • A data validation and verification process • Validation that the OBOS can process and report on migrated data consistent with new OBOS data
421	The Contractor shall work with THEA in the development of a roll-back scenario.
422	Given the significant amount of data to be transferred from the interim database to the OBOS, the Contractor shall develop the database tables and fields required to accept the data and start the migration process no later than six (6) months after NTP.
423	The Contractor shall be responsible for all activities and staffing related to the seamless migration of data from the interim database to the OBOS.
424	The Contractor shall accurately migrate data into the OBOS, validate the migration, and ensure that the OBOS will properly process/access the legacy Transaction data.
425	The Contractor shall ensure no data is lost during data migration and shall provide the results from data migration verification to the Authority for review and Approval.
426	The Contractor shall coordinate with the Authority and the legacy TOBS vendor, as required.
427	To ensure the migration process is properly designed, the Contractor shall identify a representative sample of test Transactions that span a period of time that represent changes in the status of the Transaction, for the Authority's verification and Approval, that were entered into TOBS from the roadside system. The sample set shall represent as many

Req. #	Requirement
	processing variations as reasonable. The sample set of Transactions shall be migrated by the Contractor and verified by the Authority prior to the start of a full migration
428	Upon the Authority's Approval, the Contractor shall clear all test Transactions and proceed to migrate all Transactional data from the interim database. All Transactional data from the current Fiscal year plus the previous five (5) Fiscal years shall be migrated.
429	The Contractor shall halt the migration process after each year of migration for verification by the Contractor.
430	The Contractor shall be responsible for the fidelity of the data in OBOS and shall rollback previous migration efforts and restart the migration process from the beginning if errors are found, based on the discretion of the Authority.
431	The Contractor shall provide a report detailing the results from the data migration to the Authority for review and Approval. The report shall include a visual representation of Transactions in both databases as well as a comparison of Transaction data between the two systems using summary queries that access Transaction details.

6.2 Transition/Go-Live

Transition is the process of transferring the operation, System, and all necessary data from TOBS to the OBOS for a seamless transition to the OBOS as the production System.

Req. #	Requirement
432	The Contractor shall provide a Transition Plan that describes the complete transition approach and process in accordance with the Approved, Baseline Project Schedule. This Plan shall include checkpoints and a roll-back scenario that has been coordinated with the legacy TOBS contractor. The Transition Plan shall be provided along with the SDD and shall be finalized to achieve Authority Approval no later than one hundred and twenty (120) Calendar Days prior to schedule Go-Live.
433	The Contractor shall be responsible for all activities and staffing related to the seamless transition of operations from the TOBS to the OBOS.
434	The Contractor shall coordinate with the Authority and the legacy TOBS vendor as well as the legacy roadside vendor, as required.
435	The Contractor shall correlate its Transition Approach with the outline provided in Appendix G – OBOS Go-Live Overview.
435.1	The Contractor shall achieve Go-Live when all the following have been completed: • All development necessary for the Contractor's OBOS and the Legacy OBOS has been completed and the OBOS has passed all Testing required prior to the OBOS Go-Live. • Go-Live Test scripts and Test Plans have been completed and Approved by the Authority. • All Documentation required to be completed before OBOS Go-Live has been Approved by the Authority. • The Contractor has completed and received the Authority's approval of all Deliverables, Formal Test and milestones required prior to Go-Live. • All required training Documentation has been completed and Approved by the Authority, and the Authority staff have been trained on the new OBOS.

Req. #	Requirement
	• The OBOS, and all associated System/subsystems, are complete and operational, and the OBOS is accessible by all Users as identified by the Authority. • The Authority has Approved the OBOS Transition Plan. • All Transactional data up to the point of the Go-Live date has been migrated from the TOBS to the Primary OBOS Production Database. • The Authority's Approval of Contractor Documentation certifying complete and accurate data migration • The Authority has provided the Contractor Approval to initiate the Transition Plan and Go-Live with the new OBOS. • The Contractor, in coordination with the Authority, has coordinated with and informed all external, interfacing entities ahead of the Go-Live date to ensure they are ready for the Authority's transition to the new OBOS. • The Contractor has successful cut-over in accordance with the Authority Approved Transition/Data Migration Plan
436	The Authority anticipates that the OBOS will be operational prior to the installation of a new RTCS; however, the Contractor shall plan for and support transition in the event that the new RTCS lanes are installed before Go-Live of the OBOS. In this scenario, the RTCS lanes will have been transmitting Transactional data to TOBS. This data will be included in the TOBS migration data. The OBOS Contractor will need to have completed the RTCS-OBOS interface testing, in addition to all other prerequisite Requirements for Go-Live.

6.3 Testing

Compliance with OBOS Requirements will be verified through design reviews and a well-defined testing regimen consisting of Formal Tests and informal demonstrations. Formal Tests are supported by detailed test plans comprised of scripts, procedures, inputs, and expected results. Formal Test plans in conjunction with an updated RTM shall identify which of the System Requirements are to be verified with each Formal Test. Informal demonstrations are meant to ensure that the OBOS functions being developed are consistent with the Authority's expectations. Unlike Formal Tests, there is no required Test Plan or pass/fail associated with informal demonstrations.

6.3.1 Master Test Plan

The Master Test Plan describes all tests to be performed to provide the Authority with assurance that the OBOS is operating as required.

Req. #	Requirement
437	The Contractor shall provide for the Authority's review and Approval of a Master Test Plan describing in detail the key features of the testing program. The Master Test Plan shall be submitted to the Authority for review and Approval no later than ninety (90) Calendar Days from NTP.
438	The Master Test Plan shall address, the following for each individual Formal Test: • Testing approach • Test schedule • Duration of test • Collection of data to be tested

	• The range of scenarios to be tested • Test tools • Test responsibilities • System configuration for test • Collection of the results of test data Environments • Sampling methods • Required conditions • Testing locations • Test results reporting detail • Test punch list defects severity and Priority level descriptions • Details on how punch list defects will be triaged, tracked, resolved and retested • Tools used to document defects • Procedures for tracking and documenting and retesting failed test steps, including regression testing • Regression testing procedures that will be followed each time a Software change is made after SAT Approval • Any dependencies including reliance on and readiness of third parties • The criteria for test entry and exit • Definitions of a successful test • User access and permissions • Definition of the range of variables that shall be part of each Formal Test to ensure full exercising of transaction processing activities, transaction types, interface messages, User interactions and error conditions.
439	The tests defined in the Master Test Plan shall encompass the exercising of all functions and processes including lifecycle Transaction processing, reports, User interfaces, etc.
440	The Master Test Plan shall include the Requirements Traceability Matrix and indicate in which test the requirement will be validated.

6.3.2 General Testing Requirements

Req. #	Requirement
441	The Contractor is responsible for planning, documenting, and conducting a comprehensive test program that demonstrates the OBOS meets all the Requirements of the Scope of Work.
442	The Contractor shall be responsible for all aspects of testing including conducting the tests, collecting the data, analyzing the data, and for all personnel, materials, facilities, and expenses associated with the testing program.
443	The Contractor shall be responsible for the completion of all required internal testing (e.g. unit testing, regression testing, dry run testing, etc.), and development of testing and defect tracking reports to be submitted regularly (e.g. weekly or bi-weekly) ahead of Formal Tests for the Authority's review. The Contractor shall coordinate with the Authority on the development of a Submittal schedule prior to each Formal Test, and the Contractor shall begin regular submissions to the Authority at least one (1) month prior to the execution of each Formal Test.
444	The Contractor shall conduct a dry run of all test procedures for each Formal Test, record the results and submit them to the Authority for review at least five (5) Business Days prior to each Formal Test.

Req. #	Requirement
445	The Contractor shall allow for the Authority's participation and witnessing of all testing.
446	The Contractor shall be responsible for coordinating with third parties, including but not limited to owners/operators of external systems (RTCS, TOBS, CCSS, Collections and FLHSMV) for data setup, dates and times of testing, and testing prep logistics.
447	For each Formal test, the Contractor shall develop test plans, cases and procedures/scripts that emulate various conditions and scenarios that could occur in the operation of the System to verify the OBOS functionality and its ability to handle such conditions and scenarios. Negative testing scenarios shall also be conducted.
448	The Contractor shall submit the individual test plans and associated test scripts for each Formal Test to the Authority for review and approval no later than sixty (60) Calendar Days prior to scheduled testing for the related test.
449	The test scripts shall contain a step-by-step logical testing process with the purpose of demonstrating a pass-fail acceptance for the item being tested. All testing shall follow the Authority Approved test scripts.
450	The Contractor shall coordinate with the Authority to set a Priority level for each issue and punch list item identified during each test. The Contractor shall be responsible for correcting and retesting high-priority items for the Authority's approval before an individual test can be completed and Approved.
451	The Contractor shall coordinate with the Authority to develop a retesting schedule for lower priority items. If Approved by the Authority, items of lower priority may be retested or rolled into a future test phase.
452	During Formal Tests, the Contractor shall submit daily progress reports that contain the following: • Total test cases executed. • Total test cases closed (% complete) • Total defects opened. • Total defects closed. • Remaining open defects by priority.
453	At the completion of each test, the Contractor shall submit to the Authority for review and Approval within two weeks of test completion, a comprehensive report detailing the results of all tests and any corrective actions required with specific timeframes for completion.
453.1	At a minimum, comprehensive test reports shall describe and include the following: • Test phase (e.g., FAT, UAT, EIT, etc.) • Description of the testing process • Results of the test, including results of each script (e.g. documenting expected vs actual result) • Attach a copy of the completed test script forms (e.g. actual test results from the Contractor documenting results of testing) • Screens and/or reports to document the success or failure of tests/test scripts. • Modifications made to test scripts during the test • List of items that need to be completed to formally pass the test • Listing of all defects/issues identified together with the severity level of each defect. • Plan and schedule for resolving defects. • Recommendation for addressing issues discovered during testing and for retests (if appropriate)

Req. #	Requirement
	Note: Final Requirements for comprehensive test reports shall be finalized during the Design Phase of Project prior to approval of the Master Test Plan.
454	The Authority shall have the right to stop or suspend any test for any performance issues, at the Authority's discretion, and the decision to resume or restart the test shall reside solely with the Authority.
455	With each Formal Test Plan, the Contractor shall submit an updated Requirements Traceability Matrix indicating which Requirements are to be tested with a cross reference to the scripts in which they are tested.
456	The Contractor shall clearly document in the RTM any Requirements that will not be tested and the reason for their exclusion subject to the Authority's review and Approval.
457	The Contractor shall accommodate reasonable ad hoc testing as required by the Authority. Ad hoc tests may be added before or during actual testing.
458	The Contractor shall submit proposed dates of Formal Tests to the Authority for review and Approval. The Contractor shall coordinate with the Authority to schedule tests so that Authority staff, consultants and partners may observe and/or participate in all testing.
459	The Contractor shall collaborate with the Authority to determine a priority level for each item that does not pass testing.
460	The Contractor shall pass all tests in accordance with established pass-fail criteria.
461	The Authority at its own discretion, may choose to allow the Contractor to place specific test items on a punch list and allow the Contractor to receive Approval from the Authority for the Formal Test with the punch-listed test elements being completed within a timeframe identified by the Authority.
462	A Test shall not be considered passed until all exit criteria, as documented within the Master Test Plan, have been met and all testing required in each individual, Formal Test plan, has passed. Exit criteria for each Formal Test shall be documented within and Approved with the Master Test Plan and individual, Formal Test plans. Exit criteria shall include but not limited to: • All planned testing has been completed successfully • All retesting is completed successfully except for tests the Authority agrees can be completed at a later phase • All punch list items are fixed and tested, except for those the Authority agrees can be completed at a later phase • The test report has been Approved by the Authority
463	The Authority, in its sole discretion, shall have the final determination whether the Contractor's System meets the exit criteria of, and passes each, Formal Test.

6.3.3 Informal Demonstrations

To ensure that the System is progressing in accordance with the Authority's vision, the Contractor shall demonstrate various functionality to the Authority during the development process. These demonstrations will require a documented agenda but will not require a pass/fail criteria.

Req. #	Requirement
464	The Contractor shall submit a Plan of intended demonstrations for review by the Authority. All demonstrations shall be included in the Approved, Baseline Project Schedule.

Req. #	Requirement
465	The required informational demonstrations will include the following:
465.1	• UFM creation – Using simulated Transactions, demonstrate the formation of UFMs for a minimum of ten (10) ETC and ten (10) IBT Transactions.
465.2	• ETC Transaction – Using the UFMs and the CCSS test system, demonstrate the exchange of data for ten (10) ETC Transactions including storage of the Amendments.
465.3	• IBT Transactions – Using the ten UFMs, stock images and the CCSS test system, demonstrate the exchange of data including license plate numbers, storage of the Amendments and retrieval of images by the CCSS.
465.4	• Collections Interface – Using data from one of the above Transactions, demonstrate the exchange of data required by the Collections vendor to generate collection notices.
465.5	• Dashboard – Using simulated messages, demonstrate the presentation of the real time and historical information such as ETC and IBT, prior day to current day Transactions.
465.6	• Reports – Using migrated data demonstrate the creation of: ○ Traffic and Revenue General Report ○ Traffic and Revenue Analytical Report ○ Transaction Research Report (with drill down)
465.7	• User Access – Demonstrate the creation of two (2) System Users with passwords and various access rights.
465.8	The Contractor shall document all Authority comments and trace their resolution through the System Design.
465.9	The Contractor shall coordinate the demonstrations with the outside parties, including appropriate account setup such as coordinating with the CCSS to ensure there is an ETC account in the test system that has the characteristics needed for the demonstration.

6.3.4 Formal Testing

The Contractor shall conduct the following Formal Tests in the sequence indicated below. These include:

(1) External Interface Tests (Data Exchange)
(2) OBOS Factory Acceptance Test (FAT)
(3) Operational Readiness and User Acceptance Test
(4) Security and Network Penetration Test
(5) Disaster Recovery Test
(6) Go-Live Test
(7) RTCS Integration Test
(8) Toll Site Commissioning Tests (ICT)
(9) System Acceptance Test (SAT)

The OBOS SAT may occur after the RTCS OSIT or after the RTCS ICT depending on the roadside installation schedule. All other tests shall be completed prior to the OBOS SAT.

The test sequence indicated assumes the OBOS will be ready prior to the new RTCS going live. If this is not the case, the testing sequence will need to be adjusted as Approved by the Authority prior to the start of OBOS testing.

6.3.4.1 External Interface Tests

The purpose of these tests is to ensure that the OBOS will interface properly with the defined external entities required for Go-Live. These tests are run with the test systems of the external interfaces and are not end-to-end but are intended to ensure correct data transfer and error handling. The External Interface Test with each entity is independent of the test performed with the other entities.

Req. #	Requirement
466	The External Interface Test (EIT) shall verify the correct data exchange and processing for each OBOS interface (TOBS, CCSS, Collections, FLHSMV) using simulated data and the entity's test system.
467	The EIT shall require the Contractor to work iteratively and cooperatively with each of the OBOS interfaces to coordinate testing and ensure that enough test accounts are established to adequately, and independently verify the correct operation of each external interface.
468	THE EIT shall include a representative sample of scenarios including negative test scenarios for each interface type to fully exercise the System. All sample scenarios shall be submitted to the Authority for review and Approval.
469	The EIT shall utilize the external entities' test environment and the Master Test Plan shall include the responsibilities of each party in conducting the test and in the establishment and verification of data. To this end, the EIT Plans shall be shared with the external entities as soon as possible.
470	CCSS Interface – Verify accepted and rejected transmission and data content of the following: • UFM messages • Inbound Amendments • Outbound Amendments including fare adjustments • Get Demographics • Get Image • File Transfers including POSI Lists and Transaction Recall
471	Collections/ FLHSMV Interface – Verify accepted and rejected transmission and data content of the following: • Transaction messages • Demographics messages • Get Image • Amendments • Transaction Recall • Reconciliations • Collections Stop/Release requests • DMV Stop/Release requests • DMV Stop/Release acknowledge • Collections Stop/Release acknowledge

Req. #	Requirement
472	TOBS Interface – Verify accepted and rejected transmission and data content of the following: • Transactions • Plate #s • Images • POSI List
473	Test Duration – The EIT shall be conducted over a period that allows the full exercising and validation of each interface.
474	Exit Criteria – The EIT shall pass testing when all the required testing of the specified interfaces has been successfully completed and all exit criteria, as documented in the Master Test Plan and EIT Test Plan have been met.

6.3.4.2 OBOS Factory Acceptance Test (FAT)

The OBOS FAT will test the interactive functions of the OBOS including the supporting GUI and VPN functionality.

Req. #	Requirement
475	Using migrated and simulated data, the OBOS FAT shall verify the acceptable operation of the following:

475.1	• Users
	  ○ Create Users
	  ○ Create Name and Password
	  ○ Password reset
	  ○ Access and Permissions
	  ○ Termination
	  ○ E-mail
	  ○ Notifications

475.2	• Dashboards – Verify creation and control of all required Dashboard indicators including but not limited to:
	  ○ System Health
	  ○ Traffic
	  ○ Revenue
	  ○ Alarms
	  ○ Performance

475.3	• Reports – Verify the creation and correct relationships of all reports specified in Appendix I- Reports and Dashboards:
	  ○ Lane Data
	  ○ Traffic Congestion
	  ○ Potential Revenue Loss
	  ○ State of CBO transactions
	  ○ CBO Amendments
	  ○ File Transfer Historical Record
	  ○ Collections Status
	  ○ Registration Stop Report
	  ○ Interface Report

Req. #	Requirement
	○ Discount Program ○ Waterfall ○ Expected Revenue ○ Maintenance Issues ○ System Access ○ User Activity
475.4	• Fare Table – Verify the ability to load and activate Fare Tables per Appendix B – RTCS-OBOS ICD Overview v4.0.
475.5	• Commands and Functions – Verify the operation of the following: ○ Manual recall transactions from CCSS and Collections ○ Manual Fare adjustment at CCSS ○ Manual convert of ETC Transaction to IBT Transaction
475.6	• GUI – Confirm the following with the Design Requirements: ○ GUI presentation and colors ○ Hover-text feedback ○ On-line help ○ Dropdown menus ○ Browser Support ○ User configurable windows and content default screens
475.7	• Alerts – See Section 7.~~1~~2.1 - Alerts
475.8	• VPN Access – Verify that only Users with proper VPN software and credentials can access the System.
475.9	• Discount Program – Verify the operation of all functionality related to the Discount Program as specified in Appendix F – MacDill Discount Program, including: ○ Add/remove members (including eligibility requirements) ○ Adjust member trips and credits ○ Activate/deactivate program ○ Application of the discount rules to adjust an account balance. ○ Financial impact reporting
475.10	• Test Duration – The OBOS FAT shall be conducted with end-to-end verification of at least fifty (50) transactions, together representing but not limited to the following transaction types: ○ Valid Florida ETC ○ Valid Florida ITOL ○ Florida Invoiced ○ Florida Collections ○ DMV Stop/Release ○ Valid Interoperable Agency ETC ○ Valid Interoperable Agency IBT ○ Invalid Interoperable Agency ETC ○ Invalid Interoperable Agency IBT ○ Invalid ETC ○ Converted ETC to IBT ○ Delayed Transactions due to communications failure

Req. #	Requirement
475.11	Exit Criteria – The FAT shall pass testing when all of the required testing of the specified functions have been successfully completed and all exit criteria, as documented in the Master Test Plan and FAT Test Plan have been met.

6.3.4.3 Operational Readiness and User Acceptance Test

The Operational Readiness Test (ORT) and User Acceptance Test (UAT) are the most significant test in the Project as the result of a successful test is a fully functional OBOS using the TOBS as a conduit for roadside Transactions (Stage 1). The ORT and UAT will be run using the test systems of the external entities and will utilize actual Transactions from the production TOBS. The ORT and UAT will be run in the Test Environment so as not to connect to the future Production Database to which past Transactions have been migrated. The Test Environment shall be set to contain a copy of the migrated database. The ORT and UAT will accomplish a degree of parallel testing as it will allow the comparison of production TOBS processing to OBOS processing via test interfaces.

Req. #	Requirement
476	ORT and UAT shall commence only after successful completion of the FAT.
477	The ORT and UAT shall prove that the OBOS and the Authority operations are ready for production and Go-Live.
478	The ORT and UAT shall exercise all OBOS functionality and shall be a comprehensive and exhaustive test prior to Go-Live.
479	The ORT and UAT shall be conducted utilizing actual Transactions from the legacy roadside system.
480	The first part of the ORT and UAT shall involve establishing a set number of test accounts that exist in the test CCSS. The Contractor is responsible for coordinating with the CCSS to ensure the CCSS test system has the accounts properly set up. Test account activity shall be defined in the Test Plan.
481	The ORT and UAT shall require end-to-end Transaction processing utilizing the test Environments of the CCSS, Collections, and FLHSMV external entities.
482	To the extent possible, the ORT and UAT shall compare the data from TOBS and test OBOS to verify the correct operation of all OBOS functions including, but not limited to, end-to-end Transaction processing, Dashboards, and reports (parallel test).
483	The second part of the ORT and UAT shall utilize all Transactions generated by TOBS for a period as agreed to between the Contractor and the Authority. This test shall compare overall transaction volume as well as selected actual Transactions processed by TOBS to those same Transactions processed by the test OBOS and the test interfaces. This shall be a statistical analysis as an exact match in all cases is not expected.
484	The ORT and UAT shall include provisions for Ad-Hoc testing under the direction of the Authority.
485	The ORT and UAT shall require the Contractor to work iteratively and cooperatively with the CCSS, Collections and FLHSMV to coordinate testing and ensure that enough test accounts are established to adequately, and independently verify the correct operation of each external interface.
486	The Authority staff shall participate in the ORT and UAT by exercising all interactive functions including screens, Dashboards, reports, User access, etc.

Req. #	Requirement
487	The ORT and UAT shall include OBOS load/volume stress testing at a rate of 1,000 UFM Transactions per minute for 24 hours. This test shall include simulated Transactions generated by the Contractor to the test OBOS and the transmission of Transactions from the Test Environment of OBOS to the Test Environment of CCSS as well as ack/nak response from the CCSS. The required performance pass criteria of this test shall be 100% of the stated volume requirement.
488	Exit Criteria – The ORT and UAT shall pass testing when all the required end-to-end testing, reporting, and all other functions and exit criteria defined in the Master Test Plan and ORT and UAT Plan have been successfully completed.

6.3.4.4 Security and Network Penetration Test

The purpose of the Security and Network Penetration Test is to ensure that the OBOS is secure from external threats prior to Go-Live. The test shall ensure compliance with NIST standards for external threats.

Req. #	Requirement
489	The Security and Network Penetration Test (SPT) shall be conducted prior to Go-Live.
490	The SPT shall ensure data and functionality are maintained as intended by identifying any potential flaws in the security mechanisms of the System platform.
491	The SPT shall verify that all security Requirements have been implemented.
492	The SPT shall identify and test for:
492.1	• Common Vulnerabilities & Exposures (CVE)
492.2	• Open Worldwide Application Security Project (OWASP) Top 10 Web Application Security Risks
492.3	• Penetration Testing Execution Standard (PTES)
492.4	• Compliance with NIST standards
492.5	• Test Duration – There is no defined duration for this test.
492.6	Exit Criteria – The SPT shall pass testing when all of the identified vulnerabilities in the Test Plan have been successfully completed and all exit criteria, as documented in the Master Test Plan and SPT Test Plan have been met.

6.3.4.5 Disaster Recovery Test

The Disaster Recovery Test (DRT) shall ensure that the OBOS can be returned to a fully operational state in the event of a catastrophic failure of the production OBOS.

Req. #	Requirement
493	The DRT shall be conducted after the SPT and prior to Go-Live.

Req. #	Requirement
494	The DRT shall be initiated manually following a simulated "disaster" on the OBOS. The simulated disaster shall be defined in the test plan. The DRT Plan shall include: • Method of switch over to and back from the DR site including IP addresses • Duration of DR test • Type of failure(s) to be simulated. • Expected deviations due to injected failure and use of test systems. • Coordination with external interfaces including CCSS and Collections • Method of evaluating results
495	The DRT shall include: • RPO and RTO result and proposed cure if not within specs. • Testing of end-to-end transaction processing and selected functions of OBOS • Discount Plan validation • Data integrity validation • Performance Testing • Recovery of the test OBOS • Resumption of data replication
496	The Contractor shall prepare and perform periodic tests of its Disaster Recovery Plan, at a minimum once every year, on or about the anniversary date of the OBOS Go-Live. These tests shall be coordinated with the Authority.
497	The Authority staff shall be provided complete access to observe all Disaster Recovery Test activities.
498	After any DR event or test is concluded, the Contractor shall document lessons learned and update the Disaster Recovery Plan in accordance with those lessons and submit it for the Authority's review and Approval no later than thirty (30) Calendar Days after completion of the DR event.
499	Test Duration – The DRT shall run for at least three (3) Calendar Days with live TOBS transactions to ensure sufficient exercising of the System.
500	Exit Criteria – The DRT shall pass testing when the performance validation, all identified functions, recovery of the Primary OBOS, resumption of the DR System have been successfully completed, and all exit criteria, as documented in the Master Test Plan and DRT Test Plan have been met.

6.3.4.6 Go-Live Test

The Go-Live Test is a verification of OBOS functionality starting immediately upon OBOS Go-Live. The test will require verification of normal operations as well as detailed scrutiny of Transaction processing and performance.

Req. #	Requirement
501	The Go-Live Test (GLT) shall begin when all the following steps have been completed as summarized in Appendix G - OBOS Go-Live Overview.
501.1	• The OBOS has been connected to the CCSS, Collections and Florida FLHSMV production Systems using live data and replacing TOBS as the System of record.
501.2	• All functions and external interfaces shall have been tested and verified via the ORT and UAT.

Req. #	Requirement
501.3	• All Transactional data up to the point of the Go-Live date has been migrated from the TOBS to the Primary OBOS Production Database.
502	The GLT shall commence immediately upon the Primary OBOS becoming the production System.
503	The GLT shall require extensive end-to-end Transaction monitoring with the CCSS, Collections, and FLHSMV external entities using live data.
504	As the transition to OBOS will occur at 12:00 am (midnight) ET all stakeholders should be represented by individuals on-line or on-site with responsibilities as defined in the Master Test Plan and access to the OBOS for verification of correct operation.
505	Test Duration – The GLT shall be conducted over a period of three (3) months and include full exercising and evaluation of all OBOS functions and transaction processing scenarios.
506	Exit Criteria – The GLT shall pass testing when all punch list items accumulated during the test have been corrected or dismissed as Approved by the Authority and all exit criteria, as documented in the Master Test Plan and GLT Test Plan have been met.

6.3.4.7 RTCS Integration Tests

This test shall utilize the test systems of the OBOS external entities. The RTCS Integration Test (RIT) is meant to verify that Transactions from the RTCS are received in real time and translated by the OBOS into a form compatible with UFM production as well as Dashboard and report generation.

Req. #	***Requirement***
507	RTCS FAT support – During this test and at a point selected by the roadside contractor, the OBOS Contractor shall participate, configure and operate the Test OBOS to support the RTCS FAT which will be run at a test site with actual vehicles.
508	The Contractor shall identify minimum bandwidth requirements for the ISP in the case of an edge solution.
509	The Contractor shall test the OBOS with simulated messages generated by the RTCS and the OBOS. Messages shall include: • ETC transactions • IBT transactions • Images request • Image response • ~~Video request~~ • ~~Video response~~ • Reconciliation Request • Reconciliation Response • Invalid messages The quantities of the above messages will be established by the RTCS and OBOS Contractors.
510	Each API message shall be analyzed for correct content and request/ACK response.
511	The RIT shall include OBOS load/volume stress testing at a rate of 1,000 Transactions per minute for 24 hours. This test shall support simulated Transactions from the RTCS to the test OBOS and the transmission of Transactions from the test OBOS to the test CCSS.
512	RTCS FAT support – This test shall include a limited set of end-to-end Transactions of actual vehicles, selected in cooperation with the RTCS contractor, using the RTCS test site. The test shall include the following functions at a minimum:

Req. #	*Requirement*
	• ETC transaction • IBT transaction • Image request • Image response • ~~Video request~~ • ~~Video response~~ The quantities of the above messages will be established by the RTCS and OBOS Contractors.
513	Test Duration – There is no defined duration for this test.
514	Exit Criteria – The RIT shall pass testing when all of the required testing of the specified functions have been successfully completed, and all exit criteria, as documented in the Master Test Plan and RIT Plan have been met.

6.3.4.8 Toll Site Commissioning Test (TSCT)

The purpose of the Toll Site Commissioning Test (TSCT) is to verify the OBOS compatibility with the new RTCS in a production environment and to determine that the Transactions from each RTCS gantry, as they go live, are being properly received and processed by the OBOS.

The TSCT applies to the installation of each new RTCS tolling point and will consist of two parts from an OBOS perspective:

1) Detection but not processing of actual vehicles on the roadway.
2) Fully operational RTCS with end-to-end processing of site transactions.

Req. #	**Requirement**
515	The Contractor's preparation and performance of the TSCT shall be done as a cooperative effort with the RTCS Contractor.
516	The TSCT shall begin when the first RTCS gantry is put into service and connected to the OBOS.
517	The TSCT shall be performed with the Primary OBOS production System already in use and shall process tolls from actual expressway traffic.
518	Following the installation and prior to the live operation of the RTCS gantry, the RTCS shall send live traffic transactions to the Primary (production) OBOS as a final verification of connectivity and messaging. These transactions shall have a Type of "TEST", out-of-range transaction IDs, be stored separately from actual transactions, and shall not be further processed by the OBOS.
519	Upon verification operation with test transactions, and at the RTCS Contractor's discretion, the existing tolling site will be shut down and the new RTCS site will begin sending live transactions to the OBOS for production processing.
520	Live transaction TSCT shall be conducted using actual traffic. The volume of transactions to be tested at this point shall be determined in the test plan.
521	The OBOS shall continue to utilize the TOBS for the recently transitioned tolling site to retrieve plate numbers and images to fully process the most recent transactions that were sent to the OBOS from the legacy gantry prior to the switch to the new RTCS.
522	The TSCT shall verify the correct end-to-end Transaction processing of OBOS with RTCS Transactions. The TSCT shall utilize reports and Dashboards as part of this test.
523	Test Duration – The TSCT shall be conducted for a duration agreed upon with the RTCS Contractor and long enough to achieve a consensus of confidence among all stakeholders that

Req. #	Requirement
	the integration of the new site is operating correctly. This shall be done for each installed tolling site.
524	Exit Criteria – The TSCT shall pass testing when all of the required testing of the specified functions have been successfully completed and all exit criteria, as documented in the Master Test Plan and TSCT Test Plan have been met. The TSCT for each installation must pass before the next tolling site is put into Production

6.3.4.9 System Acceptance Test

The System Acceptance Test (SAT) is the final test of the OBOS in which all OBOS functionality and performance is tested. The SAT may commence thirty (30) Calendar Days after the first TSCT passes.

Req. #	Requirement
525	During the SAT, the OBOS shall be fully operational and utilizing the RTCS from at least one fully tested RTCS installation.
526	The criteria required for the OBOS to pass the SAT shall include:
526.1	• THE OBOS is functioning as required for at least two full calendar months and all open items have been resolved with sufficient time for verification.
526.2	• All KPIs have been met or exceeded for at least two full consecutive calendar months.
526.3	• All information available from the OBOS via reports, User screens and Dashboards is accurate and complete.
526.4	• All User interfaces are operating in accordance with Requirements and specifications.
527	Verification – The System Acceptance Test Plan shall address the method and time duration in which the above bulleted items shall be verified.
528	Test Duration – The System Acceptance Test (SAT) shall include at least two full calendar months.
529	Exit Criteria – The SAT shall pass testing when all punch list items accumulated during the test have been corrected or dismissed as Approved by the Authority and all exit criteria, as documented in the Master Test Plan and SAT Plan have been met.

7 Maintenance Requirements

During the Operations and Maintenance Phase of the Contract, the Contractor is wholly responsible for the Software, Hardware, and staff necessary to ensure the OBOS is fully operational and functional.

7.1 General Maintenance

Req. #	Requirement
530	The Contractor shall provide, for the Authority's review and Approval, a comprehensive Maintenance Plan detailing the Contractor's approach and methodology to ensure the on-going OBOS operations, and performance in compliance with the Requirements. The Maintenance Plan shall be submitted for review and Approval no later than ninety (90) Calendar Days prior to Go-Live.
531	The Maintenance Plan shall describe the Contractor's approach to the replacement and resolution of any issues related to obsolescence, end of life or end of service Hardware and/or Software components of the System, including procurement lead times, THEA approvals, appropriate testing, scheduled rollouts and rollbacks if necessary.
532	The Contractor shall be wholly responsible for designing and maintaining the OBOS in a manner that ensures it is fully operational and functional twenty-four (24) hours per day, seven (7) days a week and three hundred and sixty five (365) days a year excluding Approved Maintenance.
533	The Contractor shall include OBOS Maintenance and Software/Hardware support services, including but not limited to the following:
533.1	• Real time, on-going System monitoring
533.2	• Alert tracking and notification
533.3	• Maintenance history tracking
533.4	• Preventative Maintenance
533.5	• Predictive Maintenance
533.6	• Corrective Maintenance
533.7	• Emergency Maintenance Services
533.8	• Updates, upgrades and patches
533.9	• Warranty and Software license Maintenance
534	Any OBOS Maintenance that may cause the OBOS or any portion thereof to be down or unavailable to Users shall be submitted to the Authority for review and Approval at least ten (10) Calendar Days in advance of the requested maintenance with the exception of emergency Maintenance. This request shall include the following: • Date of Maintenance • Start and End time of Maintenance • Specific Reason for Maintenance • Affected functionality • Any testing that may be required as a result of the Maintenance
535	Any failures and/or System unavailability associated with not completing scheduled Maintenance within the Approved Schedule Maintenance Period shall be included in the calculation of compliance/non-compliance with Key Performance Indicators as detailed in Appendix J - Key Performance Indicators. Such failures shall be accounted for based on priority level and shall be addressed in accordance with these Requirements.

Req. #	Requirement
536	The Contractor shall supply all Software, licenses, contractual services, and appropriate staff necessary to maintain the OBOS in accordance with the Requirements.
537	The Contractor shall ensure the OBOS does not demonstrate degraded performance. Examples of degraded OBOS performance include but are not limited to, loss of functionality, System slowdown, and System or application errors.
538	The Contractor shall provide Help Desk Support, via phone and email, to Users during the Authority business hours within 30 minutes of the request. Help Desk Support is provided to assist Users with the operation of the OBOS. This is not to be confused with Maintenance issues reported by the Users.
539	The Contractor shall obtain the Authority's Approval for the scheduling of emergency Maintenance/corrective actions, as needed.
540	The Contractor shall notify any external entities that may be affected by the Maintenance activity after obtaining Approval by the Authority.
541	The Contractor shall perform all OBOS maintenance in a safe, secure, efficient and timely manner while minimizing OBOS downtime.
542	Except for emergency Maintenance, the Contractor shall obtain approval from THEA for all maintenance windows. In general, Maintenance windows should be scheduled between 8 pm and 4 am.
543	The Contractor shall notify the Authority of any unplanned downtime or degraded performance immediately upon becoming aware of the OBOS being unavailable, or the need to make the OBOS unavailable. The Contractor shall obtain the Authority's approval for all communication with external entities.
544	The Contractor shall take appropriate action to correct all OBOS failure conditions.
545	The Contractor shall provide an incident report for each unexpected service disruption. This report shall be provided to the Authority no later than two (2) Business Days of the resolution of the issue. The incident report, at a minimum, shall include the following: • Detailed description of the event • Root Cause • Consequences and impacts • Duration (start and end time) • Details of lost data, if any • Recovery/ Resolution • Lessons Learned - How to prevent the re-occurrence of this issue
546	The Contractor shall be responsible for monitoring, maintaining, and renewing all licenses to ensure uninterrupted OBOS usage, avoiding any disruptions due to expired licenses.

7.2 System Monitoring

Req. #	Requirement
547	The OBOS shall include a Maintenance and monitoring module and ticket system which is the repository of all Maintenance activity and Alerts which can be viewed by Users. This shall monitor Production and Disaster Recovery Systems.
548	The Contractor shall provide authorized Authority staff access to the Maintenance ticket system to log issues and document System problems encountered, review the status of open tickets and research past tickets.

Req. #	Requirement
549	The System shall automatically detect, track, report and store all OBOS Maintenance and Maintenance issues.
550	The OBOS shall include network monitoring Software to monitor the network status and communications.
551	Simple Network Management Protocol (SNMP) shall be disabled by default on all network devices within the OBOS network environment, including routers, switches, firewalls, and other network infrastructure components.
552	If SNMP is required for network management tasks, it shall only be enabled with secure settings and configurations, including the use of SNMPv3 or higher versions with strong authentication and encryption mechanisms.
553	Access Control lists (ACLs) shall be implemented to restrict SNMP access to authorized management systems or entities within the segregated network, based on IP address, subnet, or other criteria as specified by network administrators.
554	Default SNMP community strings or passwords shall be replaced with unique and strong values (a random string of at least 12 characters, including uppercase letters, numbers, and special characters) to prevent unauthorized access to SNMP-enabled devices within the OBOS network.
555	Upon start-up or initialization, the OBOS shall perform a self-diagnostic test to ensure full and complete operation of all OBOS functionality. Alerts shall be reported for all failure conditions.
556	The Contractor shall establish an ongoing process to monitor, measure, calculate, and report compliance with Key Performance Indicators.
557	The Contractor shall monitor the OBOS performance in terms of latency and throughput using appropriate tools and techniques to identify any performance bottlenecks or issues.
558	The Contractor shall develop a process for identifying and classifying newly discovered network assets based on their characteristics and attributes.
559	The Contractor shall implement anomaly detection mechanisms to identify unusual or unexpected behavior on the network that may indicate the presence of a new asset.
560	The Contractor shall establish baseline profiles for normal network activity and alert on deviations from these baselines that may indicate the presence of unauthorized devices.
561	The Contractor shall monitor network traffic patterns, communication protocols, and data flows to detect anomalies associated with new assets joining the network.

7.2.1 Alerts

Req. #	Requirement
562	The OBOS shall include Alerts which are defined as the identification and notification to designated parties of an OBOS failure or anomaly that requires a response. These alerts may be generated by the OBOS or received by the OBOS from external entities.

Req. #	Requirement
563	The OBOS shall include, and the Contractor shall monitor and respond to the following types of Alerts: • Network Alerts • Data Alerts • Cloud Alerts • Internal Services and Communication Alerts • Logical Failure Alerts • Access Alerts • Security Alerts
564	Specific OBOS Alerts will be defined during the Design and Implementation Phase. Required Alerts shall include but not be limited to the following events: • Connectivity or transmission issues with an external or internal system • Failed data validation • Incoming data transfers not received as expected (e.g. by a configurable time each day) • An expected download of files or data is unsuccessful • Security breach or Intrusions • Disk capacity issues (e.g., files and/or data capacity has reached a specified configurable threshold) • Any failure to an internal process or micro-service • Exception to Transaction processing rules
565	Notification of unresolved Alerts shall repeat in accordance with a configuration table until acknowledged.
566	The OBOS shall allow for Alerts to be manually entered.
567	The OBOS shall include configurable thresholds related to Alert events.
568	The OBOS shall include an Alert configuration table that specifies the Alert type, source, required contact information, contact methodology (i.e., telephone call, email, and text messages) and Alert priority level.
569	All Alerts shall be recorded and stored in the OBOS maintenance and monitoring module.
570	An automatic email to a specified OBOS Alert contact list shall be generated and sent anytime an Alert condition occurs.
571	The specific User Alert screens, reports and Dashboards will be finalized during the Design and Implementation Phase.
572	All Alerts shall be displayed on Users' rolling Dashboards with the most recent Alert on top.
573	Each Alert shall be displayed in a different color on the Dashboard based on priority.
574	The Contractor shall resolve all assigned Alerts directly or notify the third-party responsible for resolution.
575	Alerts will have an indicated priority as well as an indicator as to whether the issues should be entered into the ticket System for resolution.

7.3 Authority Identified Anomalies and Research Requests

In addition to the Contractor's monitoring of the OBOS performance, the Authority will also review System and performance data and perform tests as deemed necessary. As a result of the Authority's activities, the Authority may request that the Contractor research and/or provide additional data, identify the extent of a possible issue and/or provide an explanation related to anomalies or trends identified by the Authority.

Req. #	Requirement
576	The Contractor shall respond and fulfill the Authority's requests for research, analysis, and/or explanation and provide feedback/report within the timeframe agreed to and Approved by the Authority.

7.4 Vulnerability Management, Scan and Audits

Req. #	Requirement
577	The Contractor shall ensure that all OBOS components (Hardware, Software, hypervisor, operating System, database, network/firewall, etc.) are managed to limit System vulnerabilities.
578	The Authority will be periodically contracting with an independent security audit firm throughout the life of the Contract. The Contractor shall fully support, participate in and assist in the Authority's performance of OBOS audits. These audits include, but are not limited to vulnerability checks, security scans, penetration testing, risk assessments and audits.
579	The Contractor shall allow the Authority to conduct and perform independent audits of the OBOS. This includes the use of audit Software tools on the OBOS.
580	The Contractor shall engage a third-party licensed Certified Public Accounting (CPA) firm or agency accredited by the American Institute of Certified Public Accounts (AICPA) to perform an annual Service Organization Control (SOC) 2, Type 1 audit. The SOC 2, Type 1 audit shall be completed, and the audit report shall be provided to the Authority for review and Approval no later than one hundred and eighty (180) Calendar Days after successful completion and the Authority's Approval of the OBOS Go-Live test. A SOC 2 Type 2 audit shall be conducted every two (2) years thereafter.
581	The SOC 2 – Type 1 Audit report shall be provided to the Authority directly from the third-party at the same time it is provided to the Contractor.
582	The Contractor shall prepare and submit to the Authority for review and Approval, a resolution plan, addressing all issues disclosed as a result of any OBOS audits
583	The Contractor shall correct all deficiencies and vulnerabilities disclosed as a result of any audits.

7.5 Incident Management

Req. #	Requirement
584	All actual or potential security incidents and breaches shall be reported to the Authority immediately after the Contractor becomes aware of the situation.
585	In the event of a cyber security breach of any kind, the Contractor shall follow ~~the Authority's Security Policy~~ processes outlined within the Security Management Plan, including notification procedures, legal and the Authority's insurance Requirements.
586	The Contractor shall provide a root cause and resolution analysis report of all resolved issues no later than ten (10) Business Days of issue resolution, or within a timeframe proposed by the Contractor and agreed to and Approved by the Authority.
587	The Contractor shall fully cooperate and assist in the investigation of suspected or actual security incidents when required by the Authority.

7.6 Change Control

Req. #	Requirement
588	The Contractor shall utilize a change management process to document all changes to the OBOS.
589	Prior to making any changes to the OBOS, the Contractor shall provide Documentation to the Authority for review and Approval supporting the proposed changes including: • Description of the change • List of affected Software components • List of all OBOS components that are impacted by the changes • Step-by-step process outlining how the changes have been reviewed and tested prior to releasing them into production • Contractor's internal test results • How the changes will be implemented • Post-installation verification process • Roll-back plan in case the changes result in errors or unanticipated behavior • Schedule of when the changes are expected to take place • Estimated duration of the change execution • The need to notify affected agencies and partners • Any necessary regression tests • Release notes • List of impacted documents, manuals, and training materials.
590	The Contractor shall track all changes to the source code and all other components of the OBOS.
591	The Contractor shall track all changes to configuration files, scripts, database configuration files, documents, plans, and any other affected files.
592	The Contractor shall update any affected Documentation, including all manuals and deliver updates to the Authority for review and Approval no later than thirty (30) Calendar Days of a change requiring updated Documentation.
593	The Contractor shall follow auditable change control procedures for all modifications to the OBOS, its associated Hardware, Software, firmware, configuration parameters, etc.
594	The Contractor shall ensure that each component of the OBOS, both Hardware and Software, is always within one patch version of the most current version released by the third-party provider.
595	The Contractor shall perform continuous assessments of obsolescence to ensure at least 12 months advanced notice of any third-party Software becoming unsupported. The cost for all testing and the implementation of replacement Software shall be borne by the Contractor.
596	The Contractor shall communicate to the Authority any obsolescence, end of life or end of service support for Hardware and Software.
597	All Systems/Software shall be upgraded and compatible with the latest Operating System at the time of System Acceptance by the Authority. The method of validation shall be addressed in the System Acceptance Test Plan.

7.7 Updates and Patches

Req. #	Requirement
598	The Contractor shall monitor, maintain, and manage software manufacturer patches, updates, and other manufacturer recommended changes.
599	The Contractor shall be responsible for ensuring that operating Systems and databases are current with the latest Security patches and Updates.
600	The Contractor shall apply patches, Updates, or other service notices supplied by the Equipment manufacturer or Software supplier, no later than thirty (30) Calendar Days from the release and notification by the manufacturer.
601	The Contractor shall notify the Authority of all Updates or security patches prior to applying them to the production OBOS.
602	The Contractor shall test each new Software release using the Test Environment, provide a written test report, and submit the report for the Authority's review and Approval no later than five (5) Business Days prior to the scheduled update. Depending on the nature of a Software release, the Contractor may be required to develop test scripts for the Authority's review and approval prior to conducting any testing.
603	The Contractor shall develop a Software release schedule for the Authority's review and Approval before testing the release. The release schedule shall also include information on the details of the release.

8 Succession Requirements

Req. #	Requirement
604	If the Contract between the Authority and the Contractor is terminated for convenience, default, or expiration of the Contract Term or any extensions thereof, the Contractor shall cooperate with the Authority to facilitate a smooth succession to a Successor system provider. The Successor may be the Authority, the Contractor, or another service provider.
605	The Contractor shall create a Succession Plan detailing a method for the orderly transfer of knowledge, data, manuals, documents, assets, licensing, warranties, and business relationships from the Contractor to the Successor. The Succession Plan shall include an overview and sequential steps detailing the transfer of the OBOS services to the Successor. The Succession Plan shall be submitted to the Authority for review and Approval no later than sixty (60) Calendar Days after Go-Live.

606	The Succession Plan shall address, at a minimum, the following, as applicable:
	• Contractor provision of knowledgeable subject matter experts (SME) to the Authority
	• Contractor participation in document reviews and planning meetings, as requested by the Authority
	• Contractor provides uninterrupted and continued Operations and Maintenance of the Contractor's OBOS during the transition
	• Transfer of Cloud Services including configuration, software and data to an account held by others (Authority or new Contractor).
	• Transfer and configuration of any multi-tenant Services that are part of OBOS operation to an account held by others (Authority or new Contractor).
	• Transfer of physical assets, including a current list of assets and their owners which shall be updated throughout the O&M Phase
	• Transfer of product, usage and Software licenses, including a current list of licenses (name, purpose, identifier, contact information, license details) which shall be updated throughout the O&M Phase
	• Transfer of service contracts, including a current list of contracts (name, purpose, terms, dates, contact information)
	• All OBOS data such as customer Demographics, Transactions, file histories, and images.
	  ○ OBOS configuration histories
	  ○ All archived data
	  ○ ICDs
	  ○ Locations

607	The Contractor shall be responsible for updating the draft Succession Plan during the Contract Term after any material changes or as directed by the Authority.
608	In the event a transition of Services under this Contract becomes necessary, the Authority may declare a Succession Event.
609	Upon Notice of a Succession Event by the Authority, the Contractor shall provide succession assistance, and the parties shall meet and confer as requested to enable a smooth transition.
609.1	The Contractor shall coordinate reviews of the Contractor's Succession Plan, Data Dictionaries, and all OBOS related Documentation, and apply any necessary updates to each document. These updated documents shall be submitted to the Authority for review and Approval.
609.2	The Contractor shall designate a Succession Manager to be a single point of contact for all succession-related issues.

Req. #	Requirement
609.3	The Contractor shall continue to provide OBOS Operations and Maintenance Support, including continued Maintenance of the OBOS, monitoring and Maintenance of associated Systems and subsystems, System interfaces (System and operational) and meeting or exceeding all Contract KPIs until a coordinated Successor System Go-Live is completed or the Authority agrees to release Contractor of its responsibilities.
609.4	The Contractor shall attend and actively participate in meetings with the Authority staff and Successor staff for the purposes of identifying, discussing, planning, tracking, and resolving succession-related tasks and issues.
609.5	The Contractor shall provide the Authority with copies of all data, including but not limited to, completed and in-progress documents (Design-related or other), As-built Documentation, infrastructure Designs in the possession, custody, or control of the Contractor (or any Subcontractors), and reasonable assistance with ensuring that data is accessible, readable, and usable by the Authority. If requested by the Authority, the Contractor shall provide all data and documents in the native Software format used to create the data and/or Deliverable, and any other format as agreed by the Authority.
609.6	The Contractor shall support data migration planning and execution activities (i.e. from the Contractor's System to the Successor's System) by making SMEs available to: • Participate in Data Migration meetings • Review and comment on Successor Data Migration Plans • Coordinate with Successor and/or other Project stakeholders to identify a data format for data extracted from the Contractor's System and establish account, code and data mapping convention(s) • Extract data from the Contractor's System and assist with the migration of OBOS data to the Successor System as requested by the Authority and Successor • Assist the Successor and the Authority with migration tasks as requested by the Authority • Assist in the development of migration testing scripts as requested by the Authority • Assist with data validation efforts • Assist the Authority and Successor with the execution and coordination of the Data Migration Plan • Support other migration efforts and duties as identified and requested by the Authority **Note**: The SMEs the Contractor makes available to support data migration planning and execution efforts shall be knowledgeable of the Authority and the Contractor's OBOS, shall have worked with the Authority, shall know the Authority OBOS database, database architecture and database Design, and shall be knowledgeable of data extraction techniques out of the Contractor's System.
609.7	The Contractor shall provide OBOS Interface support, including providing access (if necessary) to FTP servers, access to production files exchanged between all Systems and external interfacing systems, and other support as identified by the Authority.

Req. #	Requirement
609.8	The Contractor shall support transition and cutover planning and execution activities (i.e. transition from the Contractor's System to the Successor's System) by making SMEs available to: • Participate in transition and cutover meetings • Review and comment on transition and cutover Plans to identify any risks or deficiencies, provide expertise regarding decommissioning of the Contractor's OBOS, participation in the transition planning, including the transition schedule or tasks and sequence of tasks • Participate in the execution of the transition and cutover Plan, including scheduling, troubleshooting, and implementation of roll-back procedures as required by the Authority • Provide other support as identified by the Authority **Note**: The SMEs the Contractor makes available to support transition and cutover planning and execution activities shall be knowledgeable of the Authority, the Contractor's OBOS Design and shall have worked with the Authority.
609.9	The Contractor shall support network transition planning and execution activities by making SMEs available to: • Participate in transition planning meetings • Provide a list of all network Equipment in use for the OBOS • Attend meetings with the Authority and the Successor to discuss the OBOS network/architecture, devices, current configuration settings, topology, etc. • Transition network devices to the Authority and the Successor when requested by the Authority • Participate in the execution of the transition, including trouble shooting, implantation of roll-back procedures if necessary • Provide other support as identified by the Authority **Note**: The SMEs the Contractor makes available to support network transition planning and execution activities shall be knowledgeable of the Authority, the Contractor's OBOS Design, the Contractor's OBOS network and Equipment, and shall have worked with the Authority.
609.10	The Contractor shall support decommissioning planning and execution activities for the Contractor's OBOS by making SMEs available to: • Participate in transition and decommissioning planning meetings • Develop an OBOS Decommissioning Plan, and submit it for review and approval by the Authority • Participate in and coordinate with the Authority and Successor to decommission the Contractor's OBOS • Provide other support as identified by the Authority **Note**: The SMEs the Contractor makes available to support OBOS decommissioning planning and execution activities shall be knowledgeable of the Authority, the Contractor's OBOS Design and operation, and shall have worked with the Authority.
609.11	The Contractor shall support the transition of the Authority Assets, including all the Authority assets currently in use by the Contractor and the OBOS (e.g. all Hardware, switches, servers, reporting server/data warehouse, etc.), provide User and/or administrative rights to these assets, as requested, and coordinate with the Authority regarding formal turnover of all assets upon decommissioning of the Contractor System.

Req. #	Requirement
609.12	The Contractor shall support the transition/transfer of all third-party provider contracts and COTS licenses and/or subscriptions necessary to operate and maintain the Contractor's OBOS, including any Software/Provider contracts (e.g. Cloud Service Provider) and materials as requested by the Authority.
609.13	The Contractor shall participate in Documentation reviews, provide comments, and participate in comment resolution meetings as requested by the Authority.
609.14	The Contractor shall participate in, and complete other tasks as identified by the Authority specifically relating to the succession.
610	While providing succession Services to the Authority, the Contractor shall be required to submit a weekly Succession Status Report to the Authority. The Succession Status report shall be used to track all activities the Contractor performed in support of succession activities and related expenses.
610.1	The Contractor shall coordinate with the Authority on the final content and format of the report, but shall include, at a minimum, the following information: • A list of all activities the Contractor's succession support staff performed for the week • A breakdown (by staff and/or position and associated labor rate) of all activities performed and/or meetings attended, and the number of hours spent by staff members on each activity • The Succession Status Report shall reflect the total costs anticipated to be invoiced to the Authority for the week's succession support Work.
611	The Contractor shall invoice the Authority monthly for succession support.

9 Performance Requirements and Key Performance Indicators

The Contractor and the OBOS are required to meet all Requirements as detailed in this SOW. In addition, the Authority has identified specific Key Performance Indicators (KPI's) which the Contractor and OBOS shall meet or exceed during the Operations and Maintenance Phase for the Contractor to avoid Invoice Adjustments. These KPIs, as well as related Invoice Adjustment for non-compliance, are detailed in Appendix J - Key Performance Indicators. During the Design and Implementation Phase, the Authority and the Contractor will finalize the specific reporting Requirements and method of measurement for each KPI.

9.1 General Performance Requirements

Req.#	Requirement
612	The OBOS shall meet or exceed all Requirements and KPI's.
613	Non-compliance with a KPI due to a Chargeable failure will result in an Invoice Adjustment as detailed in Appendix J – Key Performance Indicators. The assessment/waiving of all Invoice Adjustments is at the sole discretion of the Authority.
614	The Contractor shall take immediate corrective action to remedy any failures and ensure that corrective action is taken to prevent repeated failures in the future.
615	The Contractor shall provide a corrective action Plan to the Authority for review and Approval that documents corrective action taken to resolve the issue and to prevent future reoccurrences of the issue.
616	Failure to meet a Requirement or KPI does not relieve the Contractor of its obligation to comply with the Requirement/KPI and to complete all associated required activities.
617	As part of the Contractor's monthly invoice during the Operations and Maintenance Phase, the Contractor shall submit a KPI compliance report. For each KPI listed in Appendix J – Key Performance Indicators, the report shall provide the following information:
617.1	• Actual performance related to each KPI for the calendar month
617.2	• An indication of compliance or non-compliance with each KPI for the Calendar month
617.3	• Calculated Invoice Adjustment for non-compliance with each KPI, if applicable
617.4	• A summary schedule showing compliance/non-compliance with each KPI for a rolling 12-month period
617.5	• Back-up data supporting the KPIs and all calculations

9.2 Non-Chargeable and Chargeable Failures

For purposes of calculating Invoice Adjustments for non-compliance with Requirements and KPIs, Chargeable and Non-Chargeable Failures are defined as follows:

- Non-Chargeable failures are those failures that are identified in the following section. Invoice Adjustments for non-compliance related to Non-Chargeable Failures will not be assessed.
- Chargeable Failures are any failures not specifically identified as Non-Chargeable Failures. Invoice Adjustments for non-compliance related to Chargeable Failures will be assessed, at the discretion of the Authority.

9.2.1 Non-Chargeable Failures

Req. #	Requirement
618	Non-Chargeable Failures shall include: • Force majeure events as defined in the Contract document • Vandalism outside of the Contractor's control • OBOS failure caused by externally applied stress conditions outside of the Requirements of this SOW. • OBOS failure caused by environmental or operating conditions outside the Requirements of this SOW. • Failures where the Authority has Approved to waive a chargeable failure in advance.

9.2.2 Chargeable Failures

Req. #	Requirement
619	Chargeable failures shall be any failures not specifically identified as a Non-Chargeable Failure.

9.3 Response and Resolution Times

Response and Resolution Time is defined as the combined time from when a failure occurs to when the issue is resolved and returned to normal operations.

Req. #	Requirement
620	The Contractor's compliance related to response and resolution times shall be measured according to the following Priority levels (also see Appendix J - Key Performance Indicators).
621	• Priority 1: Any OBOS malfunction or fault that has or may result in: ○ Loss of revenue ○ Inability to receive, transmit, process or reconcile Transaction or revenue data ○ A security breach ○ Permanent loss of data ○ Negative impact on the Authority or its customers ○ The OBOS being frozen and unreachable ○ Data being inaccurate ○ Loss of ability to release Registration Stops ○ Loss of redundancy
622	• Priority 2: Any malfunction or fault that is not a Priority 1 and: ○ Adversely affects the full functionality of the OBOS. , ○ Prohibits the ability to monitor/manage the OBOS
623	• Priority 3: Any malfunction or fault that is not a Priority 1 or 2 and results in: ○ Degradation in System performance but the KPIs are still being met ○ Any reports, queries, screens or Dashboards not being presented in a timely manner ○ Transactions are not being processed in a timely manner ○ Any negative impact to the OBOS but is not a Priority 1, Priority 2 or Priority 4.
624	• Priority 4: ○ Any issue that is cosmetic in nature
625	Response and Resolution times for every Maintenance event shall be recorded in the System and reported to the Authority.

Req. #	Requirement
626	The Contractor shall be responsible for initial triage and setting of the priority (automatically or manually) for each System malfunction or failure event. The Contractor shall be responsible for providing to the Authority, for their Approval, the assigned priority of each System malfunction or failure event within one hour of the Contractor becoming aware of the issue. If the Authority disagrees with the priority set by the Contractor, the Authority shall set priority level. The Contractor shall update the priority of a System malfunction or issue if it is determined that the priority changed during the resolution. The updated priority shall be subject to the Authority's review and Approval.
627	The Contractor shall establish a process to advise the Authority, via email, of all OBOS issues in accordance with the assigned priority level as indicated in Appendix J – Key Performance Indicators. In addition to advising the Authority via email, the Contractor shall advise the Authority Project Manager, of all Priority 1 issues via telephone within the required timeframe.
628	After becoming aware of the issue, the Contractor shall resolve all issues in accordance with the assigned priority level as indicated in Appendix J – Key Performance Indicators.
629	If the Contractor determines that a Priority 1 or Priority 2 issue cannot be resolved within the required timeframe as indicated in Appendix J - Key Performance Indicators, the Contractor shall provide a resolution schedule for the Authority's Approval within eight (8) hours of the Contractor becoming aware of the issue. The Authority's Approval of the resolution schedule that is not in compliance with the KPIs in Appendix J does not relieve the Contractor of any associated Invoice Adjustments.
630	If the Contractor cannot resolve an issue within the required time period based on the assigned priority level, the Contractor shall resolve the issue by the time/date specified by the Approved resolution schedule. Note: The Authority's Approval of a resolution schedule that is not in compliance with the KPIs does not relieve the Contractor of any associated invoice adjusted.
631	The Contractor shall immediately notify the Authority of the resolution of all issues.
632	The Contractor shall monitor, track and report to the Authority, response times for every Maintenance event through System reports and Dashboards. This includes the time the Contractor becomes aware of the issue, the time of resolution, and the remediation plan and schedule, if applicable.

10 Document Deliverable Summary

The following table summarizes all Deliverables during the Design and Implementation Phase

Design and Implementation Phase Document Deliverables	Section Ref #	Due Date
Project Management Plan	3.1.2	Submitted for the Authority's review and Approval no Later than thirty (30) Calendar Days from NTP
Software Development Plan	3.1.3	Submitted for the Authority's review and Approval no Later than thirty (30) Calendar Days from NTP
Quality Assurance and Quality Control Program and Plan	3.1.4	Submitted for the Authority's review and Approval no Later than sixty (60) Calendar Days from NTP
Risk Management Plan	3.1.5	Submitted for the Authority's review and Approval no Later than thirty (30) Calendar Days from NTP
Disaster Recovery Plan	3.1.6	Submitted for the Authority's review and Approval no later than ninety (90) Calendar Days prior to the scheduled DR Test
Security Management Plan	3.1.7	Submitted for the Authority's review and Approval no later than one hundred and twenty (120) Calendar Days from NTP
Project Kick-off Meeting/Project Communications	3.1.9	No Later than fourteen (14) Calendar Days from NTP
Monthly Implementation Progress Report	3.1.10	Submitted for the Authority's review and Approval monthly by the tenth (10th) Business Day of each month for the preceding month. The initial MIPR shall cover the first full calendar month following NTP
Monthly Maintenance and Performance Progress Report	3.1.11	Submitted for the Authority's review and Approval monthly by the tenth (10th) Business Day of each month for the preceding month. The initial MMRP shall cover the first full calendar month following Go-Live.
Project Schedule (initial)	3.2.1	Submitted for the Authority's review and Approval no Later than thirty (30) Calendar Days from NTP
Requirement Traceability Matrix (initial)	3.4	Submitted for the Authority's review and Approval with the first draft of the System Design Document
Training Plan	3.6	Submitted for the Authority's review and Approval no Later than sixty (60) Calendar Days prior to the scheduled training in accordance with the Approved, Baseline Project Schedule
Training Materials and Manual	3.6	Submitted for the Authority's review and Approval no Later than thirty (30) Calendar Days prior to scheduled training in accordance with the Approved, Baseline Project Schedule

Design and Implementation Phase Document Deliverables	Section Ref #	Due Date
System Design Document	4.1	Submitted to the Authority for review and Approval according to the Approved, Baseline Project Schedule
As-built SDD, RTM and OBOS Configuration Tables	4.1	Submitted for the Authority's review and Approval no Later than sixty (60) Calendar Days after completion and Approval of the SAT
User Authorization Matrix	2.8	Submitted for the Authority's review and Approval no Later than thirty (30) Calendar Days prior to the scheduled Operational Readiness Test and User Acceptance Test
System Configuration Table	5.5.2	Submitted for the Authority's review and Approval no Later than thirty (30) Calendar Days prior to the scheduled Operational Readiness Test and User Acceptance Test
User Manual	5.5.1	Submitted for the Authority's review and Approval no Later than sixty (60) Calendar Days prior to the scheduled Operational Readiness Test and User Acceptance Test
System Administration Manual	5.5.2	Submitted for the Authority's review and Approval no Later than thirty (30) Calendar Days prior to the scheduled Operational Readiness Test and User Acceptance Test
Data Migration Plan	6.1	Submitted for the Authority's review and Approval no Later than one hundred and twenty (120) Days from NTP
Transition Plan	6.2	Finalized to achieve Authority Approval no later than one hundred and twenty (120) Calendar Days prior to the scheduled Go-Live
Master Test Plan	6.3.1	Submitted for the Authority's review and Approval no later than ninety (90) Calendar Days from NTP
Individual Test Plans and Scripts	6.3.2	Submitted for the Authority's review and Approval no Later than sixty (60) Calendar Days prior to scheduled testing for the related test
Maintenance Plan	7.1	Submitted for the Authority's review and Approval no Later than ninety (90) Calendar Days prior to Go-Live
Service Organization Control (SOC) 2, Type 1 Audit Report	7.4	Submitted for the Authority's review and Approval no Later than one hundred and eighty (180) Calendar Days from successful completion and the Authority's Approval of the OBOS Go-Live test
Succession Plan	8	Submitted for the Authority's review and approval no Later than sixty (60) Calendar Days after Go-Live