



**February 13, 2023**

**To:** Members of the Board of Directors  
**From:** Darrell E. Johnson, Chief Executive Officer  
**Subject:** Approval to Release Request for Proposals for the Development and Implementation of a Rider Validation System

### **Overview**

The Orange County Transportation Authority has developed a request for proposals to initiate a competitive procurement process to select a firm for the development and implementation of a new rider validation system for the Orange County Transportation Authority fixed-route bus system.

### **Recommendations**

- A. Approve the release of Request for Proposals 2-2980 to select a firm for the development and implementation of a new rider validation system for the Orange County Transportation Authority fixed-route bus system for a five-year initial term with one, five-year option term.
- B. Approve the proposed evaluation criteria and weightings for Request for Proposals 2-2980 for the development, installation, and implementation of a new rider validation system for the fixed-route bus system.

### **Background**

In 2018, the Orange County Transportation Authority (OCTA) hired CH2M Hill Engineers, Inc., to analyze OCTA's fare collection system and assist OCTA with leveraging its investments in on-board bus validators to develop a new rider validation system (RVS).

The primary goals for the new RVS were to:

- Improve customer convenience and experience
- Facilitate fare policy, equity, and innovation
- Validate ridership for revenue reimbursement for free fare and pass programs and improve data collection for analytical and reporting capabilities

- Reduce onboard cash usage, bus dwell time, and operator workload
- Enhance intermodal and regional interoperability

In May 2020, the Board of Directors (Board) approved an agreement with Jacobs Engineering Group, Inc. (Jacobs) to provide technical support for development of the initial design specifications for an RVS. Initial design specifications were developed and included an account-based system, which would improve the customer experience by offering the use of smart cards and mobile wallets while serving banked, underbanked, and unbanked customers. The centralized account-based structure would also provide OCTA the capability to implement different fare policy models and improve fare equity for its customers. This system would improve OCTA's ability to collect information and report required data to external agencies that fund OCTA's reduced fare and pass programs. OCTA would also plan to expand its current retail network throughout the County and incentivize the use of smart cards and mobile ticketing to reduce use of cash onboard the bus, reduce coach operator workload, and improve travel times. The system would provide OCTA the flexibility to integrate microtransit, paratransit, and the OC Streetcar into the RVS, and would also allow OCTA's validators to read fare media from outside agencies such as Metrolink or the Los Angeles County Metropolitan Transportation Authority.

In May 2022, the Board approved OCTA staff, with the consultation of Jacobs, to proceed with full development of the technical specifications necessary for the procurement of the RVS.

### ***Discussion***

OCTA staff, in consultation with Jacobs, has finalized the development of the technical specifications to procure and implement an RVS. The RVS is expected to be an account-based electronic fare collection system with open architecture that will provide flexibility into the future as technology and OCTA's needs change. The RVS will integrate with OCTA's prior investments in mobile ticketing as well as on-board validators. In addition to delivering the RVS, the contractor will be required to provide cloud hosting and software maintenance for the initial five years of system operation as well as recruit and manage the network of retail merchants necessary to distribute fare media and reload customer accounts. Staff is seeking Board approval to release the request for proposals (RFP) as well as approve the proposed evaluation criteria and weightings based on the following procurement approach.

***Procurement Approach***

OCTA's Board-approved procurement policies and procedures require that the Board approve RFPs over \$1,000,000, as well as approve the evaluation criteria and weightings. Staff is submitting for Board approval the draft RFP and evaluation criteria and weightings, which will be used to evaluate proposals received in response to the RFP.

The proposed evaluation criteria and weightings are as follows:

- Qualifications of the Firm 20 percent
- Staffing and Project Organization 20 percent
- Work Plan 35 percent
- Cost and Price 25 percent

Several factors were considered in developing the evaluation criteria weightings. Qualifications of the firm is weighted at 20 percent as the firm must demonstrate experience implementing a new account-based, open architecture electronic fare payment system. Staffing and project organization is also weighted at 20 percent as the firm must demonstrate the level of expertise, availability, and involvement for the roles of the proposed project team. Work plan is weighted at 35 percent as the firm's proposed implementation plan and solution must be able to meet the functional and technical requirements established for the RVS, as specified in the scope of work. Cost and price is weighted at 25 percent to ensure that OCTA receives value for the services provided.

The contract term for this procurement will be a five-year initial term with one, five-year option term. The total cost for the initial term is anticipated to be approximately \$14,472,028.

This RFP will be released upon Board approval of these recommendations.

**Fiscal Impact**

This project was approved in OCTA's Fiscal Year 2022-23 Budget, Finance and Administration Division, Account No. 1261-9028-A5105-0U8.

***Summary***

Board of Directors' approval is requested to release Request for Proposals 2-2980 to select a firm for the development and implementation of a new rider validation system for the Orange County Transportation Authority fixed-route bus system and the approval of the proposed evaluation criteria and weightings.

***Attachment***

- A. Draft Request for Proposals (RFP) 2-2980, Rider Validation System

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**Approved by:**



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Chief Financial Officer,  
Finance and Administration  
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**DRAFT REQUEST FOR PROPOSALS (RFP) 2-2980**

**RIDER VALIDATION SYSTEM**



**ORANGE COUNTY TRANSPORTATION AUTHORITY  
550 South Main Street  
P.O. Box 14184  
Orange, CA 92863-1584  
(714) 560-6282**

**Key RFP Dates**

<b>Issue Date:</b>	<b>February 13, 2023</b>
<b>Pre-Proposal Conference Date:</b>	<b>February 28, 2023</b>
<b>Question Submittal Date:</b>	<b>March 6, 2023</b>
<b>Proposal Submittal Date:</b>	<b>April 4, 2023</b>
<b>Interview Date:</b>	<b>May 10, 2023</b>

## **TABLE OF CONTENTS**

<b>SECTION I: INSTRUCTIONS TO OFFERORS .....</b>	<b>1</b>
<b>SECTION II: PROPOSAL CONTENT .....</b>	<b>8</b>
<b>SECTION III: EVALUATION AND AWARD .....</b>	<b>17</b>
<b>EXHIBIT A: SCOPE OF WORK.....</b>	<b>21</b>
<b>EXHIBIT B: COST AND PRICE FORMS .....</b>	<b>22</b>
<b>EXHIBIT C: PROPOSED AGREEMENT .....</b>	<b>26</b>
<b>EXHIBIT D: STATUS OF PAST AND PRESENT CONTRACTS FORM .....</b>	<b>27</b>
<b>EXHIBIT E: CAMPAIGN CONTRIBUTIONS DISCLOSURE FORM .....</b>	<b>27</b>
<b>EXHIBIT F: SAFETY SPECIFICATIONS .....</b>	<b>34</b>
<b>EXHIBIT G: PROPOSAL EXCEPTIONS AND/OR DEVIATIONS.....</b>	<b>39</b>



February 13, 2023

**NOTICE OF REQUEST FOR PROPOSALS (RFP)**

**RFP 2-2980: "RIDER VALIDATION SYSTEM"**

**TO: ALL OFFERORS**

**FROM: ORANGE COUNTY TRANSPORTATION AUTHORITY**

The Orange County Transportation Authority (Authority) invites proposals from qualified consultants to develop, install, and implement a rider validation system (RVS). The budget for this project is \$14,472,028 for a five (5)-year initial term.

**Please note that by submitting a Proposal, Offeror certifies that it is not subject to any Ukraine/Russia-related economic sanctions imposed by the State of California or the United States Government including, but not limited to, Presidential Executive Order Nos. 13660, 13661, 13662, 13685, and 14065. Any individual or entity that is the subject of any Ukraine/Russia-related economic sanction is not eligible to submit a Proposal. In submitting a Proposal, all Offerors agree to comply with all economic sanctions imposed by the State or U.S. Government.**

**Proposals must be submitted, electronically, through the following URL link: <http://www.octa.net/Proposal Upload Link>, at or before the deadline of 2:00 p.m. on April 4, 2023. The link has an upload file size limit of 80MB. Authority will not accept hard copy proposals for this RFP.**

Offerors are instructed to click the upload link, select "**RFP 2-2980**" from the drop-down menu, and follow the instructions as prompted to upload the proposal. The upload link will expire at the submittal deadline and will not allow proposals to be uploaded.

Should Offerors encounter technical issues with uploading the proposals via the link provided, Offerors are required to contact the Contract Administrator prior to the submission deadline. Proposals and supplemental information to proposals received after the date and time specified above will be rejected.

Firms interested in obtaining a copy of this RFP may do so by downloading the RFP from CAMM NET at <https://cammnet.octa.net>.

All firms interested in doing business with the Authority are required to register their business on-line at CAMM NET. The website can be found at <https://cammnet.octa.net>.

To receive all further information regarding this RFP 2-2980, firms and subconsultants must be registered on CAMM NET with at least one of the following commodity codes for this solicitation selected as part of the vendor's on-line registration profile:

<u>Category:</u>	<u>Commodity:</u>
Fare Collection Equipment	Fare Collection Equipment
Computer: Hardware & Software	Accounting/Financial Software
	Business Software
	Computer: Hardware & Software
Professional Consulting	Fare Collection Consulting

A pre-proposal conference will be held via teleconference on February 28, 2023, at 10:00 a.m. Prospective Offerors may join or call-in using the following credentials:

- [Click here to join the meeting](#)
- OR Call-in Number: 916-550-9867
- Conference ID: 636 840 080#

An on-site/in-person conference will not be held. A copy of the presentation slides and pre-proposal conference registration sheet(s) will be issued via addendum prior to the date of the pre-proposal conference. All prospective Offerors are encouraged to attend the pre-proposal conference.

The Authority has established May 10, 2023, as the date to conduct interviews. All prospective Offerors will be asked to keep this date available.

Offerors are encouraged to subcontract with small businesses to the maximum extent possible.

All Offerors will be required to comply with all applicable equal opportunity laws and regulations.

The award of this contract is subject to receipt of federal, state, and/or local funds adequate to carry out the provisions of the proposed agreement including the identified Scope of Work.



**SECTION I: INSTRUCTIONS TO OFFERORS**

## **SECTION I. INSTRUCTIONS TO OFFERORS**

### **A. PRE-PROPOSAL CONFERENCE**

A pre-proposal conference will be held via teleconference on February 28, 2023, at 10:00 a.m. Prospective Offerors may join or call-in using the following credentials:

- [Click here to join the meeting](#)
- Call-in Number: 916-550-9867
- Conference ID: 636 840 080#

An on-site/in-person conference will not be held. A copy of the presentation slides and pre-proposal conference registration sheet(s) will be issued via addendum prior to the date of the pre-proposal conference. All prospective Offerors are encouraged to attend the pre-proposal conference.

### **B. EXAMINATION OF PROPOSAL DOCUMENTS**

By submitting a proposal, Offeror represents that it has thoroughly examined and become familiar with the work required under this RFP and that it is capable of performing quality work to achieve the Authority's objectives.

### **C. ADDENDA**

The Authority reserves the right to revise the RFP documents. Any Authority changes to the requirements will be made by written addendum to this RFP. Any written addenda issued pertaining to this RFP shall be incorporated into the terms and conditions of any resulting Agreement. The Authority will not be bound to any modifications to or deviations from the requirements set forth in this RFP as the result of oral instructions. Offerors shall acknowledge receipt of addenda in their proposals. Failure to acknowledge receipt of Addenda may cause the proposal to be deemed non-responsive to this RFP and be rejected.

### **D. AUTHORITY CONTACT**

All communication and/or contacts with Authority staff regarding this RFP are to be directed to the following Contract Administrator:

Iris Deneau, Senior Contract Administrator  
Contracts Administration and Materials Management Department  
Phone: 714.560. 5786  
Email: ideneau@octa.net

Commencing on the date of the issuance of this RFP and continuing until award of the contract or cancellation of this RFP, no offeror, subcontractor, lobbyist, or agent hired by the offeror shall have any contact or communications regarding this

RFP with any Authority's staff; member of the evaluation committee for this RFP; or any contractor or consultant involved with the procurement, other than the Contract Administrator named above or unless expressly permitted by this RFP. Contact includes face-to-face, telephone, electronic mail (email), or formal written communication. Any offeror, subcontractor, lobbyist or agent hired by the offeror that engages in such prohibited communications may result in disqualification of the offeror at the sole discretion of the Authority.

**E. CLARIFICATIONS**

**1. Examination of Documents**

Should an Offeror require clarifications of this RFP, the Offeror shall notify the Authority in writing in accordance with Section E.2. below. Should it be found that the point in question is not clearly and fully set forth, the Authority will issue a written addendum clarifying the matter which will be sent to all firms registered on CAMM NET under the commodity codes specified in this RFP.

**2. Submitting Requests**

- a. All questions, including questions that could not be specifically answered at the pre-proposal conference, must be put in writing and received via e-mail at [ideneau@octa.net](mailto:ideneau@octa.net) no later than 5:00 p.m., on March 6, 2023.
- b. Requests for clarifications, questions and comments must be clearly labeled, "Written Questions RFP 2-2980" in the subject line of the email. The Authority is not responsible for failure to respond to a request that has not been labeled as such.

**3. Authority Responses**

Responses from the Authority will be posted on CAMM NET no later than March 15, 2023. Offerors may download responses from CAMM NET at <https://cammnet.octa.net>, or request responses be sent via email.

To receive email notification of Authority responses when they are posted on CAMM NET, firms and subconsultants must be registered on CAMM NET with at least one of the following commodity codes for this solicitation selected as part of the vendor's on-line registration profile:

Category:

Fare Collection Equipment  
Computer: Hardware &  
Software

Professional Consulting

Commodity:

Fare Collection Equipment  
Accounting/Financial Software  
Business Software  
Computer: Hardware &  
Software

Fare Collection Consulting

Inquiries received after 5:00 p.m. on March 6, 2023 will not be responded to.

## F. SUBMISSION OF PROPOSALS

### 1. Date and Time

**Proposals must be submitted electronically**, through the following URL link: <http://www.octa.net/Proposal Upload Link>, at or before the deadline of **2:00 p.m. on April 4, 2023. The link has an upload file size limit of 80MB. Authority will not accept hard copy proposals for this RFP.**

Offerors are instructed to click the upload link, select “**RFP 2-2980**” from the drop-down menu, and follow the instructions as prompted to upload the proposal. The upload link will expire at the submittal deadline and will not allow proposals to be uploaded.

Should Offerors encounter technical issues with uploading the proposals via the link provided, Offerors are required to contact the Contract Administrator prior to the submission deadline. Proposals and supplemental information to proposals received after the date and time specified above will be rejected.

### 2. Acceptance of Proposals

- a. The Authority reserves the right to accept or reject any and all proposals, or any item or part thereof, or to waive any informalities or irregularities in proposals.
- b. The Authority reserves the right to withdraw or cancel this RFP at any time without prior notice and the Authority makes no representations that any contract will be awarded to any Offeror responding to this RFP.
- c. The Authority reserves the right to issue a new RFP for the project.
- d. The Authority reserves the right to postpone proposal openings for its own convenience.
- e. Each proposal will be received with the understanding that

acceptance by the Authority of the proposal to provide the services described herein shall constitute a contract between the Offeror and Authority which shall bind the Offeror on its part to furnish and deliver at the prices given and in accordance with conditions of said accepted proposal and specifications.

- f. The Authority reserves the right to investigate the qualifications of any Offeror, and/or require additional evidence of qualifications to perform the work.
- g. Submitted proposals are not to be copyrighted.

**G. PRE-CONTRACTUAL EXPENSES**

The Authority shall not, in any event, be liable for any pre-contractual expenses incurred by Offeror in the preparation of its proposal. Offeror shall not include any such expenses as part of its proposal.

Pre-contractual expenses are defined as expenses incurred by Offeror in:

- 1. Preparing its proposal in response to this RFP;
- 2. Submitting that proposal to the Authority;
- 3. Negotiating with the Authority any matter related to this proposal; or
- 4. Any other expenses incurred by Offeror prior to date of award, if any, of the Agreement.

**H. JOINT OFFERS**

Where two or more firms desire to submit a single proposal in response to this RFP, they should do so on a prime-subcontractor basis rather than as a joint venture. The Authority intends to contract with a single firm and not with multiple firms doing business as a joint venture.

**I. TAXES**

Offerors' proposals are subject to State and Local sales taxes. However, the Authority is exempt from the payment of Federal Excise and Transportation Taxes. Offeror is responsible for payment of all taxes for any goods, services, processes, and operations incidental to or involved in the contract.

**J. PROTEST PROCEDURES**

The Authority has on file a set of written protest procedures applicable to this solicitation that may be obtained by contacting the Contract Administrator responsible for this procurement. Any protests filed by an Offeror in connection with this RFP must be submitted in accordance with the Authority's written procedures.

**K. CONTRACT TYPE**

It is anticipated that the Agreement resulting from this solicitation, if awarded, will be a firm-fixed price contract specifying firm-fixed prices for individual tasks specified in the Scope of Work, included in this RFP as Exhibit A. The Agreement will have a five (5)-year initial term with one (1), five (5)-year option term.

**L. CONFLICT OF INTEREST**

All Offerors responding to this RFP must avoid organizational conflicts of interest which would restrict full and open competition in this procurement. An organizational conflict of interest means that due to other activities, relationships, or contracts, an Offeror is unable, or potentially unable, to render impartial assistance or advice to the Authority; an Offeror's objectivity in performing the work identified in the Scope of Work is or might be otherwise impaired; or an Offeror has an unfair competitive advantage. Conflict of Interest issues must be fully disclosed in the Offeror's proposal.

All Offerors must disclose in their proposal and immediately throughout the course of the evaluation process if they have hired or retained an advocate to lobby Authority staff or the Board of Directors on their behalf.

Offerors hired to perform services for the Authority are prohibited from concurrently acting as an advocate for another firm who is competing for a contract with the Authority, either as a prime or subcontractor.

**M. CODE OF CONDUCT**

All Offerors agree to comply with the Authority's Code of Conduct as it relates to Third-Party contracts which is hereby referenced and by this reference is incorporated herein. All Offerors agree to include these requirements in all of its subcontracts.

**N. OWNERSHIP OF RECORDS/PUBLIC RECORDS ACT**

All proposals and documents submitted in response to this RFP shall become the property of the Authority and a matter of public record pursuant to the California Public Records Act, Government Code sections 6250 et seq. (the "Act"). Offerors should familiarize themselves with the provisions of the Act requiring disclosure of public information. Offerors are discouraged from marking their proposal documents as "confidential" or "proprietary."

If a Proposal does include "confidential" or "proprietary" markings and the Authority receives a request pursuant to the Act, the Authority will endeavor (but cannot guarantee) to notify the Offeror of such a request. In order to protect any information submitted within a Proposal, the Offeror must pursue, at its sole cost and expense, any and all appropriate legal action necessary to maintain the

confidentiality of such information. The Authority generally does not consider pricing information, subcontractor lists, or key personnel, including resumes, as being exempt from disclosure under the Act. In no event shall the Authority or any of its officers, directors, employees, agents, representatives, or consultants be liable to a Offeror for the disclosure of any materials or information submitted in response to the RFP or by failing to notify a Offeror of a request seeking its Proposal. The Authority reserves the right to make an independent decision to disclose records and material.

Notwithstanding the above, all information regarding proposal responses will be held as confidential until such time as the evaluation has been completed; an award has been made by the Board of Directors or Authority Staff, as appropriate; and the contract has been fully negotiated.

**O. STATEMENT OF ECONOMIC INTERESTS**

The awarded Offeror (including designated employees and subconsultants) may be required to file Statements of Economic Interests (Form 700) in accordance with the Political Reform Act (Government Code section 81000 et seq.). This applies to individuals who make, participate in making, or act in a staff capacity for making governmental decisions. The Authority determines which individuals are required to file a Form 700, and if such determination is made, the individuals must file Form 700s with the Authority's Clerk of the Board no later than thirty (30) days after the execution of the Agreement, annually thereafter for the duration of the Agreement, and within thirty (30) days of termination of the Agreement.

**SECTION II: PROPOSAL CONTENT**



## **SECTION II. PROPOSAL CONTENT**

### **A. PROPOSAL FORMAT AND CONTENT**

#### **1. Format**

Proposals should be typed with a standard 12-point font, double-spaced. Proposals should not include any unnecessarily elaborate or promotional materials. Proposals should not exceed two hundred (200) pages in length, excluding any appendices, price proposal, cover letters, resumes, or required forms.

#### **2. Letter of Transmittal**

The Letter of Transmittal shall be addressed to Iris Deneau, Senior Contract Administrator, and must, at a minimum, contain the following:

- a. Identification of Offeror that will have contractual responsibility with the Authority. Identification shall include legal name of company, corporate address, telephone and fax number, and email address. Include name, title, address, email address, and telephone number of the contact person identified during period of proposal evaluation.
- b. Identification of all proposed subcontractors including legal name of company, contact person's name and address, telephone and fax number, and email address; relationship between Offeror and subcontractors, if applicable.
- c. Acknowledgement of receipt of all RFP addenda, if any.
- d. A statement to the effect that the proposal shall remain valid for a period of not less than 120 days from the date of submittal.
- e. Signature of a person authorized to bind Offeror to the terms of the proposal.
- f. Signed statement attesting that all information submitted with the proposal is true and correct.

#### **3. Technical Proposal**

##### **a. Qualifications, Related Experience, and References of Offeror**

This section of the proposal should establish the ability of Offeror to satisfactorily perform the required work by reasons of: experience in performing work of a similar nature; demonstrated competence in the services to be provided; strength and stability of the firm; staffing

capability; work load; record of meeting schedules on similar projects; and supportive client references.

Offeror to:

- (1) Provide a brief profile of the firm, including the types of services offered; the year founded; form of the organization (corporation, partnership, sole proprietorship); number, size, and location of offices; and number of employees.
- (2) Provide a general description of the firm's financial condition and identify any conditions (e.g., bankruptcy, pending litigation, planned office closures, impending merger) that may impede Offeror's ability to complete the project.
- (3) Describe the firm's experience in performing work of a similar nature to that solicited in this RFP, and highlight the participation in such work by the key personnel proposed for this project. Identify when and where the proposed system has been successfully deployed. To establish a design as service-proven, the Offeror shall submit specific details of the project that can be verified by provided references. The Offeror shall show, in detail, what has been changed from reference projects and why such changes will not hinder project success.
- (4) Identify subcontractors by company name, address, contact person, telephone number, email address, and project function. Describe Offeror's experience working with each subcontractor.
- (5) Identify all firms hired or retained to provide lobbying or advocating services on behalf of the Offeror by company name, address, contact person, telephone number and email address. This information is required to be provided by the Offeror immediately during the evaluation process, if a lobbyist or advocate is hired or retained.
- (6) Provide as a minimum three (3) references for the projects cited as related experience, and furnish the name, title, address, telephone number, and email address of the person(s) at the client organization who is most knowledgeable about the work performed. Offeror may also supply references from other work not cited in this section as related experience.

**b. Proposed Staffing and Project Organization**

This section of the proposal should establish the method, which will be used by the Offeror to manage the project, as well as identify key personnel assigned.

Offeror to:

- (1) Identify key personnel proposed to perform the work in the specified tasks and include major areas of subcontract work. Include the person's name, current location, proposed position for this project, current assignment, level of commitment to that assignment, availability for this assignment, and how long each person has been with the firm.
- (2) Include key personnel with the following minimum requirements:
  - The Project Manager shall possess at least five (5) years of demonstrable, recent (i.e., within the last ten [10] years), and extensive experience managing electronic payment system projects of similar size and scope as the OCTA project, and that include multiple points of integration with third-party systems and devices.
  - The Lead Engineer shall possess at least five (5) years demonstrable, recent (i.e., within the last ten [10] years), and extensive experience serving in a lead technical role on electronic payment system projects of similar size and scope as the OCTA project, and that include multiple points of integration with third-party systems and devices.
- (3) Furnish brief resumes (not more than two [2] pages each) for the proposed Project Manager, Lead Engineer, and other key personnel that includes education, experience, and applicable professional credentials.
- (4) Indicate adequacy of labor resources utilizing a table projecting the labor-hour allocation to the project by individual task.
- (5) Include a project organization chart, which clearly delineates communication/reporting relationships among the project staff.
- (6) Include a statement that key personnel will be available to the extent proposed for the duration of the project acknowledging that no person designated as "key" to the project shall be

removed or replaced without the prior written concurrence of the Authority.

- (7) Describe the proposed management approach to ensure adequate technical and administrative oversight over the work and to manage project schedule and budget. Include proposed procedures for technical and administrative communications between the Offeror and the Authority.
- (8) Discuss how the Operations and Maintenance (O&M) period will be staffed and managed with respect to daily monitoring of system performance, system troubleshooting and the escalation process, mobilization of as-needed or on call resources, and the Authority's primary point of contact during this period. Make reference to other projects that have similar O&M scope, and any lessons learned.

**c. Work Plan**

Offeror should provide a narrative, which addresses the Scope of Work, and shows the Offeror's understanding of Authority's needs and requirements, including the features and components required.

Offeror to:

- (1) Describe and provide diagrams of the proposed system architecture that identifies the relationship and proposed system and devices. Explain the interface points of each component, and the Application Programming Interfaces (APIs) that will be used. Describe the approach for providing and validating an open architecture system that will enable ease of integration for new partners and equipment, and meet the open architecture requirements of the Scope of Work. Offerors should discuss the open architecture capabilities of the proposed system relative to the Authority's planned integrations as described in Section 14 of the Scope of Work.
- (2) Provide a detailed description of the proposed modules of each back-office system including websites. The description shall identify specific commercial-off-the-shelf (COTS) and proprietary components included in the proposed system. Indicate whether industry standard equivalents are available and, if so, describe the benefits of the proposed solution. Describe the proposed systems for providing the full range of back-office operations as identified in the Scope of Work. Indicate which applications and functions are already operational, and which will be developed.

- (3) Describe the proposed mobile ticketing solution, identifying primary ticketing functionality/capabilities (e.g., visual/electronic validation, fare products supported) and any enhancements or additional user features supported (e.g., trip planning). Offeror to make reference to other mobile ticketing solutions the firm has deployed with similar scope.
- (4) Provide a proposed retail network coverage plan and describe how it meets the Authority's needs for a robust network of retail merchants. This should include a geographic mapping of proposed merchant locations plotted according to each location's geocoordinates. The Offeror should describe how it will meet the Authority's preference to include existing retailers in the RVS.
- (5) The Offeror should describe the proposed retail network architecture with supporting diagrams that clearly identify the relationships between applications and devices. Any significant technical variations in implementation, integration, or operation among the retail network providers should be described. Explain the proposed services including: transaction processor integration with retailers point of sale systems; authorization of transactions; reversals/voids; timely transaction processing; financial reconciliation; and system monitoring. Indicate which applications are already operational, and which will have to be developed.
- (6) Describe the Offeror's approach to open payments, and whether the firm has implemented this solution on other projects. Clarify any lessons learned or insights regarding adoption rates, fees, security impacts, inspection challenges, and unforeseen costs.
- (7) For the extended use smartcard and the potential limited use card, describe the proposed type of card, its security attributes, and its level of compliance with the standards referenced in the Scope of Work. Identify how soon in the project schedule cards could be made available and put into circulation to prepare for the transition to a new smart card system.
- (8) Describe the Offeror's experience with implementing the required fare structures detailed in the technical specification. Key features include stored value, various pass types, reduced fares, fare capping, promotional fares, and other required policies.

- (9) Provide a detailed description of proposed system hardware – Ticket Office Terminals and Mobile Sales Devices. For each device: describe supported functionality as it relates to the requirements of the Scope of Work; describe the hardware communication interfaces provided; and describe the maintainability of modules and assemblies.
- (10) Present the proposed project schedule, clearly identifying critical milestones to achieve system design, testing, pilot, and final acceptance. Identify anticipated risks in the proposed schedule and strategies to mitigate them.
- (11) Describe the various testing phases of the proposed solution. The Offeror should identify the duration, proposed location, and personnel (by function or department) recommended for participation in each testing phase.
- (12) Provide a list of the training courses, identifying the format (e.g., classroom, field, etc.), duration, student capacity, and recommended staff participation (by function).
- (13) Identify methods that Offeror will use to ensure quality control, as well as budget and schedule control for the project.
- (14) Identify any special issues or problems that are likely to be encountered in this project and how the Offeror would propose to address them.
- (15) Offeror is encouraged to propose enhancements or procedural or technical innovations to the Scope of Work that do not materially deviate from the objectives or required content of the project.

**d. Exceptions/Deviations**

State any technical and/or contractual exceptions and/or deviations from the requirements of this RFP, including the Authority's technical requirements and contractual terms and conditions set forth in the Scope of Work (Exhibit A) and Proposed Agreement (Exhibit C), using the form entitled "Proposal Exceptions and/or Deviations" included in this RFP. This Proposal Exceptions and/or Deviations form (Exhibit G) must be included in the original proposal submitted by the Offeror. If no technical or contractual exceptions and/or deviations are submitted as part of the original proposal, Offerors are deemed to have accepted the Authority's technical requirements and contractual terms and conditions set forth in the Scope of Work (Exhibit A) and Proposed Agreement (Exhibit C). Offerors will not be allowed to submit the Proposal Exceptions and/or Deviations form

(Exhibit G) or any technical and/or contractual exceptions after the proposal submittal date identified in the RFP. Exceptions and/or deviations submitted after the proposal submittal date will not be reviewed by Authority.

All exceptions and/or deviations will be reviewed by the Authority and will be assigned a “pass” or “fail” status. Exceptions and deviations that “pass” do not mean that the Authority has accepted the change but that it is a potential negotiable issue. Exceptions and deviations that receive a “fail” status means that the requested change is not something that the Authority would consider a potential negotiable issue. Offerors that receive a “fail” status on their exceptions and/or deviations will be notified by the Authority and will be allowed to retract the exception and/or deviation and continue in the evaluation process. Any exceptions and/or deviation that receive a “fail” status and the Offeror cannot or does not retract the requested change may result in the firm being eliminated from further evaluation.

**4. Cost and Price Proposal**

As part of the cost and price proposal, the Offeror shall submit proposed pricing to provide the services for each work task described in Exhibit A, Scope of Work.

The Offeror shall complete the "Price Summary Sheet" form included with this RFP (Exhibit B), and furnish any narrative required to explain the prices quoted in the schedules. It is anticipated that the Authority will issue a firm-fixed price contract.

**5. Appendices**

Information considered by Offeror to be pertinent to this project and which has not been specifically solicited in any of the aforementioned sections may be placed in a separate appendix section. Offerors are cautioned, however, that this does not constitute an invitation to submit large amounts of extraneous materials. Appendices should be relevant and brief.

**B. FORMS**

**1. Campaign Contribution Disclosure Form**

In conformance with the statutory requirements of the State of California Government Code Section 84308, part of the Political Reform Act and Title 2, California Code of Regulations 18438 through 18438.8, regarding campaign contributions to members of appointed Board of Directors, Offeror is required to complete and sign the Campaign Contribution Disclosure Form provided in this RFP and submit as part of the proposal.

This form **must** be completed regardless of whether a campaign contribution has been made or not and regardless of the amount of the contribution.

The prime contractor, subconsultants, lobbyists, and agents are required to report all campaign contributions made from the proposal submittal date up to and until the Board of Directors makes a selection.

**2. Status of Past and Present Contracts Form**

Offeror shall complete and sign the form entitled “Status of Past and Present Contracts” provided in this RFP and submit as part of its proposal. Offeror shall identify the status of past and present contracts where the firm has either provided services as a prime vendor or a subcontractor during the past five (5) years in which the contract has been the subject of or may be involved in litigation with the contracting authority. This includes, but is not limited to, claims, settlement agreements, arbitrations, administrative proceedings, and investigations arising out of the contract. Offeror shall have an ongoing obligation to update the Authority with any changes to the identified contracts and any new litigation, claims, settlement agreements, arbitrations, administrative proceedings, or investigations that arise subsequent to the submission of Offeror's proposal.

A separate form must be completed for each identified contract. Each form must be signed by the Offeror confirming that the information provided is true and accurate.

**3. Proposal Exceptions and/or Deviations Form**

Offerors shall complete the form entitled “Proposal Exceptions and/or Deviations” provided in this RFP and submit it as part of the original proposal. For each exception and/or deviation, a new form should be used, identifying the exception and/or deviation and the rationale for requesting the change. Exceptions and/or deviations submitted after the proposal submittal date will not be reviewed nor considered by the Authority.



**SECTION III: EVALUATION AND AWARD**

### **SECTION III. EVALUATION AND AWARD**

#### **A. EVALUATION CRITERIA**

The Authority will evaluate the offers received based on the following criteria:

**1. Qualifications, Related Experience, and References of Offeror 20%**

Technical experience in performing work of a closely similar nature; strength and stability of the firm; strength, stability, experience, and technical competence of subcontractors; assessment by client references.

**2. Proposed Staffing and Project Organization 20%**

Qualifications of project staff, particularly key personnel and especially the Project Manager; key personnel's level of involvement in performing related work cited in "Qualifications of the Firm" section; logic of project organization; adequacy of labor commitment; concurrence in the restrictions on changes in key personnel; project management.

**3. Work Plan 35%**

Depth of Offeror's understanding of Authority's requirements and overall quality of work plan; logic, clarity, and specificity of work plan; appropriateness of resource allocation among the tasks; reasonableness of proposed schedule; utility of suggested technical or procedural innovations; description of proposed system architecture.

**4. Cost and Price 25%**

Reasonableness of the total price, as well as the individual tasks; competitiveness with other offers received; adequacy of data in support of figures quoted.

#### **B. EVALUATION PROCEDURE**

An evaluation committee will be appointed to review all proposals received for this RFP. The committee is comprised of Authority staff and may include outside personnel. The committee members will evaluate the written proposals using criteria identified in Section III A. A list of top-ranked proposals, firms within a competitive range, will be developed based upon the totals of each committee members' score for each proposal.

During the evaluation period, the Authority may interview some or all of the proposing firms. The Authority has established May 10, 2023 as the date to conduct interviews. All prospective Offerors are asked to keep this date available. No other interview dates will be provided, therefore, if an Offeror is unable to attend

the interview on this date, its proposal may be eliminated from further discussion. The interview may consist of a short presentation by the Offeror after which the evaluation committee will ask questions related to the firm's proposal and qualifications.

At the conclusion of the proposal evaluations, the evaluation committee will score the proposals to develop a competitive range. Offerors remaining within the competitive range may be asked to submit a Best and Final Offer (BAFO). In the BAFO request, the firms may be asked to provide additional information, confirm or clarify issues and submit a final cost/price offer. A deadline for submission will be stipulated.

At the conclusion of the evaluation process, the evaluation committee will recommend to the Finance and Administration Committee, the Offeror with the highest final ranking or a short list of top ranked firms within the competitive range whose proposal(s) is most advantageous to the Authority. The Board Committee will review the evaluation committee's recommendation and forward its recommendation to the Board of Directors for final action.

**C. AWARD**

The Authority's Board of Directors will consider the selection of the firm(s) recommended by the Board Committee.

The Authority may also negotiate contract terms with the selected Offeror prior to award, and expressly reserves the right to negotiate with several Offerors simultaneously and, thereafter, to award a contract to the Offeror offering the most favorable terms to the Authority.

Offeror acknowledges that the Authority's Board of Directors reserves the right to award this contract in its sole and absolute discretion to any Offeror to this RFP regardless of the evaluation committee's recommendation or recommendation of a Board Committee.

The Authority reserves the right to award its total requirements to one Offeror or to apportion those requirements among several Offerors as the Authority may deem to be in its best interest. In addition, negotiations may or may not be conducted with Offerors; therefore, the proposal submitted should contain Offeror's most favorable terms and conditions, since the selection and award may be made without discussion with any Offeror.

The selected Offeror will be required to submit to the Authority's Accounting department a current IRS W-9 form prior to commencing work.

**D. NOTIFICATION OF AWARD AND DEBRIEFING**

Offerors who submit a proposal in response to this RFP shall be notified via CAMM NET of the contract award. Such notification shall be made within three (3) business days of the date the contract is awarded.

Offerors who were not awarded the contract may obtain a debriefing concerning the strengths and weaknesses of their proposal. Unsuccessful Offerors, who wish to be debriefed, must request the debriefing in writing or electronic mail and the Authority must receive it within three (3) business days of notification of the contract award.

**EXHIBIT A: SCOPE OF WORK**

# **SCOPE OF WORK**

## **Rider Validation System**



## Table of Contents

<b>1</b>	<b>Acronyms and Abbreviations.....</b>	<b>7</b>
<b>2</b>	<b>Glossary.....</b>	<b>9</b>
<b>3</b>	<b>Introduction .....</b>	<b>13</b>
3.1	Project Summary.....	13
3.2	Project Timeline .....	13
3.3	Current System Summary .....	14
3.3.1	Agency Overview .....	14
3.3.2	Current Fare Collection System .....	15
3.3.3	Current Fare Collection System .....	16
3.4	Project Goals .....	16
<b>4</b>	<b>Project Management .....</b>	<b>17</b>
4.1	Project Manager and Lead Engineer.....	17
4.2	Project Meetings.....	17
4.2.1	Project Kickoff Meeting .....	17
4.2.2	Progress Review Meetings.....	18
4.2.3	Project Coordination Meetings.....	18
4.3	Project Management Plan .....	19
4.3.1	Master Program Schedule .....	19
4.3.2	Risk Management .....	19
4.3.3	Subcontractor Management.....	20
4.3.4	Master Issues List.....	20
<b>5</b>	<b>Design Reviews .....</b>	<b>22</b>
5.1	General Requirements.....	22
5.2	Preliminary Design Review .....	23
5.3	Final Design Review .....	24
<b>6</b>	<b>Common Design Requirements .....</b>	<b>26</b>
6.1	Service-Proven Design .....	26
6.2	Non-proprietary Technology .....	26
6.3	Supply and Availability .....	27
6.4	Software Design Principles .....	27
6.5	Maintainability and Serviceability.....	29
6.6	Operating Environment .....	29
6.6.1	Ticket Office Equipment Climate Conditions .....	29
6.6.2	Electrical.....	30
6.7	Licensing and Data Ownership.....	30
6.8	ADA Compliance .....	31
6.9	Code and Regulation Compliance.....	31
<b>7</b>	<b>System Architecture.....</b>	<b>33</b>
7.1	Account-Based System.....	33
7.2	Real-Time Communications.....	33
7.3	Open Architecture .....	34
7.3.1	Application Programming Interfaces (APIs).....	34

7.3.2	Transaction Formats .....	42
7.4	Risk Mitigation Techniques .....	42
7.5	Payment Processing .....	43
7.5.1	Open Payments .....	45
7.6	System Security .....	45
7.7	PCI/EMV .....	46
7.8	Privacy .....	47
<b>8</b>	<b>Fare Media .....</b>	<b>48</b>
8.1	Contactless Fare Media .....	48
8.1.1	General Requirements .....	48
8.1.2	Physical Characteristics .....	49
8.1.3	Fare Media Format .....	50
8.1.4	Transit Payment Application .....	50
8.1.5	Third-Party Media .....	51
8.2	Paper Ticket Media .....	51
8.2.1	General Requirements .....	51
8.2.2	2D Barcode .....	51
8.3	Media Security and Fraud Prevention .....	52
8.4	Initial Fare Media Supply .....	52
8.5	Fare Media Sales .....	53
<b>9</b>	<b>Fare Structure .....</b>	<b>55</b>
9.1	General Requirements .....	55
9.2	Fare Products .....	56
9.3	Transfers .....	57
9.4	Fare Policy .....	57
9.5	Fare Capping .....	59
9.6	Fraud Detection .....	60
9.7	Special Fare Programs .....	60
9.8	Fare Management .....	62
<b>10</b>	<b>Open Payments .....</b>	<b>64</b>
10.1	General Requirements .....	64
10.2	Fare Policy .....	65
10.3	Security .....	65
10.4	Fraud Detection and Liability .....	65
10.5	Real Time Communication .....	66
<b>11</b>	<b>Equipment .....</b>	<b>67</b>
11.1	Common Requirements .....	67
11.1.1	General Requirements .....	67
11.1.2	Hardware .....	67
11.1.3	Software .....	68
11.2	Inspection/Validation Application .....	68
11.2.1	General Requirements .....	68
11.2.2	User Interface .....	69
11.2.3	Transaction Processing .....	70
11.2.4	Configuration .....	72



11.3	Ticket Office Terminal .....	72
11.3.1	General Requirements .....	72
11.3.2	Hardware .....	74
11.3.3	Software .....	78
11.3.4	Configuration .....	81
11.4	Mobile Sales Device .....	85
11.4.1	General Requirements .....	85
11.4.2	Hardware .....	86
11.4.3	Software .....	87
11.4.4	Configuration .....	87
<b>12</b>	<b>Back Office .....</b>	<b>88</b>
12.1	General Requirements .....	88
12.2	Account-Based Transaction Processor .....	88
12.2.1	General Requirements .....	89
12.2.2	Fare Distribution .....	89
12.2.3	Fare Payment .....	90
12.2.4	Fare Inspection .....	91
12.3	System Monitoring Management .....	91
12.4	Revenue Management .....	92
12.4.1	General Requirements .....	92
12.4.2	General Ledger .....	93
12.4.3	Accounts Receivable .....	93
12.4.4	Funds Settlement .....	94
12.4.5	Reporting .....	95
12.5	Media Inventory Management & Fulfillment .....	95
12.6	Customer Relationship Management (CRM) .....	96
12.6.1	General Requirements .....	96
12.6.2	Customer Database .....	97
12.6.3	CRM Application .....	97
12.6.4	Customer Service Records .....	99
12.7	Data Warehouse and Reporting .....	100
12.8	System Hosting .....	102
<b>13</b>	<b>Websites .....</b>	<b>104</b>
13.1	Website Design .....	104
13.1.1	Web Design Criteria .....	104
13.1.2	Website Payment Processing .....	105
13.2	Public Website .....	105
13.2.1	General Requirements .....	105
13.2.2	Account Registration .....	106
13.2.3	Autoload .....	107
13.2.4	Fare Media Purchase and Registration .....	108
13.2.5	Fare Product Purchases .....	109
13.2.6	Reduced Fare .....	109
13.2.7	Account Status and Transaction History .....	109
13.2.8	Customer Service .....	110
13.2.9	Mobile-Optimized Website .....	110

13.3	Institutional Website .....	111
13.3.1	General Requirements .....	111
13.3.2	Registration.....	112
13.3.3	Adding and Deleting Participants .....	112
13.3.4	Placing Orders .....	113
13.3.5	Payment .....	114
<b>14</b>	<b>Integrations .....</b>	<b>115</b>
14.1	Streetcar TVMs .....	115
14.2	Regional Agencies .....	115
14.3	Loyalty Program .....	116
<b>15</b>	<b>Training .....</b>	<b>118</b>
15.1	General Requirements .....	118
15.2	Training Plan .....	119
15.3	Training Materials .....	119
15.4	Training Courses .....	120
15.5	Manuals .....	122
15.5.1	Manual Content and Format .....	122
15.5.2	Required Manuals.....	123
<b>16</b>	<b>Testing.....</b>	<b>124</b>
16.1	General Requirements .....	124
16.2	Test Documentation .....	125
16.2.1	Test Plan.....	125
16.2.2	Test Procedures .....	125
16.2.3	Test Reports .....	126
16.3	Agency Test Facility.....	126
16.4	Integration Testing.....	128
16.4.1	System Integration Testing .....	128
16.4.2	Field Integration Test .....	130
16.5	Acceptance Testing.....	131
16.5.1	Pilot.....	131
16.5.2	System Acceptance Test .....	132
16.5.3	Final Acceptance .....	133
<b>17</b>	<b>Operations and Maintenance Agreement .....</b>	<b>135</b>
17.1	Warranty .....	135
17.2	Back Office Operations .....	136
17.3	Software Maintenance .....	137
<b>18</b>	<b>Performance Measurement .....</b>	<b>140</b>
18.1	RVS Key Performance Indicators .....	140
18.1.1	Back Office .....	140
18.1.2	Operations .....	141
18.2	Performance and Failure Definition .....	142
18.2.1	General Requirements .....	142
18.2.2	Failure Review Board .....	142
18.2.3	Chargeable Failures.....	143

	18.2.4 Non-Chargeable Failures.....	144
	18.2.5 Critical Failures.....	144
18.3	Retail Network Key Performance Indicators.....	145
	18.3.1 Retail Network Coverage .....	145
	18.3.2 Retail Funds Settlement.....	145
	18.3.3 Retail Financial Accuracy .....	145
18.4	Performance Reporting .....	146
18.5	Penalty Assessment .....	146
<b>19</b>	<b>Retail Network.....</b>	<b>147</b>
19.1	General Requirements.....	147
19.2	Fare Collection System Integration.....	148
19.3	Network Requirements.....	150
<b>20</b>	<b>Mobile Ticketing Application (Option) .....</b>	<b>154</b>
20.1	RVS Integration .....	154
20.2	Mobile Compatibility .....	154
20.3	Mobile Design .....	155
20.4	Mobile Distribution.....	156
20.5	Mobile Fare Structure.....	156
20.6	Mobile Accounts .....	157
	20.6.1 Reduced Fares.....	158
	20.6.2 Institutional Programs .....	159
20.7	Mobile Purchasing .....	160
20.8	Mobile Validation.....	160
20.9	Fraud Prevention and Security .....	162
20.10	Trip Planning .....	163
20.11	Rider Tools .....	164
20.12	Quality Assurance .....	164
20.13	Cash Payments.....	165
<b>Appendix A</b>	<b>Current Fare Policy Summary .....</b>	<b>166</b>
<b>Appendix B</b>	<b>Current Retail Network Vendors.....</b>	<b>167</b>

# 1 Acronyms and Abbreviations

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The following acronyms and abbreviations appear in this document

ACH – Automated Clearing House	ECR – Engineering Change Request
ADA – Americans with Disabilities Act	EEIG – European Economic Interest Grouping
ADAAG – Americans with Disabilities Act	EFT – Electronic Funds Transfer
Accessibility Guidelines	EMI – Electromagnetic Interference
AES – Advanced Encryption Standard	EMV – Europay, MasterCard, Visa
AJAX – Asynchronous JavaScript and XML	EN – European Norm
ANSI – American National Standards Institute	EPROM – Erasable Programmable Read-Only
AOB – Annual Operating Budget	Memory
API – Application Programming Interface	ERTMS – European Railway Traffic Management
APK – Android Application Package	System
APN – Access Point Name	ESN – Electronic Serial Number
AR – Accounts Receivable	ETCS – European Train Control System
ATC – Air Traffic Control system	ETL – Extract, Transform and Load
ATP – Account-Based Transaction Processor	EU – Extended Use (fare media)
AUT – Application Under Test	FACI – First Article Configuration Inspection
AVS – Address Verification System	FAQ – Frequently Asked Questions
AWS – Amazon Web Services	FAT – Factory Acceptance Test
BCPU – Bank Card Processing Unit	FCC – Federal Communications Commission
BHU – Bill Handling Unit	FDR – Final Design Review
BIB – Bus-In-A-Box	FHD – Full High Definition – A screen resolution of
BNA – Bill Note Acceptor	1920x1080 pixels
BRT – Bus Rapid Transit	FIPS – Federal Information Processing Standard
CAC – Common Access Card	FIT – Field Integration Test
CAD – Computer-Aided Design	FMI – Field Modification Instructions
CAD/AVL – Computer-aided Dispatch/Automatic	FRB – Failure Review Board
Vehicle Location System	FUT – Functional Unit Test
CDA – Combined Dynamic Data Authentication	FY – Fiscal Year
CDMA – Code Division Multiple Access	GFCI – Ground Fault Circuit Interrupter
CDR – Conceptual Design Review	GPS – Global Positioning System
CDRL – Contract Data Requirements List	GSM – Global System for Mobile Communications
CEC – California Energy Commission	HTML – Hypertext Markup Language
CHU – Coin Handling Unit	HTTPS – Hypertext Transfer Protocol Secure
COTS – Commercial-Off-The-Shelf	ICD – Interface Control Document
CRM – Customer Relationship Management	ID – Identification
CSC – Contactless Smartcard	IEC – International Electrotechnical Commission
CSV – Comma Separated Value	IEEE – Institute of Electrical and Electronics
DBE – Disadvantaged Business Enterprise	Engineers
DCU – Driver Control Unit	IIN – Issuer Identification Number
DDA – Dynamic Data Authentication	INCITS – International Committee for Information
DOB – Date of Birth	Technology Standards
DOE – Department of Education	I/O – Input/Output
dpi – Dots Per Inch	iOS – Operating system for Apple products
ECDSA – Elliptic Curve Digital Signature Algorithm	IP – Internet Protocol

IRS – Internal Revenue Service (US)	PII – Personally Identifiable Information
ISO – International Standards Organization	PIN – Personal Identification Number
IT – Information Technology	PIV – Personal Identity Verification
JSON – JavaScript Object Notation	PM – Project Manager
K-12 – Kindergarten through Grade 12	PMP – Project Management Plan
KPI – Key Performance Indicator	POS – Point of Sale system
LAN – Local Area Network	QA – Quality Assurance
LCD – Liquid Crystal Display	QC – Quality Control
LD – Liquidated Damages	QR – Quick Response
LDAP – Lightweight Directory Access Protocol	QSA – Qualified Security Assessor
LED – Light-Emitting Diode	REST – Representational State Transfer
LLRU – Lowest Level Replaceable Unit	RFI – Radio Frequency Interference
LTE – Long Term Evolution	RMA – Returned Materials Authorization
LU – Limited Use (fare media)	RMS – Revenue Management System
MDM – Mobile Device Management	RSA – A type of public-key cryptosystem (see Glossary)
MIFARE – Widespread contactless chip family	RVS – Rider Validation System
MIL – Master Issues List	SAE – Society of Automotive Engineers
MIMS – Media Inventory Management System	SAM – Secure Access Module
MS – Microsoft	SAT – System Acceptance Test
MSD – Mobile Sales Device	SCADA – Supervisory Control and Data Acquisition
NCITS – National Committee for Information Technology Standards	SED – Smartcard Encoder/Dispenser
NEC – National Electric Code	SIT – System Integration Test
NFC – Near Field Communication	SNMP – Simple Network Management Protocol
NFPA – National Fire Protection Association	SOC – Service Organization Control
NIC – Network Interface Controller	SQL – Structured Query Language
NIST – National Institute of Standards and Technology	TCP – Transmission Control Protocol
NTP – Notice to Proceed	TLS – Transport Layer Security
OCTA – Orange County Transportation Authority	TOT – Ticket Office Terminal
OEM – Original Equipment Manufacturer	TVM – Ticket Vending Machine
OSHA – Occupational Safety and Health Administration	UID – Unique Identification Number
PAN – Primary Account Number	UL – Underwriters Laboratories
PAR - Payment Account Referenced	UPS – Uninterruptable Power Supply
PAT – Production Acceptance Test	U.S. – United States
PC – Personal Computer	USB – Universal Serial Bus
PCI-DSS – Payment Card Industry Data Security Standard	VDC – Volts of Direct Current
PDF – Portable Document Format	VPN – Virtual Private Network
PDR – Preliminary Design Review	WAN – Wide Area Network
	WBS – Work Breakdown Structure
	WCAG – Web Content Accessibility Guidelines
	Wi-Fi – Wireless LAN

## 2 Glossary

Term	Description
Account-based system	System where account details are stored at a central server, as opposed to a card-based system, where account information resides on the fare media.
Agency	Any reference to Agency in these technical specifications refers to OCTA.
API	A set of protocols that define interaction between software packages. APIs can be proprietary or open source, but are required for data exchange between software systems.
Autoload	Process where value is loaded automatically to a transit account when the account balance reaches a certain threshold, or at a specified time interval.
ACH	ACH is an electronic network for financial transactions in the U.S. ACH processes large volumes of credit and debit transactions in batches. The ACH system is the primary EFT system used by agencies and businesses to receive payments.
Back office	The fare engine and transaction processing component and all systems supporting back office functions, including the data warehouse, customer relationship management module, and other modules which rely on transaction data to function.
Bank card authorization	Step during a credit or debit payment transaction when the card and account is verified by the card issuing bank and payment is committed. Usually is processed by a credit card processor, and often requires real-time communication link.
Business rules	The rules and guidelines that govern an agreement between parties. In an electronic fare system, the business rules define how the system will enforce the Agency fare policies.
Canned reports	Pre-built reports that provide fundamental data in a database-driven operation.
Card-based system	System where account details are stored on the fare media itself rather than in the back office; fare processing is performed by the fare payment device and updated value is written to the media after each transaction.
Closed-loop	A system or payment where data processing is performed entirely within the system.
COTS	Term for products that are available for purchase in the open marketplace by the general public. COTS goods are generally widely available at lower cost than privately developed products.
CAD/AVL	System that provides vehicle dispatch, scheduling, location, and maintenance services within a centralized dispatch center. CAD/AVL systems typically require operator login, which is then integrated with the fare collection system and equipment.
Contactless bank card	Bank-issued credit or debit card that supports contactless payment through an ISO 14443 communication interface.

Term	Description
Contactless reader	Hardware component that supports a contactless communication protocol such as ISO 14443, and is embedded into contactless fare collection equipment.
CSC	Any card that supports contactless communications through an ISO 14443 interface.
CDRL	The CDRL number refers to a series of contract documents to be provided by the Contractor, that address how the Contractor will fulfill the associated requirements.
Contractor	The firm under contract to the Agency for the design, manufacture, testing, installation, and maintenance of the fare collection system.
Customer account	An account registered by an individual or institution that can be linked (or unlinked) to multiple transit accounts. One (1) individual or institutional customer account can be comprised of multiple transit accounts that each have their own levels of stored value.
Customer Relationship Management (CRM) system	Enterprise software system used to manage customer relationships including customer support information, sales data, and IT support. Usually managed through customized software portal developed to the requirements of the Agency.
Data warehouse	Central database used as primary system for reporting and data analysis.
EMV	Global payment standard for bank-issued contact and contactless credit/debit cards.
IP	The communications protocol of the public Internet, many WAN, and most LAN. The IP is part of the TCP/IP protocol suite, and the terms "IP network" and "TCP/IP network" are synonymous.
ISO-14443	International standard that defines contactless proximity cards, including physical layer definition and transmission protocols. Used for many identification and transportation purposes.
IIN	The first six digits of a credit or debit card Primary Account Number that identifies the institution (e.g., bank) that issued the card to the cardholder.
Lead Engineer	The employee who will be assigned by the Contractor to oversee onsite design, testing, and installation functions.
MIFARE	Family of contactless chips manufactured by NXP Semiconductors for use in contactless smartcards. Several variants of MIFARE chips are widely used by U.S. transit agencies.
NFC	Wireless communication standard that defines communications between mobile devices such as smartphones, and includes the use of secure memory to store sensitive data on devices. Based on existing communications standards, including ISO 14443.
Negative list	Where media is identified that is invalid for use and rejected.
Non-volatile memory	Memory or storage that is able to save records or information even without power, typically used for secondary or long-term storage.

Term	Description
Open architecture	A system architecture where data exchange and format is based on published standards allowing for interoperability between equipment from different contractors. Contrary to closed architecture, where the interfaces are proprietary.
Open payments	Payment model where payments are made using industry standard bank cards.
Open source	Software development model that uses publicly available source code in effort to encourage collaboration and interoperability. Use, modification, and distribution are usually governed by open source licenses.
Open standards	A system that leverages industry standards that define data formats and protocols for communications, payment processing, and security (e.g., ISO 14443, 802.11, Visa payWave, and PCI) rather than proprietary formats and protocols.
OEM	Manufacturer that produces products sold by another company, usually under that company's brand or model. It is common for the manufacturer to provide warranty support for the product.
PAR	A unique identifier associated with a specific cardholder account number. This 29 identification number can be used in place of sensitive consumer identification fields, and transmitted across the payments ecosystem to facilitate consumer identification.
PCI-DSS	Standard that defines security requirements for contractors accepting bank cards for payment.
Payment credential	An instrument that provides proof of qualification to make a payment, usually associated with a credit card company or closed-loop card issuer.
PII	Information that can be used to uniquely identify an individual. Usually subject to stringent security and data transmission rules and regulations.
POS system	Manned terminal used for the sale of fare media and loading of transit value. Most commonly used at in-person customer service centers or retail locations.
Positive list	Where media is identified that is allowed immediate use, without pre-authorization or account verification.
PAN	The account number used to access a bank-administered credit or debit account. This number is embossed on the front of the customer's bank card, and is usually the number transmitted when a contactless bank card is used for payment.
Project Manager	The Contractor employee will report to the Agency Fare Systems Administrator and will provide management oversight for the implementation of the fare collection system.
RSA	RSA is one of the first practicable public-key cryptosystems and is widely used for secure data transmission. RSA stands for Ron Rivest, Adi Shamir and Leonard Adleman, who first publicly described the algorithm in 1977.



Term	Description
Special fare programs	Programs administered for certain groups and institutions requiring a different set of fares rules. Includes business, educational, social service, and government entities that have special public transportation needs.
TVM	Self-service fare media vending device where customers can purchase, reload, or inspect fare media. Can have many physical forms.
Tokenization	Process to secure sensitive data elements during processing and transmission by replacing the data with a proxy, or token, and storing the original data, which can be accessed using the proxy, in a secure location.
Transit account	In an account-based electronic fare system, the back office account that stores the value loaded by the customer and used to pay fares.
Validator	Physical device used to accept fare payment. Usually installed at the entrance to a vehicle or at a station.
Velocity check	A fraud prevention method that identifies when individual cards have been used above a threshold within a set time period.
VPN	The extension of a private network through a public domain using encryption and other security measures. Allows access to private network from remote location or device.

## **3 Introduction**

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### **3.1 Project Summary**

The Orange County Transportation Authority (OCTA) intends to procure and implement a new account-based, open architecture electronic fare payment system. OCTA intends to solicit the products and services of an experienced and qualified fare system vendor, or “Contractor”. The Contractor shall develop, install, and implement a Rider Validation System (RVS) System for OCTA. The RVS will serve as a common fare system platform and unify many aspects of the fare collection system, with the following high-level features:

- Account-based back office utilizing a proven design that has been previously deployed in a comparable transit environment.
- Issuance of contactless smartcard fare media, with support for other forms of fare media.
- Deploy a retail network of “gift card” retail locations where customers can purchase and reload electronic fare media.
- Support for modern and innovative fare policies including stored value, reduced fares, fare capping, institutional programs, and other special programs.
- Ability to accept Open Payments including contactless debit/credit cards and mobile wallets such as Apple and Google Pay.
- Deployment of public and institutional websites that offer comprehensive account management and administrative features.
- Ability to manage and process transactions from several channels including fare validators (bus and rail), TVM, websites, inspection devices, mobile ticketing, and retail network.
- Electronic payment processing compliant with PCI and EMV standards.
- PCI compliant hosted or cloud-based central management system to manage and configure the system, in addition to reporting and data querying capabilities.
- Open architecture with unrestricted access to system API to allow future integration and expansion of the system.
- Option for an integrated mobile ticketing solution that shares a common back office and utilizes modern design and proven quality control.

This document contains functional requirements that describe the intended system design while allowing the flexibility for an accelerated and agile implementation.

### **3.2 Project Timeline**

The RVS project timeline is expected to be aggressive, but dynamic as external factors change. The implementation period from NTP to final system acceptance shall be no longer than eighteen (18) months, at which point all system acceptance testing will have verified all functionality, back office modules, network connectivity, API connections, and all required integrations.

The design review phase shall consist of two (2) design reviews to facilitate a rapid resolution of outstanding design decisions. Design review will be immediately followed by development and implementation across all required platforms of the RVS.

Development will transition to a testing phase which will include lab, field, and pilot testing. No successive testing phase will commence until the previous phase has successfully passed.

The granting of Final Acceptance shall start the two (2)-year warranty period, and five (5)-year Operations and Maintenance contract which will include a five (5)-year option. The total RVS operations period will be for a total of ten (10) possible years.

Figure 3-1 provides an overview of the estimated project timeline. This figure is meant as an estimate, but the project team shall revisit/revise the project schedule regularly to try to achieve that timeframe. Contractor shall provide feedback and innovative suggestions to minimize risk and help meet the eighteen (18) month project schedule.

*Figure 3-1: Estimated Project Timeline*

Phase	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Notice to Proceed (NTP)																			
Requirements Review																			
Design Review																			
Development and Implementation																			
Lab and Field Testing																			
Pilot																			
Training																			
Final Acceptance																			

## 3.3 Current System Summary

### 3.3.1 Agency Overview

OCTA operates local bus, express bus, and ADA compliant paratransit (OC ACCESS) services throughout 465 square miles, including 34 cities and the unincorporated areas of Orange County. OCTA provides direct connection to neighboring counties via the express bus service and local demand-response ride share service called OC-Flex. OCTA is also currently implementing the OC Streetcar project, which will serve the cities of Santa Ana and Garden Grove. Table 2-1 provides an overview of OCTA's system and service characteristics prior to the pandemic in 2020.

*Figure 3-2: OCTA System and Service Characteristics (pre-pandemic)*

General	
Annual Operating Budget (AOB)	\$290.3M (FY18-19)
Farebox Recovery (Operations)	16.5% (FY18-19)
Ridership	40 million (annual)
Bus	
Number of Buses	520
Number of Lines	60

Number of Bus Stops	5,500
Paratransit (OC ACCESS)	
Number of Vehicles	248

### 3.3.2 Current Fare Collection System

OCTA's current fare system is based on its GFI Genfare farebox fleet, implemented 22 years ago and installed on every fixed-route vehicle. The GFI farebox is a validating unit that accepts cash payments and can detect authentic bills and coins with varying degrees of accuracy. The majority of the OCTA's current fare collection revenue comes from onboard cash purchases.

The farebox can also issue/print magnetic-stripe (magstripe) paper media and is capable of validating magstripe media upon initial purchase or subsequent rides, depending on pass type. The magstripe media cannot be reloaded or reused after the pass has expired. Colleges participating in the College Pass Program, such as Santa Ana Community College and Santiago College, have the ability to reprogram the expiration date on the student passes.

Figure 3-3 shows an example of the OCTA farebox functionality, as well as the existing OCTA fare media.

Figure 3-3: OCTA Farebox and Fare Media



With the farebox fleet in place, modernization of OCTA's fare collection system started in 2015 with the launch of the moovel mobile ticketing system. This new system consisted of a visually-validated mobile ticketing application and a limited number of onboard bus validators installed on its Express Routes for pilot purposes. In 2016, OCTA retained INIT to produce and install onboard bus validators for the entire fleet to optically validate the 2D barcode on the already deployed moovel mobile ticketing application. The 2D barcode is dynamically generated and includes fraud prevention tools to prevent the improper sharing or duplication of mobile ticketing products.

After a phased implementation, the full OCTA fleet completed validator installations in 2018, marking a successful integration of two (2) fare collection vendors. The current mobile ticketing application can be used on all fixed-route buses and allows customers the ability to purchase multiple passes that can be activated

immediately or stored for future use. Fare validation on the mobile application requires customers to first activate a pass, and then scan the 2D barcode generated on their phone on the bus validator. In 2020, OCTA executed a contract with Bytemark to continue and mirror the existing mobile ticketing application.

### **3.3.3 Current Fare Collection System**

OCTA offers one-day and 30-day passes for all routes. Fare categories include full fare, as well as reduced fare for senior and disabled citizens, and College students not participating in the College Pass Program. Other OCTA pass types include college and university passes, as well as perk passes for employees. College and university pass that contain magnetic encodings are accepted at fareboxes and are distributed by the school. The exceptions are the California State University Fullerton, Chapman University, and University of California, Irvine where the agency is responsible for creating the passes.

For onboard purchases, customers insert cash or coin into the GFI farebox, which then issues a pass based on the type of pass and route chosen. This process has a direct impact on OCTA's bus dwell time and will be a consideration for future fare options. Senior and disabled citizens must show valid ID to be able to purchase reduced fares on-board.

For prepaid purchases, customers can purchase passes at more than 140 participating retail locations, on the website, over the phone, by mail, on the mobile ticketing application, or in-person at the OCTA store. The price of prepaid passes are cheaper than on-board passes. For reduced fare purchases made through the mobile ticketing application, website, and mail, customers must apply for an OCTA Senior Reduced Fare ID, OCTA Disabled Fare ID, or College Fare ID.

## **3.4 Project Goals**

To guide the development of the new fare collection system, key project stakeholders from OCTA developed a series of project goals. These goals provide the framework for the system design described in these specifications.

- Improve customer convenience and experience
- Facilitate fare policy simplification, equity, and innovation
- Validate ridership for revenue reimbursement for pass programs
- Improve data collection for analysis capabilities
- Reduce onboard cash usage, dwell time, and operator workload
- Enhance intermodal and regional interoperability

## 4 Project Management

### 4.1 Project Manager and Lead Engineer

Req #	Requirement
4.1-1	The Contractor shall designate responsible and experienced individuals to serve as the PM and Lead Engineer for the entire term of the contract. Both the PM and Lead Engineer will maintain close collaboration throughout the project lifecycle.
4.1-2	The PM shall be someone who has managed projects of similar size and complexity and who possesses full authority to render technical and commercial decisions on behalf of the Contractor. The PM will have full authority to manage and direct key staff that are responsible for the development of the RVS.
4.1-3	The Lead Engineer shall have served in the lead technical position on projects of similar size and complexity and who possesses a command of the technologies that shall be utilized as part of the implementation. The Lead Engineer shall participate in all meetings and preparation of deliverables that include content of a technical nature.
4.1-4	The PM shall possess at least five (5) years of demonstrable, recent (i.e., within the last ten [10] years), and extensive experience managing electronic payment system projects of similar size and scope as the OCTA project, and that include multiple points of integration with third-party systems and devices.
4.1-5	The Lead Engineer shall possess at least five (5) years demonstrable, recent (i.e., within the last ten [10] years), and extensive experience serving in a lead technical role on electronic payment system projects of similar size and scope as the OCTA project, and that include multiple points of integration with third-party systems and devices.
4.1-6	The designated PM, Lead Engineer, and any other staff replacements shall be subject to OCTA review and approval.
4.1-7	An on-site representative (the PM and/or Lead Engineer) shall be located in the OCTA region during key project milestones, including design review meetings and integration testing. The on-site representative shall give OCTA at least two (2) weeks advance notice of any anticipated changes to their onsite availability.
4.1-8	Contractor staff consistency is important and key Contractor staff, including the PM and Lead Engineer, shall be assigned solely to this project throughout its duration, unless contractually released, or replaced and approved by OCTA.

### 4.2 Project Meetings

#### 4.2.1 Project Kickoff Meeting

The purpose of the project kickoff meeting is to allow all parties to understand the scope and schedule of the project, and to confirm expectations and responsibilities from all stakeholders.

Req #	Requirement
4.2.1-1	No later than twenty-one (21) calendar days following NTP, the Contractor shall participate in a project kickoff meeting to be held at OCTA's offices. Initiation of the meeting shall be the responsibility of the Contractor.

Req #	Requirement
4.2.1-2	<p>The Contractor shall work with OCTA to assemble an agenda for the meeting that covers the following topics at a minimum:</p> <ul style="list-style-type: none"> <li>• Introductions of key Agency and Contractor points of contact</li> <li>• Review of project roles and responsibilities</li> <li>• Review of Contractor's scope of work</li> <li>• Presentation of draft project baseline schedule</li> <li>• Discussion of key risks or project concerns</li> </ul>

## 4.2.2 Progress Review Meetings

The purpose of progress review meetings is to provide a regular update on key actions and corrective measures required to keep the project on schedule and budget. These meetings may be attended by executive staff as required to determine overall project status.

Req #	Requirement
4.2.2-1	Progress reviews will be held at OCTA facilities on a monthly basis, at a minimum. Live video or teleconference meetings may be substituted for in-person meetings with prior approval.
4.2.2-2	The Contractor shall prepare and submit an agenda at least five (5) business days prior to all progress review meetings for review and approval by OCTA.
4.2.2-3	<p>The topics to be discussed and reviewed will include, but are not limited to:</p> <ul style="list-style-type: none"> <li>• Minutes of the prior progress review meeting</li> <li>• Updated master program schedule</li> <li>• Updated CDRL submittal list and schedule</li> <li>• Updated action item log and/or issues list</li> <li>• Progress since last meeting</li> <li>• Contract budget, milestone payment, and invoice status and schedule</li> <li>• Any needed corrective measures to maintain the project schedule</li> <li>• Any other issues related to the project</li> </ul> <p>The discussion topics may vary depending on project needs and priorities. OCTA or Contractor may introduce new topics not listed here.</p>
4.2.2-4	The Contractor shall document minutes for all monthly progress review meetings, and submit those minutes for OCTA review within three (3) business days following each meeting.

## 4.2.3 Project Coordination Meetings

The purpose of project coordination meetings is to provide a standing forum for items and topics to be discussed, and decisions that need to be made which cannot be held until monthly progress reviews. Other ad-hoc meetings may also be necessary to facilitate project delivery.

Req #	Requirement
4.2.3-1	Project coordination meetings shall be held on a weekly basis, at a minimum. Initiation of the meetings shall be the responsibility of the Contractor.
4.2.3-3	The Contractor's PM and/or Lead Engineer will be present during all coordination meetings. The Contractor will have a videoconferencing application for those participating remotely.

Req #	Requirement
4.2.3-4	The Contractor's Lead Engineer, PM, and other designated staff shall participate as required in other ad-hoc meetings to facilitate project coordination and decision making.
4.2.3-5	The Contractor shall be responsible for documenting minutes for each coordination and ad-hoc meeting, and submitting those minutes for OCTA review within three (3) business days following each meeting.

## 4.3 Project Management Plan

Req #	Requirement
4.3-1	A PMP will be submitted no later than twenty-one (21) calendar days following NTP, and will be subject to OCTA review and approval.
4.3-2	<p>The PMP will include but is not limited to the following elements:</p> <ul style="list-style-type: none"> <li>• Organization chart identifying key project personnel and contact information</li> <li>• Master program schedule, identifying key program milestones and activities</li> <li>• Project risk register, including identified project risks and actions required to mitigate them</li> <li>• Subcontractor management and communications plan</li> <li>• Document and MIL control processes and procedures</li> </ul> <p>Additional elements of the PMP may be proposed or requested, but the PMP will meet the requirements in this section at a minimum.</p>

### 4.3.1 Master Program Schedule

Req #	Requirement
4.3.1-1	The master program schedule will identify all program activities and key milestones, along with expected and actual completion dates.
4.3.1-2	The master program schedule will be cost-loaded and developed using Microsoft Project or an OCTA-approved equivalent.
4.3.1-3	The listing of activities in the master program schedule will be in sufficient granularity and detail to identify all predecessor and dependent activities, including the activities of other entities that impact the Contractor's delivery of the system.
4.3.1-4	The master program schedule approved by OCTA will become the baseline schedule, against which subsequent schedule updates will show performance.
4.3.1-5	The master program schedule will designate intermediate program milestones and target dates to track ongoing performance.
4.3.1-6	The Contractor shall update the master program schedule on a monthly or more frequent basis as requested by the Agency and submit the updated schedules for OCTA review and approval.

### 4.3.2 Risk Management

Req #	Requirement
4.3.2-1	As part of the PMP, the Contractor will include a risk management plan that will address risk planning, risk identification, risk analysis, and risk control, and will be reviewed and updated on a monthly basis at a minimum, or as requested by OCTA.



4.3.2-2	The processes that the Contractor shall follow for mitigating risk from the project will be identified, along with the processes for identifying, evaluating, and reporting (i.e., to OCTA) future risks.
4.3.2-3	The processes for developing and implementing corrective action plans to lessen the impact an unexpected event has on the project will be identified, as will the process for returning the project to steady state.
4.3.2-4	The Contractor shall maintain a comprehensive program risk register comprised of data fields including, but not limited to: Risk Title, Risk Description, Risk Owner, Risk Status, Risk Consequence, Probability Score, Impact Score, Mitigation Approach, Mitigation Status, and Due Date. Regular updates to the risk register will occur as part of scheduled project meetings.

### **4.3.3 Subcontractor Management**

Req #	Requirement
4.3.3-1	The PMP will include a subcontractor management plan outlining all activities to be performed by subcontractors, and procedures for organizing and communicating with subcontractors.
4.3.3-2	The Contractor shall provide all necessary plans, specifications, and instructions to its subcontractors and suppliers to enable them to properly perform their work.
4.3.3-3	The Contractor shall ensure that subcontractors or suppliers are informed of all applicable requirements in this specification and that appropriate engineering and project management tools are utilized for coordination and communication.
4.3.3-4	The Contractor shall have all subcontractors and suppliers available when required for meetings, testing, and resolution of design deficiencies, production problems, and similar situations. During all phases of the project, OCTA will have access to all subcontractors.
4.3.3-5	The subcontractor management plan will include procedures and processes to be followed for the replacement of any subcontractors throughout the duration of the contract.

### **4.3.4 Master Issues List**

Req #	Requirement
4.3.4-1	The Contractor shall maintain an electronic MIL for the ongoing tracking and management of project issues and action items.
4.3.4-2	MIL items will be identified and updated at design review meetings, project coordination meetings, progress review meetings, and on an ad-hoc basis.

4.3.4-3	<p>The MIL shall track the following attributes for each entry at a minimum:</p> <ul style="list-style-type: none"><li>• Item number</li><li>• Date opened</li><li>• Description</li><li>• Required action</li><li>• Priority</li><li>• Assigned party</li><li>• Status (open/closed/in progress/deferred/etc.)</li><li>• Date closed</li><li>• Other attributes may be required by OCTA. No action items will be assigned to OCTA without OCTA's knowledge and consent.</li></ul>
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## 5 Design Reviews

Two (2) formal design review phases will be undertaken during the project to develop and describe the technical design that will satisfy the requirements in these specifications. For each design review phase, the Contractor shall submit a set of documentation, hardware samples, and software demonstrations to OCTA for review and approval. The requirements in this section describe the criteria for execution and approval of each design review phase.

### 5.1 General Requirements

Req #	Requirement
5.1-1	Formal design reviews will be conducted to evaluate design progress, as well as the technical, functional, and programmatic adequacy of the design in meeting the requirements in these specifications.
5.1-2	The Contractor shall submit a design review plan for OCTA review and approval within thirty (30) calendar days of NTP. This plan will describe the scope, schedule, and deliverable format for each of the formal design reviews.
5.1-3	<p>The Contractor shall conduct two (2) formal design reviews:</p> <ul style="list-style-type: none"> <li>• PDR</li> <li>• FDR</li> </ul> <p>The requirements for each design review phase are described in this section.</p>
5.1-4	<p>Design reviews will consist of the following activities at a minimum:</p> <ul style="list-style-type: none"> <li>• A design review package will be submitted by the Contractor and reviewed by OCTA and Contract staff</li> <li>• A MIL will be created following the review and will be provided to OCTA</li> <li>• A formal design review meeting, or series of meetings, will be held between the Contractor and OCTA staff, where the Contractor will explain the design and OCTA will confirm compliance with the applicable requirements. Where possible, issues will be resolved during the design review meetings</li> <li>• All issues discussed during the meetings will be documented by the Contractor. OCTA will determine the appropriate action to close an issue, considering where the project is in the overall design</li> <li>• If required, the Contractor shall resubmit the design review package, or parts of the package, to address the issues identified during OCTA review and subsequent design review meeting</li> <li>• The design review package will be approved upon OCTA's determination that there are no critical open issues remaining in the MIL for that design phase</li> <li>• The design reviews process will include as many demonstrations (demos) of existing components as possible.</li> <li>• Other design review activities may be requested by OCTA throughout the design review process.</li> </ul>
5.1-5	Each design review package will include documents in a searchable electronic format (e.g., PDF, DOC) that will be shared via OCTA-provided document control system (see Document Control section), and at least one (1) reproducible hard copy.

Req #	Requirement
5.1-6	The Contractor shall submit design review packages that include all required CDRLs and supporting documentation at least twenty-one (21) calendar days prior to each formal design review meeting.
5.1-7	The formal design review meetings should include demonstrations of existing software and hardware functionality to supplement the design review package. Where possible, demos are strongly encouraged to enhance the design review process by obtaining direct OCTA feedback. The Contractor may request a demonstration in place of a formal design document as long as the feedback and outcomes are documented.
5.1-8	OCTA will provide comments on the design review packages at least seven (7) calendar days prior to each formal design review meeting.
5.1-9	Design review meetings will occur in Orange County with the Contractor, PM, lead engineer, and all relevant technical staff attending in person. The specific location will be identified by OCTA, and a teleconference phone number will be available for remote participation where permitted.
5.1.10	The Contractor and/or OCTA may establish suitable confidentiality and nondisclosure agreements associated with design review submittals.

## 5.2 Preliminary Design Review

The objectives of PDR are to review progress of the system design and evaluate compliance of the completed design and work in progress with the requirements of these specifications. The Contractor is encouraged to categorize PDR information into logical topics for organized review and discussion.

Req #	Requirement
5.3-1	The PDR package will be submitted within forty-five (45) days of NTP.
5.3-2	PDR will represent approximately 70% completion of the total technical and operational system design.
5.3-3	PDR may be conducted as a series of meetings in Orange County relevant to the topics being discussed.
5.3-4	<p>At a minimum, PDR will include the following:</p> <ul style="list-style-type: none"> <li>• Schedule compliance review and discussion of variances or delays</li> <li>• Detailed hardware and software specifications for all Contractor-supplied devices</li> <li>• Complete customer and operator user interface specifications, flow charts, and messages for all Contractor-supplied devices and systems, including accommodations for all boundary and error conditions</li> <li>• Detailed interface and communication specifications for all internal and external system interfaces</li> <li>• Detailed specifications for all configuration control systems</li> <li>• Detailed specifications for access control systems supporting back office operations</li> <li>• Detailed descriptions of system backup and recovery procedures</li> <li>• List of special tools and diagnostic test equipment needed for maintenance of each Contractor-supplied device and system</li> <li>• Demonstration of as many functional hardware and software components as possible.</li> </ul>

Req #	Requirement
5.3-5	If resubmittal of all or part of the PDR package is required, the Contractor shall provide the revised documents within fourteen (14) calendar days following completion of the formal design review meetings.
5.3-6	Design reviews should include demonstrations of existing software and hardware functionality to supplement the design review package. Where possible, demos are strongly encouraged to enhance the design review process by obtaining direct OCTA feedback. The Contractor may request a demonstration in place of a formal design document as long as the feedback and outcomes are documented.

## 5.3 Final Design Review

The objective of FDR is to finalize the detailed system design that satisfies all of the requirements in these specifications.

Req #	Requirement
5.4-1	The FDR package will be submitted within 45 days of PDR approval.
5.4-2	FDR will represent 95% completion of the detailed system design with production specifications and drawings ready for release. The remaining 5% of design may be refined during testing and implementation.
5.4-3	Data submitted for PDR will be updated to a level of detail consistent with a completed design and resubmitted as part of FDR.
5.4-4	<p>At a minimum, FDR will include the following:</p> <ul style="list-style-type: none"> <li>• Schedule compliance review and discussion of variances or delays</li> <li>• Assembly drawings for all Contractor-supplied devices</li> <li>• Final system architecture drawings</li> <li>• Detailed software specifications for all back office systems with software module descriptions in a narrative format and data flow diagrams to the lowest level of decomposition</li> <li>• Detailed specifications for all application programming interfaces (APIs) supporting frontend and back office operations</li> <li>• Detailed specifications for all system transaction formats</li> <li>• Detailed descriptions of all message formats and data elements for device and system events and alarms</li> <li>• Interface control documentation for all systems and subsystems</li> <li>• Complete data dictionary and detailed database design documentation, including all tables, views, and materialized views for all database schemas in the system, in electronic format (e.g., ER Studio)</li> <li>• Documentation of database programming features including, but not limited to; queries, query formats, triggers, jobs, functions, and procedures</li> <li>• Proposed database names and service accounts</li> <li>• Demonstration of as many functional hardware and software components as possible.</li> <li>• In addition, all requirements need to be met in CDRLs by the end of FDR.</li> </ul>
5.4-5	If resubmittal of all or part of the FDR package is required, the Contractor shall provide the revised documents within 14 calendar days following completion of the formal design review meetings.

**RFP 2-2980**  
**EXHIBIT A**

Req #	Requirement
5.4-6	Design reviews should include demonstrations of existing software and hardware functionality to supplement the design review package. Where possible, demos are strongly encouraged to enhance the design review process by obtaining direct Agency feedback. The Contractor may request a demonstration in place of a formal design document as long as the feedback and outcomes are documented.

## 6 Common Design Requirements

### 6.1 Service-Proven Design

Req #	Requirement
6.1-1	Software and hardware provided under this Contract will be designed to provide a minimum useful life of 15 years.
6.1-2	<p>The system design will be service-proven. As service-proven, or derived from a service-proven design, the system design will meet all of the following criteria:</p> <ul style="list-style-type: none"> <li>• Has been deployed and met system acceptance requirements at a minimum of one (1) transit agency</li> <li>• Has been deployed and successfully integrated frontend equipment with a back office system at a minimum of one (1) transit agency</li> <li>• Has been deployed and achieved a level of reliability, accuracy, and availability consistent with the performance requirements in these specifications at a minimum of one (1) transit agency at a similar level</li> <li>• Has integrated or interfaced with at least one (1) agency utilizing another vendor's fare collection system.</li> </ul>
6.1-3	<p>The following equipment will be nearly identical in design and construction to a model deployed and in revenue service (i.e., in use and passed system acceptance) at a minimum of one (1) transit agency:</p> <ul style="list-style-type: none"> <li>• Ticket Office Terminals (TOTs)</li> <li>• Mobile Sales Devices (MSDs)</li> <li>• Fare Inspection Devices</li> </ul>
6.1-4	To establish a design as service-proven, the Contractor shall submit specific details of the design's application history, certified by current users of the equipment.
6.1-5	The Contractor may offer, for approval, a design which is largely unchanged from a service-proven design, but which varies slightly in design or manufacture to meet the requirements of these specifications, including newer generations of service-proven equipment. The Contractor shall show, in detail, what has been changed and why such changes will not adversely affect operation or maintenance in the planned environment.

### 6.2 Non-proprietary Technology

Req #	Requirement
6.2-1	At the time of delivery, equipment and all associated components and software will not contain non-standard, prototype, obsolete, or discontinued products. Any required equipment modifications needed to accept replacements for end-of-life components during the operations and maintenance period and any extensions (see Operations and Maintenance section) shall be provided at cost to the Contractor.
6.2-2	Software applications and devices will be built using commercial-off-the-shelf (COTS) components where possible, and custom software and hardware modules only if necessary.

Req #	Requirement
6.2-3	The system will be designed using open standards for software design, communications protocols, fare media, and other relevant design components. The system open standards shall meet all Agency standard requirements. The system will adhere to all open architecture requirements in the System Architecture section.
6.2-4	Smartcard media will be available for competitive purchase from multiple U.S. sources. The Contractor shall provide the specifications and associated documentation necessary to support the future procurement of smartcard media from third-parties.
6.2-5	The system will be designed so that incorporating technology upgrades may be done with no or minimal redesign of components, modules, software, or other work.
6.2-6	The system will adhere to all of the general system requirements in the System Architecture section.

### 6.3 Supply and Availability

Req #	Requirement
6.3-1	The Contractor shall furnish equipment and materials from the manufacturers identified in the Contractor's submittals, unless otherwise approved.
6.3-2	If it is found that approved sources do not furnish a uniform product, or if the product from such source proves unacceptable per the requirements in these specifications, the Contractor shall, at no additional expense to the Agency, take any and all steps necessary to furnish acceptable materials.
6.3-3	The Contractor shall select and supply devices, components, parts, modules, assemblies, and subassemblies, as well as software and other essential elements of the system, based on projected availability and long-term original equipment manufacturer (OEM) support commensurate with the required useful life of the system.
6.3-4	All devices, components, parts, modules, assemblies, and subassemblies will be available for purchase for a minimum of 12 years from Final Acceptance.
6.3-5	If any vital device, component, part, module, assembly, or subassembly, or support for OEM software, is being discontinued or obsoleted by the Contractor or OEM, the Contractor shall notify the Agency a minimum of 90 calendar days prior to the last available date of purchase or support.
6.3-6	The Contractor shall work with the Agency to find or develop a suitable replacement for any device, component, part, module, assembly, subassembly, or software that is obsoleted by the Contractor or OEM. If the Contractor chooses to obsolete any Contractor-provided equipment or software within 12 years from Final Acceptance, all hardware and software development costs necessary to support a replacement will be borne by the Contractor.

### 6.4 Software Design Principles

Req #	Requirement
6.4-1	The Contractor shall supply all necessary software applications and shall design and configure all device and back office software applications for optimal system performance. The Contractor shall install all software that is necessary for system operation and to successfully meet the operational and performance requirements in



Req #	Requirement
	these specifications.
6.4-2	<p>System software will incorporate the following design elements at a minimum:</p> <ul style="list-style-type: none"> <li>• Be developed using a non-proprietary, hardware architecture-independent programming language</li> <li>• Compiled with a commercially available compiler and commented in English</li> <li>• Include provisions for setting and verifying date and time, with automatic adjustments for leap year and daylight savings time, as needed</li> <li>• Be fully integrated with the operating system to support all required functions of the applications in both a networked and a stand-alone environment</li> <li>• Not utilize or employ hard coding of configuration parameter values, except where expressly permitted</li> <li>• Be fully debugged, documented, and include all approved revisions introduced up to the time of Final Acceptance</li> <li>• Be portable to other software platforms or languages where possible</li> <li>• Utilize object-oriented programming or equivalent programming methodology that encourages software reuse and minimizes development time</li> </ul>
6.4-3	<p>System software will incorporate the following controls at a minimum:</p> <ul style="list-style-type: none"> <li>• Allow for the distribution of software modifications to all system devices from the back office without field intervention or component replacement</li> <li>• Be fully version-controlled, with the ability to revert to a previous software version or fork</li> <li>• Support audit of activity to show when and what changes were made from version to version</li> <li>• Be designed using best practices that allow for OS and database patches and upgrades to be applied with minimal testing</li> </ul>
6.4-4	<p>System software will incorporate the following diagnostic capabilities at a minimum:</p> <ul style="list-style-type: none"> <li>• Sample all input conditions at rates sufficient to detect and remedy all unsafe or damaging conditions in the shortest possible time</li> <li>• Perform self-diagnostic routines and respond promptly and predictably to detected faults</li> <li>• Respond predictably when powering up or recovering from power interruptions</li> <li>• Permit thorough interrogation of all input, output, and internal conditions by external diagnostic equipment</li> <li>• Provide error codes that contain easily understood explanatory text and include the manner in which the error can be corrected. This will apply to all errors in the system, including but not limited to: APIs, TOT software, mobile applications, websites, etc.</li> </ul>
6.4-5	Software upgrades will be centrally managed and fully tested prior to installation. The system shall be able to roll-back to previous software versions without adversely impacting operations.
6.4-6	All third-party software will be at the latest commercial release at the time of FDR. If a release candidate is pending, the Agency will review and approve the version that will be deployed.

## **6.5 Maintainability and Serviceability**

Req #	Requirement
6.5-1	System equipment will provide reliable operation over its design life, and will be designed to require minimal scheduled and unscheduled maintenance.
6.5-2	For ease of service and replacement, all electrical connections between components and subassemblies will be established by means of connectors that allow rapid removal of a component or subassembly. Plug-in connectors will be equipped with strain relief to prevent damage to cables and connectors.
6.5-3	Components requiring frequent adjustment or maintenance will be conveniently located and designed to facilitate access and adjustment utilizing tool-free techniques wherever possible. The replacement of field devices or components will be quick and secure.
6.5-4	All devices will have clear labels and symbols that at a minimum indicate safety warnings, servicing steps, and wiring connections.
6.5-5	No more than one (1) person will be required to perform corrective maintenance on an individual piece of equipment.
6.5-6	The Contractor shall provide documentation during PDR that defines: <ul style="list-style-type: none"> <li>• Preventative Maintenance frequency for all system devices based upon time and transactions</li> <li>• A list of all PM tasks to be performed, including a brief description of the work, and any parts, materials or other components required</li> <li>• Time required to complete each defined PM task</li> <li>• Which PM tasks require tools to complete, and which can be performed as “fingertip maintenance”</li> </ul>
6.5-7	The time for entry into a Ticket Office Terminal, removal and replacement of the device or a device module, and restoration of the TOT to an operating condition will take no longer than 15 minutes.

## **6.6 Operating Environment**

### **6.6.1 Ticket Office Equipment Climate Conditions**

Req #	Requirement
6.6.1-1	Ticket Office Terminals (TOTs) will be designed to be installed in Agency facilities and office locations. Operation of the equipment in this environment will not in any way impair equipment performance throughout the required useful life of the system.
6.6.1-2	Means will be provided to detect failure of any cooling device and provide for a controlled shutdown of the system components and generation of a maintenance event.

## **6.6.2 Electrical**

### **6.6.2.1 Power and Voltage Requirements**

Req #	Requirement
6.6.2-1	The Contractor shall design, supply, install, test, and commission all internal system components necessary to provide the required electrical power to the Contractor-supplied equipment.
6.6.2-2	Electrical power will be obtained from existing power sources and will be filtered, transformed, converted, battery-stored, and distributed by the Contractor as required, including all necessary connections and terminations.
6.6.2-3	In the event of a loss of electrical power, all equipment will complete any transaction in process, retain all data, and shutdown in an orderly manner. The equipment will return to full operational status after a power failure without manual intervention or adversely affecting the integrity of stored data.
6.6.2-4	Adequate protection against transient power surges will be incorporated to the extent necessary to prevent damage to the electronic components of the equipment.
6.6.2-5	Power sensing will be incorporated into equipment power supplies to cause the devices to switch off automatically if the supply voltage increases or decreases to levels beyond the voltage tolerance.
6.6.2-6	All system components will retain any information stored in non-volatile memory under any conditions of the supplied power.

### **6.6.2.2 Grounding**

Req #	Requirement
6.6.2-1	The Contractor shall meet safety requirements for the grounding that conforms to the National Electric Code (NEC) and UL, SAE and local codes where applicable.
6.6.2-2	The Contractor shall provide certification that all system components furnished have been tested to meet applicable UL criteria. Documentation citing UL certification or acceptable test results will be provided for review and approval during design review.

## **6.7 Licensing and Data Ownership**

Req #	Requirement
6.7-1	The Agency will own all data generated by the equipment, systems, and software delivered under this Contract. The Agency will be able to freely access and distribute all data free of charge. The Agency will retain ownership of all data in perpetuity with no restrictions or additional cost.
6.7-2	All documentation described in these specifications will become the property of the Agency, or provided under a perpetual license to enable internal use and distribution to third-parties at no additional cost to the Agency.
6.7-3	All system and software interfaces will be defined and documented, and will be provided to the Agency under a perpetual license to enable internal use and distribution to third-parties at no additional cost to the Agency.

Req #	Requirement
6.7-4	All open architecture APIs, libraries, and Intellectual Property, including data exchange formats and algorithms, will be provided to the Agency under a perpetual license to enable internal use and distribution to third-parties at no additional cost to the Agency.

## 6.8 ADA Compliance

Req #	Requirement
6.8-1	All equipment, software, and customer interfaces will be in compliance with Americans with Disabilities Act (ADA) standards to maximize ease of use. The system equipment will comply with the most recent version of the ADA Accessibility Guidelines (ADAAG) at the time of Final Acceptance.
6.8-2	The Contractor shall submit for review and approval at PDR, documentation with descriptions and drawings of how each customer-facing system will achieve ADA compliance.

## 6.9 Code and Regulation Compliance

The Contractor shall design the system to be compliant with relevant standards, laws, and regulations to ensure that the system:

- Presents no safety hazards for customers and Agency employees
- Will withstand the rigors of the environments in which the equipment will be installed, and the public use to which it will be subjected
- Provides for the secure storage and transmittal of data
- Is designed using state-of-the-art methods to maximize quality
- Satisfies federal, state, and other requirements for ergonomics and usability

The list of applicable codes, laws, ordinances, statutes, standards, rules, and regulations will include, but is not limited to, the items below. The latest revisions in effect at the time of Final Acceptance will apply.

- Americans with Disabilities Act (ADA)
- Americans with Disabilities Act Accessibility Guidelines (ADAAG)
- Advanced Encryption Standard
- ANSI X9.24, Financial Services Retail Key Management
- European Norm EN55022, Emissions standards for CE marking
- European Norm EN55024, Immunity standards for CE marking
- FCC Part 15 Class B – Radio Frequency Devices
- FIPS 140-2
- IEEE 802.11 b/g/n standard for wireless data communications
- IEEE 802.11i standard for wireless data network security
- International Electrotechnical Commission Standard 529 (IEC529)
- ISO/IEC 7810, Identification Cards – Physical Characteristics
- ISO 9001
- ISO/IEC 8583 – Financial transaction card originated messages
- ISO/IEC 14443 Parts 1 through 4 – Contactless Smart Card Standard
- ISO/IEC 18092 / ECMA-340, Near Field Communication Interface and Protocol-1
- ISO/IEC 21481 / ECMA-352, Near Field Communication Interface and Protocol-2
- National Electrical Code (NFPA 70)

- National Electrical Manufacturers Association Publication 250-2003
- National Electrical Safety Code (ANSI C2)
- National Fire Protection Association (NFPA) 130
- NCITS 322-2002, American National Standard for Information Technology – Card Durability Test Methods
- NIST 800-171
- Occupational Safety and Health Administration (OSHA)
- Payment Card Industry Data Security Standards (PCI-DSS)
- Payment Card Industry Payment Application Data Security Standards (PA-DSS)
- Society of Automotive Engineers SAE J1113-13 Electrostatic Discharge
- Society of Automotive Engineers SAE J1455 Vibration and Shock
- UL Standard 60950, “Information Technology Equipment – Safety”
- World Wide Web Consortium, Mobile Web Application Best Practices
- Web Content Accessibility Guidelines WCAG 2.0

In the case of conflict between the provisions of codes, laws, ordinances, statutes, standards, rules, and regulations, the more stringent requirement will apply.

## 7 System Architecture

The new OCTA Rider Validation System (RVS) will be an open architecture, account-based system with key system interfaces built using Application Programming Interfaces (APIs) published by the Contractor and fully owned or licensed by the Agency. The RVS will interface with existing hardware, including onboard validators, rail validators, inspection devices, and ticket vending machines.

### 7.1 Account-Based System

Req #	Requirement
7.1-1	The Contractor shall design, develop, and implement an account-based electronic fare collection system.
7.1-2	An account-based back office will manage closed-loop transit accounts that store fare value and/or products loaded by customers, and enable use of that value and/or products for the payment of transit fares and transit-related services. The account-based back office will also allow institutions to purchase/load smartcards on behalf of participants.
7.1-3	The account-based back office will process all transactions generated by the system devices, including loading transit accounts upon request from fare distribution devices, and performing fare calculation and account balance updates at the time of fare payment. All fare processing and updating of accounts will be performed in real-time (see Real-Time Communications section).
7.1-4	Transit accounts will be accessed by the customer when loading value or paying fares using Agency- and third-party-issued contactless fare media (e.g. smartcards).
7.1-5	The fare media will serve as a token for accessing transit accounts, and no data will be written to the media when loading or using fare value, except for data required to support risk mitigation techniques (see Risk Mitigation Techniques section).
7.1-6	The system will be sized such that the total number of possible accounts, and total concurrent use of accounts, will, at a minimum, support 200% of the current ridership figures presented in the Current System Summary section.
7.1-7	The account-based system will be designed such that other regional partners and other stakeholders can join the system to install, administer, and configure their own equipment and components. Such additions will not require redesign or additional software development. The system core design will support regional participants.
7.1-8	The account-based system will be designed such that other regional partners and other stakeholders can integrate their existing fare system with the RVS. Examples would include selling and accepting other agency's products.

### 7.2 Real-Time Communications

Req #	Requirement
7.2-1	All fare distribution, payment, and validation devices integrated as part of the system will be equipped with real-time communications to the back office. Real-time is defined as less than 500 milliseconds under normal network conditions.
7.2-2	The communication interfaces will support the real-time loading of fare value through all distribution channels, processing of closed-loop fare payments onboard vehicles and at rail stations, and fare inspection and validation by inspection staff.

Req #	Requirement
7.2-3	The lowest-latency network connections possible will be employed, using hardwired, cellular and Wi-Fi connections, as appropriate for each device.
7.2-4	The system will support the offline operation of field devices to perform essential functions where appropriate. In offline operation, devices shall operate according to defined business rules, and transmit stored transaction information as soon as communications are re-established. The RVS will then reconcile and process transactions appropriately.

## 7.3 Open Architecture

The RVS will be designed and implemented using an open architecture to provide flexibility as technology and Agency needs change. The open architecture will apply to all fare media, system interfaces and transaction formats used for the management, distribution, payment, and inspection of fares. There is a general preference for the use of open standards and cloud-based applications.

### 7.3.1 Application Programming Interfaces (APIs)

The Contractor shall develop, publish specifications for, and implement the use of Application Programming Interfaces (APIs) to support all critical system functions and interfaces between system components. The API specifications will include all API calls, data formats, and communication and security protocols used to support the system interfaces. The specifications will become the property of the Agency or provided under an unrestricted, royalty-free license. Additional APIs, beyond those described in this section, may be required if needed to support required system functionality.

#### 7.3.1.1 General Requirements

Req #	Requirement
7.3.1.1-1	The Contractor shall develop HyperText Transfer Protocol Secure (HTTPS) based functional (e.g., not device- or system-specific) APIs that support core system functions and enable access to those functions for any device or system that requires use of them. Devices and systems may make use of more than one (1) API to support required functionality.
7.3.1.1-2	The Contractor shall make use of the best available API framework at the time of the Notice to Proceed.
7.3.1.1-3	Each API will be developed using modern architecture and formats (e.g., REST/JSON or modern equivalent). The specific architecture and format to be used will be identified and agreed upon during design review.
7.3.1.1-4	The Contractor shall implement strong security features to prevent fraudulent use of the APIs and authenticate all users based on industry-accepted best practices.

Req #	Requirement
7.3.1.1-5	<p>The Contractor shall publish full API specifications that document all API calls and the process for making those calls, including:</p> <ul style="list-style-type: none"> <li>• Detailed call descriptions</li> <li>• Use cases</li> <li>• Call structure</li> <li>• Data elements and format</li> <li>• Error handling</li> <li>• Timing requirements</li> <li>• Use of required security protocols</li> <li>• Sample code</li> </ul>
7.3.1.1-6	<p>The Contractor shall be responsible for providing the following APIs at a minimum:</p> <ul style="list-style-type: none"> <li>• Fare Distribution API</li> <li>• Fare Payment API</li> <li>• Fare Inspection API</li> <li>• Transit Account Management API</li> <li>• Customer Account Management API</li> <li>• Device Management API</li> <li>• CAD/AVL Integration API</li> <li>• Mobile Ticketing Integration API</li> </ul> <p>Alternative categorization of APIs may be permitted, as long as the functional requirements are met.</p>
7.3.1.1-7	<p>The Contractor shall demonstrate use of the APIs as part of system implementation and testing. The Contractor shall perform API-specific testing, which will be witnessed and validated by Agency representatives prior to Final Acceptance. Any changes to the APIs as a result of testing will result in the API specifications being updated by the Contractor.</p>
7.3.1.1-8	<p>The Contractor shall take the lead role in working collaboratively with third-parties to use and adapt the APIs to integrate legacy systems as necessary to support the requirements in these specifications.</p>
7.3.1.1-9	<p>The full range of APIs provided by the Contractor will support all interfaces within the fare collection system, and is not limited to the specific APIs described in this section. Any additional APIs that are required will be identified during design review. The Contractor shall provide Interface Control Documents (ICDs) for each system interface that describes the interface and APIs used to support it.</p>
7.3.1.1-10	<p>The APIs and ICDs will be fully owned by or licensed to the Agency with the right to use and distribute the specifications without further approval, license, or payment.</p>
7.3.1.1-11	<p>The Contractor shall update the API and ICD specifications as necessary throughout the warranty and operations and maintenance term (see Operations and Maintenance section).</p>

### **7.3.1.2 Fare Distribution API**

The fare distribution API will support the sale of fare media and fare products offered through all fare distribution channels.



Req #	Requirement
7.3.1.2-1	<p>The fare distribution API will support the sale of all available fare media and fare products, and will be utilized by all fare distribution devices and systems, including but not limited to:</p> <ul style="list-style-type: none"> <li>• Ticket Vending Machines</li> <li>• Ticket Office Terminals</li> <li>• Customer Relationship Management System</li> <li>• Public and Institutional Websites</li> <li>• Mobile Validation Application</li> <li>• Third party systems (e.g., retail sales network, mobile ticketing system, or other agencies' fare collection systems)</li> </ul> <p>Additional sales devices or modules may utilize the fare distribution API.</p>
7.3.1.2-2	<p>The fare distribution API will support the following functionality at a minimum:</p> <ul style="list-style-type: none"> <li>• Retrieval of available fare media and fare products, and associated pricing</li> <li>• Sale of all fare media types, and creation or activation of an associated transit account</li> <li>• Sale of all available fare products (e.g., stored value and passes), and update of an associated transit account</li> </ul>
7.3.1.2-3	<p>The fare media and products available for sale, and the associated pricing, will be configured and maintained in the back office. The fare media API will return this information upon request from a fare distribution device/system. The results provided will be configurable to be specific to the sales channel, device/system location, or individual device/system making the API call.</p>
7.3.1.2-4	<p>The fare distribution API will include API calls for the passing of data between the fare distribution devices/systems and the back office to initiate a sale transaction, which will result in the creation, activation, or updating of a closed-loop transit account.</p>
7.3.1.2-5	<p>Unique fare media and/or transit account identifiers will be securely captured by the distribution devices/systems and passed to the back office to create or activate a new transit account (e.g., in support of new media issuance), or initiate the loading of value to an existing transit account. All fare media and product sales will be processed by the back office in real-time to enable immediate use by the customer.</p>
7.3.1.2-6	<p>The fare distribution API will support the generation of sale and payment transactions within the back office by capturing all information required to appropriately record the sale, including at a minimum:</p> <ul style="list-style-type: none"> <li>• Date/time</li> <li>• Agency</li> <li>• Sales channel ID</li> <li>• Employee ID (if applicable)</li> <li>• Device/system ID</li> <li>• Device/system location</li> <li>• Fare media ID</li> <li>• Transit account token</li> <li>• Product(s) sold</li> <li>• Payment amount(s)</li> <li>• Payment type(s)</li> </ul>

Req #	Requirement
7.3.1.2-7	The fare payment API will support the sale of multiple products (e.g., fare media and value) in a single transaction with a single payment in a single sales transaction.
7.3.1.2-8	The fare distribution API will return a confirmation of the actions taken by the back office to complete a sale. If the sale was unsuccessful, a denial and associated reason code will be provided. All response types and error handling will be described in detail in the fare distribution API specification.

### 7.3.1.3 Fare Payment API

The fare payment API will support the processing fare payments by all fare payment devices.

Req #	Requirement
7.3.1.3-1	The fare payment API will support the processing of closed- and open-loop fare payments across all modes using all supported fare media and fare products, and will be utilized by all fare payment devices, including but not limited to: <ul style="list-style-type: none"> <li>• Validators</li> <li>• Inspection/Validation Device Application</li> </ul>
7.3.1.3-2	The fare payment API will include API calls for the passing of data between the fare payment devices and back office to initiate a fare payment transaction, which will result in a fare calculation being performed and processing of a payment against a closed- or open-loop transit account.
7.3.1.3-3	Unique fare media and/or transit account identifiers will be securely captured by the fare payment devices and passed to the back office to perform a fare payment. All fare payment processing will be performed by the back office in real-time.
7.3.1.3-4	The fare payment API will support the generation of fare payment transactions within the back office by capturing all information required to calculate and appropriately record the payment, including at a minimum: <ul style="list-style-type: none"> <li>• Date/time</li> <li>• Agency</li> <li>• Vehicle/station ID</li> <li>• Operator ID (bus and inspection/validation application only)</li> <li>• Device ID</li> <li>• Stop ID (bus and mobile only)</li> <li>• Geolocation information (bus and mobile only)</li> <li>• Block (bus and mobile only)</li> <li>• Route (bus and mobile only)</li> <li>• Run (bus and mobile only)</li> <li>• Direction/platform</li> <li>• Fare media ID</li> <li>• Transit account token</li> <li>• Payment type (e.g. closed-loop or open-loop)</li> <li>• Other data encoded to the media (e.g., rider classification)</li> <li>• Authorization mode (e.g., online or offline)</li> </ul>

Req #	Requirement
7.3.1.3-5	The fare payment API will support the passing of a pre-calculated fare to support third party programs (e.g. parking and bike share), where third-party devices or systems will calculate the amount due. The back office will process pre-calculated fare transactions based on the fare structure configured for the associated mode or participant.
7.3.1.3-6	<p>The fare payment API will return a confirmation of the actions taken by the back office to complete a payment and account status information, including at a minimum:</p> <ul style="list-style-type: none"> <li>• Payment status (e.g., success or failure)</li> <li>• Account rider classification</li> <li>• Fare product used</li> <li>• Fare charged</li> <li>• Remaining balance</li> <li>• Transfer time remaining (if applicable)</li> </ul> <p>If the payment was unsuccessful, an associated reason code will be provided. All response types and error handling will be described in detail in the fare payment API specification.</p>

#### **7.3.1.4 Fare Inspection API**

The fare inspection API will support the inspection of fares (i.e., confirmation of fare payment) by fare inspectors using the mobile fare inspection/validation device application.

Req #	Requirement
7.3.1.4-1	The fare inspection API will query closed- and open-loop transit accounts to support the inspection of fares paid across all modes using all supported fare media and fare products and will be utilized by the mobile fare inspection/validation device application.
7.3.1.4-2	The fare inspection API will include API calls for passing data between the mobile fare inspection application and back office to initiate a fare inspection transaction, which will result in confirmation or denial of payment made using a closed- or open-loop transit account.
7.3.1.4-3	Unique fare media and/or transit account identifiers will be securely captured by the mobile fare inspection/validation device application and passed to the back office to perform a fare inspection. The back office will query transit account ride history and use Agency-defined business rules to determine fare payment status in real-time.
7.3.1.4-4	<p>All fare inspections will result in a recorded transaction. The fare payment API will support the generation of transactions by capturing all information required to determine the status of a fare payment and appropriately record the inspection, including at a minimum:</p> <ul style="list-style-type: none"> <li>• Date/time</li> <li>• Agency</li> <li>• Vehicle/station ID</li> <li>• Device ID</li> <li>• Stop ID</li> <li>• Geolocation information</li> <li>• Block (bus inspection only)</li> <li>• Route (bus inspection only)</li> </ul>

Req #	Requirement
	<ul style="list-style-type: none"> <li>• Run (bus inspection only)</li> <li>• Direction/platform</li> <li>• Fare media ID</li> <li>• Transit account token</li> <li>• Payment type (e.g. closed-loop or open-loop)</li> <li>• Other data encoded to the media (e.g., rider classification)</li> </ul>
7.3.1.4-5	<p>The fare inspection API will return fare inspection status information, including at a minimum:</p> <ul style="list-style-type: none"> <li>• Inspection status (e.g., valid or invalid)</li> <li>• Account rider classification</li> <li>• Fare product used (if valid)</li> <li>• Fare charged (if valid tap)</li> <li>• Transfer time remaining (if applicable)</li> <li>• Account balance (if applicable)</li> <li>• Fare payment transaction history</li> <li>• All data required for reduced/special fare inspection</li> </ul> <p>If the inspection is determined to be invalid, an associated reason code will be provided (e.g., no tap, blocked card). All response types and error handling will be described in detail in the fare inspection API specification.</p>

### 7.3.1.5 Transit Account Management API

The transit account management API will support the querying and management of fare-related data maintained within closed- or open-loop transit accounts.

Req #	Requirement
7.3.1.5-1	<p>The transit account management API will support the querying and management of data maintained within back office transit accounts, and will be utilized by all devices and systems that require access to those functions, including but not limited to:</p> <ul style="list-style-type: none"> <li>• Ticket Vending Machines</li> <li>• Ticket Office Terminals</li> <li>• Customer Relationship Management System</li> <li>• Public and Institutional Websites</li> <li>• Third party systems (e.g., retail sales network, mobile ticketing system, or other agencies' fare collection systems)</li> </ul> <p>Additional devices or modules may utilize the transit account management API. Not all devices/systems will require or be granted access to all transit account management API functions.</p>
7.3.1.5-2	<p>The transit account management API will support the following functionality at a minimum:</p> <ul style="list-style-type: none"> <li>• Query transit account status (e.g., associated rider classification, active/inactive, blocked/unblocked)</li> <li>• Query fare payment transaction history</li> <li>• Query sales transaction history</li> <li>• Query adjustment transaction history</li> <li>• Enable fare product for autoloading</li> </ul>

Req #	Requirement
	<ul style="list-style-type: none"> <li>• Generation of fare payment reversal (e.g., cancellation)</li> <li>• Generation of sales reversal (e.g., refund)</li> <li>• Generation of an account adjustment (e.g., credit or debit)</li> <li>• Transfer of balance between two (2) accounts</li> <li>• Block/unblock card, account, or individual fare product</li> <li>• Lost, stolen, or damaged card replacement (e.g., associate new card with existing account)</li> <li>• Generation of an opt-out refund (e.g., close account and issue refund)</li> </ul> <p>The final list of transit account management APIs will be finalized during design review.</p>
7.3.1.5-3	The transit account management API will include API calls for the passing of data between the devices/systems and the back office to perform all functions.
7.3.1.5-4	The transit account management API will allow devices/systems to query a transit account status and return the sales, fare payment, and adjustment transactions that were conducted over a specified timeframe, or a specified number of past transactions.
7.3.1.5-5	The transit account management API will allow devices/systems to setup autoloading for an existing fare product. Enabling autoloading will require a valid funding source to be stored in an associated customer account and may be performed using the customer account management API instead.
7.3.1.5-6	The transit account management API will allow authorized personnel to perform adjustment, reversal, transfer, and refund transactions to modify transit account balances.
7.3.1.5-7	The transit account management API will allow authorized personnel to generate blocking (and unblocking) and replacement transactions to close or prevent use of transit accounts, fare media, and fare products.
7.3.1.5-8	Unique fare media and/or transit account identifiers will be securely captured by the devices/systems and passed to the back office to perform all functions. The back office will perform all functions in real-time.
7.3.1.5-9	<p>The transit account management API will capture all required information to generate a detailed transaction within the back office for all functions performed, including at a minimum:</p> <ul style="list-style-type: none"> <li>• Date/time</li> <li>• Agency</li> <li>• Sales/customer service channel ID</li> <li>• Employee ID (if applicable)</li> <li>• Device/system ID</li> <li>• Device/system location</li> <li>• Operator/administrator ID</li> <li>• Fare media ID</li> <li>• Transit account token</li> <li>• Details of action performed</li> </ul>
7.3.1.5-10	The transit account management API will return a confirmation of the actions taken by the back office. If any action is unsuccessful, a denial and associated reason code will be provided. All response types and error handling will be described in detail in the transit account management API specification.

### **7.3.1.6 Customer Account Management API**

The customer account management API will support the querying and management of individual and institutional customer data maintained within the customer database.

Req #	Requirement
7.3.1.6-1	<p>The customer account management API will support the querying and management of data maintained within the customer database, and will be utilized by all devices and systems that require access to those functions, including but not limited to:</p> <ul style="list-style-type: none"> <li>• Ticket Office Terminals</li> <li>• Customer Relationship Management System</li> <li>• Public and Institutional Websites</li> <li>• Third party systems (e.g., retail sales network, mobile ticketing system, or other agencies' fare collection systems)</li> </ul> <p>Additional devices or modules may utilize the customer account management API. Not all devices/systems will require or be granted access to all customer account management API functions.</p>
7.3.1.6-2	<p>The customer account management API will support the following functionality at a minimum:</p> <ul style="list-style-type: none"> <li>• Create new individual customer account</li> <li>• Create new institutional customer account</li> <li>• Query customer account status and data</li> <li>• Modify customer account data</li> <li>• Register (i.e., link) a transit account, open payment credential, or third-party agency card to an individual or institutional customer account</li> <li>• Unregister (i.e., unlink) a transit account, open payment credential, or third-party agency card from an individual or institutional customer account</li> <li>• Add a funding source to an individual or institutional customer account</li> <li>• Close an individual or institutional customer account</li> </ul>
7.3.1.6-3	<p>The customer account management API will include API calls for the passing of data between the devices/systems and the back office to perform all functions.</p>
7.3.1.6-4	<p>The API will allow devices/systems to create individual and institutional customer accounts within the customer database, and associate or disassociate existing transit accounts with those customer accounts.</p>
7.3.1.6-5	<p>The customer account management API will allow devices/systems to query and modify all individual and institutional customer account data, including but not limited to name, address, date of birth, phone number, e-mail address, institution and administrator contact information, username, password, security questions/answers, account access PIN, and funding sources.</p>
7.3.1.6-6	<p>The API will support the individual and bulk import of data for institutional customers and customers applying for a reduced fare classification, including scans of applications and supporting documentation, eligibility parameters, and card personalization information, such as a customer photograph, to be stored in the customer database. Imported documents will include spreadsheets (e.g., .xlsx, .csv) and other file types determined during design review.</p>
7.3.1.6-7	<p>The customer account management API will allow authorized personnel or customer account end users to close customer accounts. Closing of a customer account will not</p>

Req #	Requirement
	affect the associated transit accounts.
7.3.1.6-9	The customer account management API will return a confirmation of the actions taken by the back office. If any action was unsuccessful, a denial and associated reason code will be provided.

### **7.3.1.7 Device Management API**

The device management APIs will support the monitoring and management of all devices deployed within the system.

Req #	Requirement
7.3.1.7-1	The device management API will support the reporting of device events and alarms, and the distribution of new software, configuration parameters, positive/negative list updates as required, and will be utilized by all devices deployed within the system.
7.3.1.7-2	The device management API will support the passing of data between the devices and the monitoring management tool (see Monitoring Management section) to enable the monitoring of system performance in real-time. The device events and alarms reported via the device management API will provide enough detail to support proactive device maintenance at the module-level, and support accurate reporting on all system performance requirements.
7.3.1.7-4	The device management API will support the real-time distribution configuration parameter updates. Device configuration will include real-time updates to any positive and negative lists maintained locally at the devices. Updates will be distributed on an increment-basis so that only updates since that last timestamp/version received by an individual device are transmitted. This differential or incremental update (or functional equivalent) will reduce bandwidth and data transmission requirements across the system.

### **7.3.2 Transaction Formats**

Req #	Requirement
7.3.2-1	The Contractor shall publish specifications for all transactions generated and used within the system that are not already covered by the required APIs.
7.3.2-2	Transaction specifications will include detailed descriptions of the transaction structure, data elements, and data formats, and identify all devices and systems that generate and consume the described transactions.
7.3.2-3	Transaction formats will be based on published standards wherever possible, including those used to interface with commercial software packages, such as the Contractor-provided CRM, revenue management, and reporting systems.
7.3.2-4	The transaction formats shall be fully owned by or licensed to the Agency, including the right to distribute the specifications to third parties without further approval, license, or payment.

## **7.4 Risk Mitigation Techniques**

The account-based architecture depends on reliable and responsive communication between every field device and the back office. To account for intermittent or unreliable communications, the system will

support risk mitigation techniques used to limit fraud, provide accurate and timely account information, and control risk.

Req #	Requirement
7.4-1	<p>The system will support the limited writing of data to closed-loop fare media for the purposes of fraud mitigation, displaying accurate and timely account information, and risk management. Risk mitigation data shall not include detailed fare information or other data that supersedes the account-based back office. The information written to the fare media may include:</p> <ul style="list-style-type: none"> <li>• Recent transaction meta data or associated information (e.g., transaction timestamps)</li> <li>• Transit account balance states (e.g., low balance or successful load indicators)</li> <li>• Transit account status information (e.g., rider classification, institutional program, or blocking indicators)</li> </ul> <p>Data to be written to the media will be determined during design review and subject to Agency approval.</p>
7.4-2	Any data written to the closed-loop fare media will be used to supplement back office account data, and will be limited in nature. The data shall be interpreted by the devices with minimal or no business rules logic (e.g., knowledge of fare polices and products).
7.4-3	Data may be written to the closed-loop fare media at time of manufacture, loading, and/or use. All data shall be secured for both reading and writing using strong cryptography.
7.4-4	The system will support the distribution of positive and/or negative lists to be maintained locally at the devices and used for fare validation and inspection. Positive and negative lists will be managed within the back office and distributed to the devices via the Device Management API.
7.4-5	If used, positive and negative list updates will be distributed to devices no less than every five (5) minutes and include version control to ensure timely and accurate synchronization. The list update frequency shall be configurable.
7.4-6	All processes governing the use of risk mitigation techniques will be fully documented in the software specifications for the devices and may be shared to enable the same functionality on third-party devices.

## 7.5 Payment Processing

Req #	Requirement
7.5-1	The Contractor shall be responsible for the processing of payments for sales through all fare distribution channels.
7.5-2	All devices and systems that process electronic payments, including credit cards, debit cards, and bank account (ACH) transfers, will interface with the Agency's processor for the processing of those payments.



Req #	Requirement
7.5-3	<p>Devices and systems requiring an interface to the payment processor include, but are not limited to:</p> <ul style="list-style-type: none"> <li>• Validators</li> <li>• Ticket Office Terminals</li> <li>• Mobile Fare Inspection/Validation Device Application</li> <li>• Mobile Sales Devices</li> <li>• Mobile Ticketing</li> <li>• Customer Relationship Management System</li> <li>• Customer and Institutional Websites</li> </ul>
7.5-4	The system will be able to support an interface between the account-based transaction processor and payment processor to process open payments, if this functionality is enabled in the future.
7.5-5	The interface to the payment processor may be built using a central, Contractor-provided payment application to which all devices and systems processing payments connect, or built on an individual device- and system-level.
7.5-6	If a central payment application is used, the Contractor shall provide a payment processing API, including all required security protocols, to allow third-party devices to process payments through the payment application.
7.5-7	The system will use tokenization for all funding sources stored within the system. The Contractor shall make use of a third-party tokenization service so that no payment data, encrypted or otherwise, is stored within the system.
7.5-8	The tokenization solution provided by Contractor shall allow for refunds and tracking of chargebacks without having to store the bank card number.
7.5-9	All devices and systems will default to Europay MasterCard Visa (EMV) processing, including the use of offline data authentication (e.g., CDA and DDA), and fall back to non-EMV processing only when it is not supported by the card being used for payment or method of acceptance.
7.5-10	All devices and systems accepting payments will support configurable minimum and maximum payment amounts. The minimum and maximum amounts will be able to be independently set by distribution channel and payment type, including by credit/debit card type (e.g., Visa, MasterCard, American Express, Discover).
7.5-11	All devices and systems accepting debit cards for payment will be able to identify pre-tax benefit cards issued by the government and pre-tax benefit providers based on the Issuer Identification Number (IIN). Stored value and passes loaded using these cards will be identified as such and segregated within the transit account to ensure compliance with all applicable IRS regulations.
7.5-12	The system will maintain payment records to support the auditing of all payments processed, and to support payment dispute and chargeback resolution.
7.5-13	The Contractor shall be fully responsible for acquiring all required bank certifications, including PCI and EMV certifications, for the interfaces to the payment processor and the system as a whole.
7.5-14	The Contractor shall be responsible for demonstrating that the payment gateway is compliant to PCI-DSS, and for providing the necessary PCI-DSS testing and certification.
7.5-15	The Contractor shall provide system diagrams for payment processing including all gateways and processors used and document all fees.

## **7.5.1 Open Payments**

Req #	Requirement
7.5.1-1	The Contractor shall use the Agency's processor and merchant acquirer to process and settle open payment transactions (see Open Payments section). A new merchant account (or new Merchant IDs under the existing account) may be established with the Payment Service Providers (PSPs) to support the processing of open payments.
7.5.1-2	The Contractor may propose use of a new card-present gateway provider for open payment services, if the gateway provider can integrate with the agency's existing payment service provider for the processing and settlement of transactions.
7.5.1-3	The Contractor shall be responsible for the integration of the open payment solution, including any proposed gateway provider, with the existing payment service providers, and completion of any certifications of those interfaces required to deploy the solution to a production environment.
7.5.1-4	The Contractor shall support the configuration to accept or deny the use of contactless payment credentials from any card brand or issuer, based on the Agency agreements with the existing payment service providers.

## **7.6 System Security**

Req #	Requirement
7.6-1	The connection between the frontend devices and back office will be over an IP network. The connections will be secured using Transport Layer Security (TLS 1.3) and strong encryption, such as Advanced Encryption Standard (AES). All data sent via the internet will be at least TLS 1.3 encrypted using the HTTPS protocol, or equivalent.
7.6-2	All payment data will be secured from the point when it is captured to when it is received by the processor. When communications are over public networks, Virtual Private Networks (VPNs) or Access Point Name (APN) will be used to increase security and data control.
7.6-3	All data transmission between any parts or components of the fare collection system, as well as other outside servers will be secured using Secure Socket Layers (SSL). SSL certificates will be acquired from known and reputable certifying authorities.
7.6-4	Hardware firewalls will be established around all system-specific servers, in addition to the use of software firewalls and other traffic filtering security measures where required.
7.6-5	Logical access to all supplied systems will require security industry best practices and be centrally managed using a Contractor-provided user authentication and access control platform based on a contractor-neutral, industry standard protocol, such as Lightweight Directory Access Protocol (LDAP) or equivalent.
7.6-6	System security features will be maintained and security issues will be addressed as they arise throughout the development period, pilot, warranty term, and operations and maintenance period (see Operations and Maintenance section). Operating system updates, software patches, bug fixes, and system enhancements to address identified security issues will be provided.

Req #	Requirement
7.6-7	<p>Security-sensitive information (including information about the project or design) will be submitted separately, in accordance with procedures to be jointly developed between the Contractor and the Agency. Security-sensitive information will include:</p> <ul style="list-style-type: none"> <li>• Information that would allow an individual to create, duplicate, skim or counterfeit fare media</li> <li>• Information that would allow an individual to overcome security features or interlocks intended to prevent access to sensitive information</li> <li>• Information that would allow an individual to divert revenue, whether electronic or cash revenue, from the system</li> </ul> <p>The handling of security-sensitive information shall adhere to general security best-practices, via a framework such as NIST 800-171 Revision 2.</p>
7.6-8	All media submitted by the Contractor shall be free of viruses and malware.
7.6-9	All Agency security and system management standards will be adhered to.
7.6-10	The Contractor shall notify the Agency immediately in the event of any breach, or suspected breach, of system data.
7.6-11	All cloud-based applications shall be containerized.
7.6-12	No third-party systems will be joined to the Agency domain or initiate remote access. All remote access, data pulls, or data pushes will be initiated from within the Agency's network.
7.6-13	Third-party vendors utilizing Agency credentials will employ Multi-Factor Authentication (MFA) and Single Sign On (SSO).

## 7.7 PCI/EMV

Req #	Requirement
7.7-1	The Contractor shall be responsible for ensuring that the system as delivered is compliant with all applicable Payment Card Industry (PCI) standards at the time of Final Acceptance, and with all Agency, state, and local policies for the handling of Personally Identifiable Information (PII).
7.7-2	All equipment provided or purchased by the Contractor that will capture, store, transmit, or process bank card data will be certified, by the OEM or Contractor, as compliant with all applicable PCI standards at the time of Final Acceptance. At minimum, PCI DSS 4.0 compliance standards will be adhered to.
7.7-3	Physical and logical access to system components that contain PII and/or financial data will be restricted. Physical and logical security will be sufficient for compliance with the PCI standards in effect at the time of Final Acceptance.
7.7-4	The Contractor shall provide a PCI compliance plan during design review and obtain certification for the entire system. The Contractor shall employ a certified Qualified Security Assessor (QSA) and shall conduct all testing required to achieve certification prior to Final Acceptance.
7.7-5	The Contractor shall provide, as part of recurring software maintenance (see Software Maintenance section), continual updates to maintain and demonstrate compliance as new versions of the PCI security standards are published.
7.7-6	All devices and systems accepting bank cards for payment will be certified as compliant with the Europay MasterCard Visa (EMV) standards in effect at the time of Final Acceptance, and capable of being certified to newer versions via software upgrades.

Req #	Requirement
7.7-7	The Contractor shall identify and notify the Agency of any changes to the standards which are instituted between the time of the Notice to Proceed (NTP) and implementation and certify that all system software meets these requirements.
7.7-8	<p>The Contractor will maintain and implement policies/procedures to manage subcontractors with whom cardholder data is shared, as follows:</p> <ul style="list-style-type: none"> <li>• Maintain a list of service providers or subcontractors who manage or process PCI data.</li> <li>• Report PCI DSS compliance status annually that attests that all subcontractors are PCI DSS 4.0 (or later) compliant.</li> <li>• Maintain information about which PCI DSS requirements are managed by the Contractor and its subcontractors.</li> </ul>
7.7-9	All applicable Agency standards related to security, including the OCTA Security Guidelines, will be adhered to.

## 7.8 Privacy

Req #	Requirement
7.8-1	All customer Personally Identifiable Information (PII) data as well as the transmission of PII data, will be safeguarded from unauthorized access or use through the employment of strong encryption, such as Advanced Encryption Standard (AES).
7.8-2	The approach to system security will include avoiding the storage of bank card data and PII on field devices (e.g., TOT, CRM) whenever possible, and only storing and transmitting such data in a tokenized or encrypted form.
7.8-3	PII data will be transmitted and stored separately from the fare transaction database. PII information will not be associated or linked to sales or usage data in standard reports or data exports.
7.8-4	The Contractor shall describe their privacy policy and discuss the handling of Personally Identifiable Information.
7.8-5	All privacy elements shall comply with Agency privacy policies, and the NIST 800-53 Revision 5 Framework.

## 8 Fare Media

### 8.1 Contactless Fare Media

The RVS will use contactless Extended Use (EU) smartcards as credentials/tokens for rider's accounts. The system will also support Limited Use (LU) smartcards for special programs.

#### 8.1.1 General Requirements

Req #	Requirement
8.1.1-1	Contactless fare media provided as part of the system will meet all applicable common design requirements in the Common Design Requirements section in addition to the requirements in this section.
8.1.1-2	Contactless fare media will be based on ISO 14443 and ISO 18092 (NFC) compliant formats.
8.1.1-3	Additional Agency-defined formats may be defined during system design that conform to the design principles in this section.
8.1.1-4	All sales channels and fare distribution devices (TOT and CRM) will issue or reload extended-use (EU) smartcards; existing fare distribution devices will support issuing and reloading EU cards through APIs (See Application Programming Interfaces (APIs), and Integrations). The system will also support limited-use (LU) smartcards, which may be used to support specific markets and special fare programs. Rider classifications and fare products associated with each media type will be based on fare structure configuration (see Fare Structure section).
8.1.1-5	Contactless fare media (i.e., EU and LU) will be designed for use in an account-based system, and serve as a unique token for accessing closed-loop transit accounts maintained within the back office. No data will be written to the media when loading or using fare value, with the exception of data required to support risk mitigation techniques (see Risk Mitigation Techniques section).
8.1.1-6	Contactless fare media will be designed to support revenue reconciliation and transaction records within the back office.
8.1.1-7	The system will support fare media replacement in the event that a card is lost, stolen, or damaged, which will link a new piece of fare media to an existing account and block use of the old fare media.
8.1.1-8	The transit account token stored on the media will not be the media serial number (i.e., UID) or transit account number used within the account-based system, and will not be printed on the media or otherwise accessible using a commercial card reading device.
8.1.1-9	The format of the transit account token and transit account number used within the account-based system will be subject to Agency review and approval during design review.
8.1.1-10	Contactless fare media will be produced based on branding developed by the Agency and a design developed jointly with the Contractor. The media will also be produced with one (1) or both sides left blank for custom printing following manufacture.
8.1.1-11	In addition to the contactless interface, contactless fare media may be produced with barcodes and/or magnetic stripes to allow interaction with third-party systems outside the scope of the new fare collection system (see Integrations section). If required, the format and data content of any barcodes or magnetic stripes will be defined during design review.

Req #	Requirement
8.1.1-12	The Contractor will design, develop, manufacture, and deliver all fare media required for the initial deployment of the new fare collection system. The Contractor will deliver all graphics files and related materials required for manufacture of the fare media to the Agency for review and approval no less than 90 days prior to the start of fare media production.

## **8.1.2 Physical Characteristics**

Req #	Requirement
8.1.2-1	All contactless fare media will comply with ISO/IEC 14443-1 for physical characteristics and ISO/IEC 7810 ID1 for physical dimensions. Thickness and other physical characteristics not defined by these standards will be finalized during design review.
8.1.2-2	Extended-use fare media will be constructed of appropriate durable materials for a minimum useful life of 10 years. The media will comply with the most recent versions of ISO/IEC 10373 and ANSI INCITS 322 for durability.
8.1.2-3	Limited-use fare media will be constructed of appropriate durable materials for a minimum useful life of one (1) year. The media will comply with the most recent versions of ISO/IEC 10373 and ANSI INCITS 322 for durability.
8.1.2-4	The Agency reserve the right to acquire a sequence of Issuer Identification Numbers (IIN) that could be used as the fare collection system card ID. Final decision on the use of a IIN will be established at design review.
8.1.2-5	The contactless fare media will have read/write performance of not less than 200,000 read/write cycles.
8.1.2-6	All contactless fare media will include an etched, unique non-sequential serial number for the purposes of traceability that is separate from the encoded and encrypted token, and smartcard Unique Identification Number (UID).
8.1.2-7	The contactless fare media will be printed using a four-color process, front and back, and support edge to edge printing.
8.1.2-8	The Contractor will work with the Agency to design fare media graphics, text, and packaging prior to proceeding with procurement of media. Packaging and fare media graphics design will utilize artwork and graphics provided by the Agency, formulation of text for both fare media and packaging shall incorporate input from the Agency, and both graphics and text shall be subject to the Agency's approval.
8.1.2-9	All pre-printed graphics will be protected by a clear coat that covers the entire surface of the card.
8.1.2-10	Fare media available for purchase through the retail network will be limited to extended-use, closed-loop smart cards as defined in this specification.
8.1.2-11	The Contractor will work with the Agency and package supplier to design the retail packaging specifications, ensuring the correct data specifications for the magstripe and/or barcode are captured, as well as the correct packaging thickness for magstripe swiping.
8.1.2-12	Prior to commencing full production, and within 30 calendar days of approved graphic designs, the Contractor shall supply at least 20 proof samples of each contactless media type and packaging for review and approval by the Agency, if not already provided as system test cards (see Initial Fare Media Supply section).

### **8.1.3 Fare Media Format**

Req #	Requirement
8.1.3-1	The contactless fare media will use a MIFARE compatible format with an account-based transit payment application developed by the Contractor. An alternative contactless fare media format, such as an open payment format, ISO/IEC 24747, may be proposed by the Contractor so long as it meets all of the requirements in these specifications and is approved by the Agency.
8.1.3-2	The contactless fare media format will support a minimum of a 8 byte smartcard UID.
8.1.3-3	The contactless fare media format will support strong cryptography, such as Advanced Encryption Standard (AES) to protect access to and modification of all data encoded to the media (see Media Security and Fraud Prevention section).
8.1.3-4	If possible, the same fare media format will be used for both the EU and LU media.

### **8.1.4 Transit Payment Application**

Req #	Requirement
8.1.4-1	The contactless fare media will use a MIFARE-compatible transit payment application, developed by the Contractor, to support account-based closed-loop fare payments in both single- and multi-application smartcard environments.
8.1.4-2	The transit payment application will be compatible with all modern MIFARE formats, including but not limited to: Ultralight C, MIFARE Plus, DESFire, and Nano. The specific platform to be used for the Agency-issued contactless fare media will be specifically designed for an account-based system, with limited memory capacity and strong security. The platform proposed by the Contractor will be finalized during design review.
8.1.4-3	The transit application will support the secure storage of a unique token used to access a transit account maintained within the back office. The secure token will not be the smartcard UID or transit account number used within the back office, and will not be printed on the media or otherwise accessible using a non-system device.
8.1.4-4	The transit application will support the encoding of additional data at the time of manufacture and used to support risk mitigation techniques (see Risk Mitigation Techniques section).
8.1.4-5	If possible, the same transit payment application will be used for both the EU and LU media.
8.1.4-6	The Contractor shall publish bit-level specifications for all transit payment applications across all supported card formats within the system, including information on all security protocols necessary to access and encode data on the media. The application specifications will be subject to Agency review and approval during design review.
8.1.4-7	The Contractor-developed transit payment applications will be fully owned by or licensed to the Agency, including the right to distribute specifications to third-parties for media production and to support multi-application smartcard implementations without further approval, license, or payment.

## **8.1.5 Third-Party Media**

Req #	Requirement
8.1.5-1	<p>The fare collection system will support the acceptance of third-party issued media that uses the Contractor-provided transit payment application in a multi-application environment. Compatible third-party media may include but is not limited to:</p> <ul style="list-style-type: none"> <li>• State and local government employee IDs</li> <li>• Transit employee and contractor IDs</li> <li>• Corporate employee IDs</li> <li>• School and college IDs</li> <li>• Social service program cards</li> <li>• PIV and CAC cards issued as identification to military and federal employees</li> <li>• Fare media from other transit agencies</li> </ul> <p>Other third-party issued media may be specified during design review.</p>
8.1.5-2	<p>If the Agency chooses to utilize the transit payment application for third-party media, the media will be supported without any additional development to the Contractor-supplied devices and systems.</p>
8.1.5-3	<p>All third-party media accepted within the system will be associated with a closed-loop transit account registered with the same personalization information on the ID. The rules associated with registration and use of third-party media will be defined during design review.</p>

## **8.2 Paper Ticket Media**

### **8.2.1 General Requirements**

Req #	Requirement
8.2.1-1	<p>Paper ticket media provided as part of the system will meet all applicable common design requirements in the Common Design Requirements section in addition to the requirements in this section.</p>
8.2.1-2	<p>The RVS will be able to consume existing paper tickets via barcode to verify payment.</p>
8.2.1-3	<p>If needed, the field equipment (e.g., TOT, MSD) will be able to issue paper tickets using the Agency's existing ticket stock.</p>

### **8.2.2 2D Barcode**

Req #	Requirement
8.2.2-1	<p>An encrypted 2D barcode (QR or Aztec) will be dynamically printed on each paper ticket that contains all of the information printed on the ticket, in addition to other necessary security or anti-fraud features by using an Agency-approved format.</p>
8.2.2-2	<p>The 2D barcode will contain all the required information for ticket inspections, verifications, or other electronic validation purposes.</p>
8.2.2-3	<p>If the 2D barcode printed on tickets is QR format, they will follow standard Model 2, Version 14 between 2.5cm-3cm square.</p>



## 8.3 Media Security and Fraud Prevention

Req #	Requirement
8.3-1	All contactless fare media will support strong cryptography, such as Advanced Encryption Standard (AES), and support offline cryptography as necessary.
8.3-2	The paper ticket media 2D barcode will be encrypted or cryptographically signed with strong cryptography using an asymmetrical security key infrastructure to protect access to and modification of all data encoded to the barcode. Barcodes will be encrypted using an Agency-approved encryption method.
8.3-3	All encryption may be implemented using a digital signature, or functional equivalent, that minimizes overhead and maximizes validation performance. Asymmetric algorithms that add significant overhead (i.e. RSA) are not preferred.
8.3-4	The Contractor will manage the key infrastructure and generate the public key to share with other contractors as required. The Contractor will work with such contractors to securely manage and share any public encryption keys, and ensure that the media is compatible with all validation devices.
8.3-5	The Contractor shall provide cryptographic key management services and tools for contactless fare media. Key management in this context includes but is not limited to: <ul style="list-style-type: none"> <li>• Key generation: Derived key generation for each manufactured card, including card manager key sets, as well as multiple application-related key sets (may include both encryption and authentication keys)</li> <li>• Key storage: Secure storage and retention of card and application key sets</li> <li>• Key updates: Ability to update, or roll, all cryptographic keys used within system</li> <li>• Key sharing: Secure sharing of application key sets with third parties for use in multi-application environments</li> </ul>
8.3-6	The Contractor shall use the highest possible security in generating, storing, deploying, and transmitting cryptographic keys. When stored, all key information will be encrypted as per the System Security section. The Contractor shall submit a cryptographic key management plan for Agency review and approval during design review.
8.3-7	If the fare collection system design requires the card manufacturer to encode the cryptographic keys to the fare media, the cryptographic key management plan shall identify trusted card manufacturers with appropriate security mechanisms in place to ensure that the cryptographic keys remain safe and secure.
8.3-8	The Contractor shall provide detailed specifications for the generation and management of all cryptographic keys used within the system. The key generation algorithms will be fully owned by or licensed to the Agency, including the right to distribute specifications to third parties for media production and to support multi-application smartcard implementations without further approval, license, or payment.

## 8.4 Initial Fare Media Supply

Req #	Requirement
8.4-1	The Contractor will provide the initial supply of fare media to support the first year of operation following system launch.

Req #	Requirement
8.4-2	<p>The initial fare media supply will be comprised of several media types, including but not limited to:</p> <ul style="list-style-type: none"> <li>• Extended-use full fare smartcards (with graphics)</li> <li>• Extended-use full fare smartcards (blank)</li> <li>• Extended-use reduced fare smartcards (with graphics/non-personalized)</li> <li>• Extended-use reduced fare smartcards (personalized)</li> <li>• Limited-use smartcards (with graphics)</li> <li>• Custom printed smartcards for special programs</li> </ul> <p>The final list of media types will be determined during design review.</p>
8.4-3	Pricing for various fare media types will be provided as part of the Contractor's proposal. Fare media pricing will be updated prior to purchase of the initial supply to account for market adjustments.
8.4-4	The estimated quantity of fare media to be provided will be based on projected quantities listed in the Pricing Sheet. The Contractor will work with Agency staff during design review to determine the necessary quantities and varieties of fare media to ensure the successful launch of all standard and special fare programs.
8.4-5	Prior to commencing full production, and within 30 calendar days of approved graphic designs, the Contractor shall supply at least 20 proof samples of each media type for review and approval by the Agency.
8.4-6	Delivery of fare media may occur at once or in installments as deemed appropriate by the Agency. The Media Inventory Management System (See Media Inventory Management section) will maintain an inventory of all serialized fare media as it is produced, held in inventory, installed in sales devices, and eventually issued to customers.
8.4-7	Fare media (contactless and paper ticket) will be available for competitive purchase from multiple U.S. sources. The Contractor will provide the specifications and associated documentation necessary to support the future procurement of media from third-parties.
8.4-8	All supplied fare media will undergo a comprehensive QA process prior to delivery to ensure adherence to all required performance standards and certifications. Media that fails to meet these requirements will be replaced by the Contractor at their own expense.
8.4-9	Test cards (at least 200) will be provided for each version of fare media, including closed-loop EU and LU media, and paper 2D barcode tickets. Test cards may also serve as proof samples if provided within 30 days of approval of graphic designs, but 200 cards are required if proof samples are to serve as test cards.

## 8.5 Fare Media Sales

Req #	Requirement
8.5-1	The extended-use (EU) fare media will be associated with closed-loop transit accounts that shall be loadable with all fare product types described in the Fare Products section. If the Agency chooses to issue limited-use (LU) fare media in the future (see Contactless Fare Media section), the associated transit accounts shall be loadable with all the same fare product types.
8.5-2	The fare collection system will support a one-time charge, or "card fee," for issuance

Req #	Requirement
	of new fare media. This card fee shall be configurable based on fare media type, rider classification, and distribution channel, and may be set to zero (0) for specific fare media types or for sales through specific channels.
8.5-3	The fare collection system will support replacement card fees, which shall be configurable based on fare media type and replacement thresholds (e.g., the first replacement is free, and each successive replacement associated with the same account is \$5). This replacement fee will be able to be waived by a customer service agent utilizing the contractor-provided CRM system.
8.5-4	The ability to load a particular fare product to a transit account will be configurable based on the fare media type and rider classification associated with the account.
8.5-5	The loading of stored value will be restricted based on configurable parameters, including the minimum and maximum amount that can be loaded in a single transaction, and the maximum amount that a transit account can contain.
8.5-6	Fare product and value purchases made with transit benefits (e.g., through institutional accounts or loyalty programs) shall be identified as such for reporting and refund investigation purposes.

## 9 Fare Structure

The fare payment system will be able to support a variety of fare structure configurations at system launch and in the future. Fare structure includes the supported fare policies, fare media, fare products, and distribution channels through which customers purchase fare media and products. The fare structure will be configurable by the Agency and Contractor, and designed to create a simple, unified system that enables interoperability across current and future transit modes without additional development. At minimum, the fare policies in Figure 9-1 will be supported, along with the detailed fare structure configuration requirements in this section.

*Figure 9-1: Supported Fare Structure*

Fare Products	Stored Value
	Calendar-Based Passes
	Rolling Passes (Time-Based)
	Trip-Based Passes
	Fare Incentives (e.g., Bonus Rides and Bonus Value)
Transfers	Mode-Specific (e.g., Bus-to-Bus, Rail-to-Rail)
	Intermodal (e.g., Bus-to-Rail, Bus-to-Streetcar)
	Upgrade Transfers (Local to Express)
Fare Policy	Rider Classification-Based Fares
	Mode-Based Fares (Bus/Rail)
	Service Type-Based Fares (Local/Express)
	Location-Based Fares
	Day- and Time-Based Fares (Peak/Off-Peak)
	Discount Pricing
	Fare Capping (Stored Value Deductions, Pay as You Go)
	Fare Capping (Post pay for Institutions)
	Post pay per Ride
	Promotional Fares/Promo Codes
	Event Based Fares
	Distance Based Fares
	Zone Based Fares

### 9.1 General Requirements

Req #	Requirement
9.1-1	The Contractor shall design, develop, and implement a fare engine, and the configurable fare sets, business rules, and transaction processing necessary to support the current fare structure referenced in the Current System Summary section and all fare structure configuration requirements in this section.
9.1-2	The Contractor shall work with the Agency during design review to develop and submit a preliminary business rules document that describes the fare structure configuration to be deployed at launch. The final fare structure configuration will be defined and documented no later than 120 calendar days before the start of integration testing for the applicable part of the system.

## 9.2 Fare Products

Req #	Requirement
9.2-1	The fare collection system will support stored value, which will serve as an electronic cash-equivalent, and will be accepted for payment across all modes and services. When stored value is used for payment, the system will deduct the correct fare at each boarding or entry in real-time from the account, based on the fare pricing configuration described in the Fare Policy section.
9.2-2	The fare collection system will support the issuance of one-ways (single rides) and round trips. The validity period of these products shall be configurable.
9.2-3	The fare collection system will support calendar passes that are valid for unlimited rides during a pre-defined calendar period. Calendar passes will be configurable to be valid for any calendar period from one (1) day to one (1) year, including periods that are bounded by specific dates (e.g., valid from Oct. 5 through Dec. 15).
9.2-4	The fare collection system will support rolling passes that are valid for unlimited rides for a pre-defined period starting at pass activation, which may occur upon sale or first use. Rolling passes will be configurable to be valid for a continuous duration from 30 minutes to one (1) year (e.g., valid for 24 hours from first use), or bounded by a service period (e.g., valid from first use through the end of the service day).
9.2-5	The fare collection system will support trip-based passes that are valid for a pre-defined number of trips. Trip-based passes shall be configurable to be valid from one (1) to 100 trips, and to include transfer privileges or not (see Fare Transfers section).
9.2-6	The fare collection system will support group passes that are valid for a configurable number of persons at the point of sale (and thus variable in price) or in the product definition. When used, ridership shall count boardings equivalent to the number of persons configured for the product.
9.2-7	The acceptance or denial of pass products for use on a particular mode or service shall be configurable based on all of the fare pricing parameters described in the Fare Policy section. Pass products shall be configurable as mode-specific (e.g., valid for bus only) or joint passes (e.g., valid for bus and streetcar).
9.2-8	All pass products shall be configurable with a grace period that extends the validity for a set period of time (e.g., 30 minutes or 10 days) or a number of rides (e.g., one ride).
9.2-9	One (1) transit account will be able to support multiple fare products (e.g., stored value and pass products), with the number of allowed unique fare products, including active and multiple inactive instances, to be configurable by the Agency. Order of precedent rules, to be defined during design review, will determine which fare products are used first and under which scenarios.
9.2-10	Pass products shall be configurable to grant a partial credit towards a fare for a premium service. In this scenario the remainder of the fare, or “upgrade fare,” will be deducted from stored value. If the customer does not have enough stored value in their account to cover the upgrade fare, the system shall be configurable to allow the ride or not, taking the balance remaining on the card or not, with the balance due displayed on the validation device.
9.2-11	The fare collection system will support bonus fare incentives (e.g., purchase \$10 in stored value, receive \$11; and ride 10 times, get one free).
9.2-12	The fare collection system will support escheatment of value in dormant transit accounts through the assessment of a configurable dormancy fee or other means as

Req #	Requirement
	determined during design review and allowed by state and federal regulations.

## 9.3 Transfers

Req #	Requirement
9.3-1	The fare collection system will support the granting of a transfer fare credit for a boarding (e.g., fare payment) that occurs within a defined time period of another boarding. The transfer period (e.g., time during which a boarding is eligible for a transfer) will be configurable.
9.3-2	Transfers will be supported for customers that pay fares using stored value and trip-based pass products.
9.3-3	The granting of a transfer fare credit, the credit amount, and transfer validity shall be configurable based on all fare pricing parameters described in the Fare Policy section. Transfers shall be configurable by mode (e.g., valid for bus-to-bus only), service level, time of day, rider classification, and directionality (e.g., to prevent or allow round trips).
9.3-4	Transfers shall be configurable to grant a partial credit towards a fare for a premium service. In this scenario the remainder of the fare, or “upgrade fare,” will be deducted from stored value. If the customer does not have enough stored value in their account to cover the upgrade fare, the system shall be configurable to allow the ride or not, taking the balance remaining on the card or not, with the balance due displayed on the validation device.

## 9.4 Fare Policy

Req #	Requirement
9.4-1	<p>The fare collection system will support single-tap or “flat” fare pricing that is fully configurable based on parameters including, but not limited to:</p> <ul style="list-style-type: none"> <li>• Rider classification</li> <li>• Mode</li> <li>• Service type</li> <li>• Location</li> <li>• Day and time</li> <li>• Discounts</li> <li>• Media type (mobile ticket, closed-loop card, open-loop card)</li> </ul> <p>These fare pricing parameters will also govern the acceptance or denial of fare products being used for payment (see Fare Products section) and the granting of transfers (see Fare Transfers section).</p>
9.4-2	The default fare set will be associated with transit accounts that have a Full Fare rider classification. Additional rider classifications shall be supported with unique fare sets such as Child, Youth, Student, College, Senior, Disabled, Paratransit, Local, Low Income, and Visitor. Rider classifications will be modified manually, or automatically based on customer date of birth or the granting of a temporary classification with a configurable end date.

Req #	Requirement
9.4-3	Fare pricing shall be configurable based on the mode being travelled (e.g., bus or streetcar). The Agency will be able to add new modes or participants (e.g., parking and bike share) with unique fare pricing as needed and without additional development.
9.4-4	The fare collection system will support premium pricing for certain types of service (e.g., express bus service). Service-based fare pricing shall be configurable for a single route or groups of routes.
9.4-5	The fare collection system will support location-based fares, or the ability to price fares based on the location of payment (e.g., boarding at specific stop locations). Location-based fare pricing shall be configurable based on the station location programmed into the streetcar devices, or the geo-location information captured from the CAD/AVL system onboard vehicles.
9.4-6	The fare collection system will support fare pricing based on the time of day and day of week (e.g., peak and off-peak fares). Peak/off-peak fare pricing shall be configurable for specific fare classifications, modes, and service types, and put into effect at all times or on a scheduled basis (e.g., every weekday).
9.4-7	The fare collection system will support the offering of discounted fares on a temporary and permanent basis, up to and including the offering of free fares. Discounted fare pricing shall be configurable for specific fare media types, rider classifications, modes, service types, and routes, and put into effect indefinitely or for a defined period (e.g., from June 5 to June 7).
9.4-8	The fare collection system will support mileage-based fares, where customers pay fare based on trip length. Mileage-based fares shall be configurable for specific fare classifications, modes, and service types. Mileage-based fares shall be configurable to incorporate a base fare plus per-mile fare. The per-mile fare shall be configurable to incorporate different fare rates for different mileage groups (i.e. \$0.20 per-mile for miles 1-10, \$0.25 per-mile for miles 11-20, etc.).
9.4-9	The fare collection system will support zone-based fares where customers are charged different fare rates depending on the number of fare zones traveled. Zone-based fares shall be configurable for specific fare classifications, modes, service types, and routes. The fare collection system will allow for configuration of zone designations and zone fare levels.
9.4-10	The fare collection system will support event-based fares. Event based fares shall be configurable for specific fare classifications, modes, service types, regularly occurring events (e.g., sporting events), and one-off events (e.g., concerts).

Req #	Requirement
9.4-11	<p>The fare collection system will support promotional codes for free or discounted passes or value:</p> <ul style="list-style-type: none"> <li>Promotional codes will support dollar off or percentage off product price including provision of products at no cost to the customer.</li> <li>Promotional codes can be limited to select fare products (passes or SV) or available for general use.</li> <li>Promotional codes will support defined validity periods in which the promo code can be applied.</li> <li>Promotional codes will be accepted across all system payment channels (website, CRM, TOT) provided by the Contractor. Where possible, promotional codes will be accepted by third party sales channels (Retail and TVMs)</li> </ul>
9.4-12	<p>The fare collection system will support goodwill, complimentary, or ability to sell an otherwise priced product at \$0 for use in following situations:</p> <ul style="list-style-type: none"> <li>Registration of purchased fare media (e.g., receive \$2 back when purchasing card for \$4)</li> <li>Free rides on birthday or another programmable event</li> <li>Buy 5 passes, 6<sup>th</sup> is free</li> <li>Loyalty programs (see requirement 9.4-13)</li> </ul>
9.4-13	<p>The fare collection system shall utilize a RESTful API from Brandmovers (Agency's loyalty programs vendor) in order to update Brandmovers loyalty accounts on items including, but not limited to:</p> <ul style="list-style-type: none"> <li>Rides taken (by count and/or value)</li> <li>Products/Value purchased</li> <li>Account information such as fare media ID, passenger type, transit account status</li> </ul>

## 9.5 Fare Capping

Req #	Requirement
9.5-1	<p>The fare collection system will support fare capping. The fare collection system will allow customers to pay base fares using stored value until they reach a pre-defined amount over a calendar period. The fare collection system will support fare capping at multiple levels (e.g., daily, 7-day, monthly) such that customers will be able to accrue rides to reach the daily cap while also accruing rides to reach longer term caps.</p>
9.5-2	<p>The fare collection system will support fare caps for individual service types, service levels, and modes (bus, streetcar, express, access, etc.).</p>
9.5-3	<p>The fare collection system will allow customers to reach fare caps for multiple service types and modes. The fare collection system will allow customers who have reached the fare cap on one (1) service/mode to board premium services/modes at a discounted fare. If the customer does not have enough stored value in their account to cover the upgrade fare, the system shall be configurable to allow the ride or not, with the balance due displayed on the validation device.</p>



## 9.6 Fraud Detection

Req #	Requirement
9.6-1	The fare collection system will support fraud prevention policies, including the ability to automatically identify suspect usage patterns based on sales and ridership data, flagged payment methods, and block the use of fare media, transit accounts, and fare products based on configurable fraud rules.
9.6-2	The fare collection system will support Agency-configurable velocity checks, and other fraud prevention measures, that identify excessive or potentially fraudulent use of fare media or payment cards. The velocity thresholds and time periods will be configurable per sales channel type, service type, or geographical location.
9.6-3	The fare collection system will support the setting of a configurable upper limit of rides for unlimited ride passes (e.g., 50 rides for a one-day pass) that will generate an automated alert within the system, and optionally block the fare media or product, when the limit is reached.
9.6-4	The fare collection system will detect, and generate an automated alert for potential fraudulent duplication of fare media, if the same card or account is used for payment in two (2) geographically separated locations within a configurable period of time.
9.6-5	For transit accounts with stored value, the system will support the configuration of a “floor limit,” or value below which the account balance is not allowed to fall (so long as the device generating a fare payment is online). The floor limit may be configured to be a zero (0) or negative balance. Transit accounts with negative balances will be automatically blocked by the system.
9.6-6	For transit accounts with stored value, the system will support the deduction of any remaining value up to a zero balance and subject to a configurable minimum balance to complete a validation transaction as a “short pay”. Short pay transactions will be a unique searchable/reportable/identifiable transaction type in the system.
9.6-7	The fare collection system will support configurable rules to prevent the sharing of fare media and accidental payments through “passback protection,” or a configurable time period in which a card will not be accepted for payment at the same device (local passback) or on any device (global passback) after an initial use. Local and global passback will have different configurable time periods.
9.6-8	The fare collection system will support the placing of fare media and transit accounts into “observation mode”, which will generate an automated alert when the fare media or account is used. This may be used by fare enforcement staff to monitor known stolen or compromised fare media or transit accounts.
9.6-9	The blocking of fare media, transit accounts, and individual fare products may be performed automatically (if the Agency approves) or manually, and on an individual or bulk basis (e.g., if a known batch of cards was lost, the entire batch may be blocked).
9.6-10	Additional fraud prevention policies supported by the system may be defined during design review.

## 9.7 Special Fare Programs

Req #	Requirement
9.7-1	The fare collection system will support special fare programs, or institutional programs, with a unique fare media, fare products, business rules.
9.7-2	The fare collection system will support the current range of special fare programs

Req #	Requirement
	<p>offered by the Agency, and future programs, including but not limited to:</p> <ul style="list-style-type: none"> <li>• Employee fares</li> <li>• Interagency fares</li> <li>• OC-Flex program</li> <li>• OC ACCESS paratransit</li> <li>• College pass programs</li> <li>• School (K-12) programs</li> <li>• Corporate and employer programs</li> <li>• Government and military programs</li> <li>• Social service agency programs</li> <li>• Local attraction and tourist programs</li> <li>• Partner programs supporting transit-related services, including but not limited to parking, bike share, and tourist transportation</li> </ul> <p>Special fare programs and their associated fare media, fare products, and business rules will be defined during design review.</p>
9.7-3	<p>The fare collection system will support the printing of personalized special fare program media using the Ticket Office Terminal (see Ticket Office Terminal section). Rider classifications associated with unique fare policy (see Fare Policy section) will be supported for special fare programs and media.</p>
9.7-4	<p>Fare products offered through special fare programs will be distributed primarily through the institutional website (see Institutional Website section) but also supported via the CRM, TOT, and Mobile Ticketing Application (MTA).</p>
9.7-5	<p>Fare products offered through special fare programs will be configurable to allow purchase by designated institutions only and at variable discounts by institution.</p>
9.7-6	<p>Configuration parameters to be supported to govern an institution's participation in special fare programs shall include but not be limited to:</p> <ul style="list-style-type: none"> <li>• Program type (e.g., direct load, post-bill, or media order-only)</li> <li>• Available fare media</li> <li>• Available fare products</li> <li>• Fare media and product pricing</li> <li>• Fare media and product ordering windows</li> <li>• Payment type (e.g., prepay or invoice)</li> <li>• Payment terms</li> </ul> <p>The special fare program configuration parameters will be set by the Agency during registration of an institutional customer and will be stored in the institutional customer account (see Institutional Website section).</p>
9.7-7	<p>Special fare programs will include post-bill programs where the institution is invoiced based on the participants' actual usage of the system. For these programs, the participants' transit accounts will be loaded with an unlimited-ride pass, and the system will calculate the amount due on a monthly basis using pass ridership data and an Agency-defined formula.</p>
9.7-8	<p>Special fare programs will include fare sales using pre-tax transit benefits funds. Stored value and passes loaded through transit benefit programs will be identified as such and segregated within the transit account to ensure compliance with all applicable IRS regulations.</p>

Req #	Requirement
9.7-9	Special fare programs will include the bulk sale of fare media. If the Agency chooses to support limited-use media in the future, bulk sales will include LU media where the associated transit accounts are pre-loaded with products and/or value.
9.7-10	The Contractor shall support the migration and persistent transmission of data from any existing databases used for the administration of special or reduced fare programs, including data on qualified individuals, schools, employers, government agencies, and social service agencies. This data will be exchanged on a daily basis at minimum, the specific frequencies will depend on the program.
9.7-11	The Contractor will support interfacing with government-supported reduced fare databases and similar eligibility verification systems. The RVS will be able to query and integrate with programs like Cal-ITP or other programs that provide customer credentials and eligibility information. The API's provided as part of the Open Architecture section will be utilized for such integrations.

## 9.8 Fare Management

Req #	Requirement
9.8.1	The system will include a fare configuration management tool to support fare configuration (distribution, payment, inspection processing) by the Account-Based Transaction Processor. A web-based fare configuration management tool is preferred, but the tool needs to meet all functional security requirements (see System Security section).
9.8.2	The configuration of fare sets, including all fare sets, fare rules, product availability, and other parameters necessary to support the fare structure configuration described in this section, will be accessible and modifiable using the Contractor-provided tools.
9.8.3	The system will be able to configure the availability of specific products based on time of day and/or location. For example, if service is unavailable to a particular location or at a particular time (e.g., weekends), those tickets will be unavailable for purchase.
9.8.4	The system will be able to manage, store, and deploy an active fare set and at least two (2) pending fare sets. An active fare set will become effective immediately upon publication. Pending fare sets will be able to be activated manually, or automatically based on a future activation date configured within the tool.
9.8.5	Publication and activation of fare sets shall minimize negative impact to operations. Users of the fare configuration management tool shall be notified/warned of any action, prior to taking that action, that may negatively impact system operations.
9.8.6	The configuration of the fare products available for sale and fare product pricing will be accessible and modifiable using the configuration management tool. Available fare products and pricing will be able to be configured by sales channel, customer account (via the website(s)), location, time, day, and individual device.
9.8.7	To the extent that any fare product availability and pricing information is maintained locally at the devices, the system will publish this information for distribution. Devices that are not in communication at the time of distribution will receive updates as soon as communications are re-established.

Req #	Requirement
9.8.8	The system will publish fare media positive and negative lists generated and used by the account-based transaction processor, and distributed to devices, to support the risk mitigation techniques discussed in the Risk Mitigation Techniques section. Positive and negative list updates will be published no less than every five (5) minutes and include version control to ensure timely and accurate synchronization.

# 10 Open Payments

## 10.1 General Requirements

Req #	Requirement
10.1-1	The RVS shall be capable of accepting contactless open payments (i.e., contactless EMV bankcards and mobile wallets) for the payment of fares where fare payment is accepted.
10.1-2	The RVS will support all contactless open payment methods that comply with EMV standards, including those from all major North American networks (e.g., Mastercard, Visa, American Express, and Discover) and those initiated using contactless-enabled bankcards and NFC-based mobile wallet applications (e.g., Apple Pay, Google Pay, Samsung Pay).
10.1-3	<p>The Contractor shall be responsible for processing open payments transactions, including:</p> <ul style="list-style-type: none"> <li>• Risk management – maintaining and distributing a hotlist of invalid open payment credentials</li> <li>• Account Management – Managing transit accounts associated with open payment tokens</li> <li>• Payment validation – issuance of an acceptance or denial response based on fare calculation</li> <li>• Payment authorization – bank authorization using an interface to the payment processor</li> <li>• Settlement reconciliation – transaction-level reconciliation of settled bank card transactions</li> </ul>
10.1-4	The Contractor shall be responsible for ensuring compliance with all EMV payment acceptance requirements, including support for all forms of Offline Data Authentication (e.g., Dynamic Data Authentication and Combined Data Authentication).
10.1-5	The solution will be fully compliant with the latest version of the Visa Mass Transit Transaction (MTT) processing model for the acceptance of open payments published at the time of launch, including all rules related to transaction processing, aggregation, and debt recovery. The solution will also be fully compliant with the latest version of any similar specifications issued by other supported card brands at the time of launch.
10.1-6	The Contractor shall be responsible for ensuring that all applicable equipment and software used to process open payment transactions is certified as compliant with the latest version of the Payment Card Industry (PCI) Payment Application Data Security Standard (PA-DSS) published at the time of launch.
10.1-7	The RVS will request payment authorization from the payment processor in parallel with internal fare validation processing in compliance with card brand rules.
10.1-8	Upon first tap, the RVS will generate a unique Transit Account if one does not already exist. The RVS will log Payment Account Reference (PAR) values and will associate it with a unique Transit Account for each open payment credential.
10.1-9	If a new Transit Account is created for an open payment credential that duplicates an existing account, the RVS will support the merging of the duplicative Transit Accounts, including any recalculation of fares.

Req #	Requirement
10.1-10	If the balance of a Transit Account associated with an open payment credential falls below \$0, the account will be added to a hot list maintained by the RVS and distributed to all validators for use in offline taps.
10.1-11	The acceptance of open payments shall be configurable, such that the Agency can choose whether or not to accept open payments via back office parameters.

## 10.2 Fare Policy

Req #	Requirement
10.2-1	All fare policy configurations, as referenced in the Fare Structure section, will be supported as part of the acceptance of open payments.
10.2-2	Riders eligible for Special Fare Programs, as defined in the Special Fare Programs section, will be able to link their open payments credential to their respective fare program. The final list of special fare programs eligible for use with open payments will be determined during design review.

## 10.3 Security

Req #	Requirement
10.3-1	All open payment card data captured and used by the system will be tokenized in a secure manner, which removes the tokenized data, and the systems and networks that handle only the tokenized data, from PCI scope.
10.3-2	The Vendor shall make use of End-to-End Encryption (E2EE) for the transmittal of open payment data, which effectively removes any agency networks used to transmit the encrypted data from PCI scope.
10.3-3	<p>The Vendor shall be responsible for the management of all cryptographic keys used to protect open payment data, including:</p> <ul style="list-style-type: none"> <li>• EMV cryptographic keys used by fare validation devices to generate encrypted EMV payloads</li> <li>• Secret salt values used by fare validation devices to create internal open payment (i.e., hashed PAN) tokens</li> <li>• Any other encryption keys and/or hashing values/salts used to protect sensitive data stored in production and non-production databases</li> </ul> <p>The Vendor shall submit an updated cryptographic key management plan, detailing generation and management of all cryptographic keys used within the system, for review and approval during design review.</p>

## 10.4 Fraud Detection and Liability

Req #	Requirement
10.4-1	The RVS will support the aggregation of fare payments made using the same open payment credential over a defined period or up to a defined spending threshold.

Req #	Requirement
10.4-2	The RVS will support configurable, automated debt recovery processes, which attempt to recover lost fare revenue due to declined open payment authorizations, including time-based debt recovery (i.e., periodic re-authorization attempts) and tap-driven debt recovery, as well as manual customer-initiated debt recovery through all customer service channels. The RVS will support aggregation and debt recovery rules by card brand or issuer.
10.4-3	<p>All parameters for payment aggregation and debt recovery processes will be configurable and can be set globally or for each individual card brand. Configurable parameters shall include, but are not limited to:</p> <ul style="list-style-type: none"> <li>• Payment aggregation on / off</li> <li>• Payment aggregation value threshold</li> <li>• Payment aggregation time threshold</li> <li>• Payment pre-authorization on / off</li> <li>• Payment pre-authorization amount</li> <li>• Automated debt recovery on / off</li> <li>• Automated debt recovery period</li> <li>• Automated debt recovery frequency</li> <li>• Tap-driven debt recovery on / off</li> </ul>

## 10.5 Real Time Communication

Req #	Requirement
10.5-1	The RVS will serve as the system of record for determining acceptance or denial of an open payment. The RVS will also decide whether to submit an open payment transaction, once accepted, to the payment processor for payment authorization and return a positive or negative result to the Fare Validation Device in real time.
10.5-2	The RVS will calculate the fare, and record any debt associated with the open payment credential in the event of a payment decline. When determining an open payment fare validation result, the RVS will utilize the hotlist.
10.5-3	Following local validity checks, and each card brand's processing model and other liability sharing (e.g., first-ride risk) requirements, the RVS will accept the open payment credential, and create a Transit Account if one does not already exist.
10.5-4	A RVS validation response indicating acceptance of an open payment will contain the same information as a closed-loop payment.

# 11 Equipment

## 11.1 Common Requirements

### 11.1.1 General Requirements

Req #	Requirement
11.1.1-1	All system provided equipment will be free from safety hazards and will be designed to comply with relevant Underwriters Laboratories (UL) standards. All interior and exterior surfaces shall be free from sharp edges, protrusions, exposed wires, or other hazards.
11.1.1-2	System equipment displays and all other instructions, labels, and information contained on the equipment will be visually readable within all common positions and meet ADA guidelines.

### 11.1.2 Hardware

Req #	Requirement
11.1.2-1	Agency fare equipment will satisfy all applicable common hardware design requirements specified in the Common Design Requirements section including: <ul style="list-style-type: none"><li>• Service-proven design</li><li>• Non-proprietary technology</li><li>• Supply and availability</li><li>• Maintainability and serviceability</li><li>• Operating environment</li><li>• ADA compliance</li><li>• Licensing and data ownership</li><li>• Code and regulation compliance</li></ul>
11.1.2-2	All provided fare equipment will satisfy all applicable requirements specified in the System Architecture section.
11.1.2-3	All equipment will meet the applicable hardware security requirements in the System Security section.
11.1.2-4	All equipment design will be subject to review and approval by the Agency.
11.1.2-5	All Ticket Office Terminals and component equipment will be labeled with a unique bar-code for use with the Media Inventory Management System (see Media Inventory Management section). Through this process the movement of any bar-coded component will be scanned and associated with an identified location. The Contractor will comply with existing monitoring and auditing procedures for maintaining all stationary and component equipment.



### **11.1.3 Software**

Req #	Requirement
11.1.3-1	Equipment software will employ software that satisfies the common design requirements in the Common Design Requirements section, including: <ul style="list-style-type: none"> <li>• Service-proven design</li> <li>• Non-proprietary technology</li> <li>• Open architecture</li> <li>• Software design principles</li> <li>• Licensing and ownership</li> <li>• ADA compliance</li> <li>• Code and regulation compliance</li> </ul>
11.1.3-2	All equipment will meet the applicable software security requirements in the System Security section.
11.1.3-3	All equipment will employ a current or recent version of a COTS operating system. The operating system will be capable of performing all tasks necessary to support the equipment and its applications, including the ability to multitask, manage memory, maintain performance without degradation, and communicate with the back office in real-time.
11.1.3-4	All equipment will maintain local transaction records in non-volatile memory should communications to the back office be unavailable. Local records will not be deleted until they have been confirmed as received and recorded by the back office.
11.1.3-5	The design of the system will provide a mechanism to recover transactions or other data stored on faulty equipment that has not been transmitted to the back office.

## **11.2 Inspection/Validation Application**

### **11.2.1 General Requirements**

Req #	Requirement
11.2.1-1	The Contractor shall provide a mobile application that will be installed on Agency-provided Android devices. The application will enable Agency employees and partners to inspect and validate the contactless and 2D barcode fare media specified in the Fare Media section, and mobile ticketing barcodes (see Mobile Ticketing Application section). The application will be designed for field inspection/validation and support real-time communications with the back office.
11.2.1-2	The Contractor shall include a configurable fare validation functionality that enables Agency personnel to collect fares by reading fare media in a mobile environment.
11.2.1-3	The fare inspection/validation application will support the ISO-18092 (NFC) media format.
11.2.1-4	The fare inspection/validation application will be designed to operate on NFC-enabled mobile handsets.
11.2.1-5	The fare inspection/validation application will support secure contactless inspection and validation of open payment credentials.
11.2.1-6	The fare inspection/validation application will be designed to operate on the Android mobile platform.
11.2.1-7	Mobile devices will be remotely managed through a Contractor-provided Mobile

Req #	Requirement
	Device Management (MDM) solution. Alternatively, the Agency's existing MDM tool may be used if preferred.
11.2.1-8	The provided applications will be installed and managed using the MDM solution, which will also control what services, applications, and functionality are accessible on the devices. By default, only the Contractor-provided applications will be enabled, and users will not have access to any other device features such as phone calls, web browsing, email, etc.
11.2.1-9	The MDM solution will include remote management and Over the Air (OTA) capability to locate, lock, disable, or erase lost/stolen devices.

## **11.2.2 User Interface**

Req #	Requirement
11.2.2-1	The fare inspection/validation application will employ a user interface that is based on industry-accepted user interface design standards, and consider ergonomics, human factors, and graphic design best practices to assist in development of the application layout and interaction.
11.2.2-2	The fare inspection/validation application will require login by the fare inspector via manual entry, or by reading a contactless employee badge, if available. The login will be validated against a list of valid IDs. Repeated login rejections will lock the device until unlocked by an administrator.
11.2.2-3	Following login, the fare inspection/validation application will require the fare inspector to enter the route or location where inspection is occurring, and select the appropriate fare set if the validation feature of the application is on. The inspector will be able to modify the route, location, or fare set without logging out of the application.
11.2.2-4	The fare inspection/validation application will provide a standard interface ready to inspect/validate fare media. The fare validation results will be clearly presented to minimize confusion by employees, partners, and customers.
11.2.2-5	The fare payment status reported by the inspection/validation application will include at a minimum, the result (e.g., valid or no valid fare payment), and if a valid payment has been found, the time and date of payment, location, fare product used, product validity, amount paid, and fare category associated with the account.
11.2.2-6	The fare inspection results will be clearly presented to minimize confusion by inspectors and customers.
11.2.2-7	The fare inspection/validation application will provide the inspector with a clear and visible notification when the device is offline.
11.2.2-8	The fare inspection/validation application user interface will be subject to Agency review and approval during design review.
11.2.2-9	The fare inspection/validation application will have ADA-compliant visual and audible indicators that provide distinctive messages for approval or denial of all fare media inspections and validations. The fare inspection/validation application will have different visual and audible indicators for reduced fares. All fare inspection/validation application visual and audio output will be fully configurable and subject to Agency review and approval during design review.

### **11.2.3 Transaction Processing**

Req #	Requirement
11.2.3-1	The fare inspection/validation application will use the Contractor-provided fare inspection API (see Fare Inspection API section) to query the transaction history maintained within the ATP in real-time.
11.2.3-2	Consistent with risk mitigation techniques employed in the system (see Risk Mitigation Techniques section), the fare inspection/validation application will be able to read any data written to the media and receive updates of positive and negative lists from the back office to support offline processing.
11.2.3-3	<p>All inspections will generate fare inspection transactions that include the following information, at a minimum:</p> <ul style="list-style-type: none"> <li>• Date and time</li> <li>• Device ID</li> <li>• Operator ID</li> <li>• Route number/station ID</li> <li>• Geo-location information (GPS data)</li> <li>• Media type</li> <li>• Card/account number</li> <li>• Fare category (e.g., full fare, reduced fare)</li> <li>• Fare instrument or product used (where applicable)</li> <li>• Transfer validity (if applicable)</li> <li>• Inspection result (valid, invalid, incomplete)</li> <li>• Transaction ID</li> </ul> <p>Final inspection transaction data will be determined during design review.</p>
11.2.3-4	In order to support fare validation functionality, the fare inspection/validation application will communicate with the ATP (see Back Office General Requirements section and Account-Based Transaction Processor section) in real-time for the processing of fare payments using the Contractor-provided fare payment API (see Fare Payment API section).
11.2.3-5	Prior to transmitting a fare payment transaction to the ATP, the fare inspection/validation application will perform local fare media validity checks, including checks against any locally maintained positive and negative lists, as deemed necessary for security and the efficient processing of transactions.

Req #	Requirement
11.2.3-6	<p>The transaction result from the ATP will include:</p> <ul style="list-style-type: none"> <li>• Validation result</li> <li>• Fare product used</li> <li>• Fare amount charged</li> <li>• Balance remaining</li> <li>• Fare product expiration date</li> <li>• Fare product remaining rides or days</li> <li>• Rider class</li> <li>• Transfer time remaining</li> <li>• Low balance warning (threshold to be configurable)</li> <li>• Time-based pass expiration warning (threshold to be configurable)</li> </ul> <p>Displayed results will be determined during design review. Results will be configurable, set by downloadable configuration parameters from the back office.</p>
11.2.3-7	The fare inspection/validation application will provide a payment result within one (1) second of valid fare media being presented for all fare payment types.
11.2.3-8	The fare inspection/validation application will be able to operate in an offline mode, and accommodate scenarios where a full authorization cannot be received within the required timeframe. In these scenarios, risk mitigation strategies will be employed to limit exposure for declined payments (see Risk Mitigation Techniques section).
11.2.3-9	All transactions generated in an offline mode will be sent to the ATP immediately upon restoration of communications.
11.2.3-10	The fare inspection/validation application will generate, store, and transmit a discrete data record for each transaction and/or validation performed.
11.2.3-11	<p>Each transaction record will be unique and will include the following information, at a minimum:</p> <ul style="list-style-type: none"> <li>• Date and time</li> <li>• Device ID</li> <li>• Operator ID</li> <li>• Route number/station ID</li> <li>• Geo-location information (GPS data)</li> <li>• Media type</li> <li>• Card/account number</li> <li>• Fare category (e.g., full fare, reduced fare)</li> <li>• Action performed</li> <li>• Fare instrument or product used (where applicable)</li> <li>• Transaction value (where applicable)</li> <li>• Transaction result (e.g., success, failure)</li> <li>• Transaction ID</li> </ul> <p>Transaction records details will be finalized during design review.</p>

Req #	Requirement
11.2.3-12	<p>The fare inspection/validation application will maintain audit registers that track the following information at a minimum:</p> <ul style="list-style-type: none"> <li>• The total count and value of all transactions completed by the mobile fare validation application since data was last uploaded to the back office.</li> <li>• The date and time of the last successful data upload to the back office.</li> </ul> <p>These registers will be modified only by the fare inspection/validation application itself and will not be manually alterable.</p>
11.2.3-13	Audit register records will be transmitted to the back office at the end of service day for reconciliation, or upon a configurable time period.

## **11.2.4 Configuration**

Req #	Requirement
11.2.4-1	Fare inspection/validation devices will receive date/time, fare set, configuration, and list updates from the back office at startup and as necessary. Additionally, equipment will automatically synchronize with the back office throughout the day to update configuration and list data.
11.2.4-2	All devices will be able to receive multiple account lists from the back office including, but not limited to, positive and negative lists. All local lists will be updated based on changes since the last update at a configurable interval of no less than every five (5) minutes. The updates will be differential (only changes are transmitted) to minimize the amount of data transmitted and improve list update performance.
11.2.4-3	The fare inspection/validation software will include the flexibility to ensure that future OCTA fare policy will be satisfied without software modifications. All fare policy modifications will be through fare set and other configuration changes, downloadable from the back office.
11.2.4-4	Devices will receive configuration and software updates when available from the back office. The devices will not commence updating software until it has received and verified the complete update. If any updates require a reboot, they will occur during non-operating hours, unless specifically approved by authorized service staff.
11.2.4-5	Each update will have a unique version number and include an activation date and time if applicable. Updates shall be downloaded and applied at that activation time, or activated immediately after download and verification is confirmed.
11.2.4-6	The download process will not interrupt normal equipment operations, or cause data or file corruption if communication is lost. The process will recover from such loss and complete the download without issue.
11.2.4-7	Users of the fare configuration management tool shall be notified/warned of any action, prior to taking that action, that may negatively impact system operations.

## **11.3 Ticket Office Terminal**

### **11.3.1 General Requirements**

Req #	Requirement
11.3.1-1	The Ticket Office Terminal (TOT) will be a modular device, and will support multiple configurations at four (4) transit store locations at a minimum, depending on the

Req #	Requirement
	peripheral modules included. The TOT hardware will be optimized for its intended use and configuration, and include a fixed-location TOT option.
11.3.1-2	TOTs will be designed to permit rapid exchange of the device and peripheral modules to restore service in minimal time. Repairs will be performed in the field and no special tools or instruments will be required for exchange of modules.
11.3.1-3	<p>The TOT will provide all functions available and will be installed for card sales and bulk stored value/product (loyalty program) loads. The device will include:</p> <ul style="list-style-type: none"> <li>• Integrated touch-screen and computer enclosure</li> <li>• Separate keyboard and pointing device (i.e., mouse)</li> <li>• Contactless smartcard reader</li> <li>• 2D barcode reader</li> <li>• Cash drawer module</li> <li>• Bank card processing module</li> <li>• Receipt printer</li> <li>• Customer display</li> <li>• Camera and Tripod</li> <li>• Scanner</li> <li>• Extended use smartcard printer/encoder</li> <li>• Communications interfaces as necessary</li> <li>• Uninterruptible power supply</li> </ul>
11.3.1-4	The TOT and peripheral modules will be subject to Agency review and approval.
11.3.1-5	To accommodate the required variety of installation locations, the TOT (excluding peripheral modules) will be compact and easily positioned for user comfort and ergonomics.
11.3.1-6	<p>The TOT will conduct a variety of transactions. At minimum, these transactions will include:</p> <ul style="list-style-type: none"> <li>• Sell all supported fare media (and create new transit accounts)</li> <li>• Sell all supported fare products (e.g., stored value) and load fare products to transit accounts</li> <li>• Query transit account status (e.g., associated rider classification, active/inactive, blocked/unblocked) for both closed-loop and open payment credentials</li> <li>• Query transit account status for open payment credentials either through the contactless reading of open payment credentials, the manual entry of the bankcard number, or the manual entry of a receipt reference code</li> <li>• Query fare payment transaction history</li> <li>• Query sales transaction history</li> <li>• Query adjustment transaction history</li> <li>• Enable fare product for autoload (requires funding source in customer account)</li> <li>• Generation of fare payment reversal (e.g., cancellation)</li> <li>• Generation of sales reversal (e.g., refund)</li> <li>• Generation of an account adjustment (e.g., credit or debit)</li> <li>• Transfer of balance between two (2) accounts</li> </ul>

Req #	Requirement
	<ul style="list-style-type: none"> <li>Block/unblock card, account, or individual fare product</li> <li>Lost, stolen, or damaged card replacement (e.g., associate new card with existing account)</li> <li>Generation of an opt-out refund (e.g., close transit account and issue refund)</li> <li>Create new individual customer account</li> <li>Create new institutional customer account</li> <li>Query customer account status/data</li> <li>Modify customer account data</li> <li>Modify institutional account data</li> <li>Register (e.g., link) a transit account to an individual or institutional customer account</li> <li>Unregister (e.g., unlink) a transit account from an individual or institutional customer account</li> <li>Add a funding source to an individual or institutional customer account</li> <li>Close an individual or institutional customer account</li> <li>Encoding, printing, and issuance of personalized extended-use fare media (when configured to do so), including the addition of a photo</li> <li>Perform bulk sales (e.g. card activations and bulk product/stored value loads)</li> </ul>
11.3.1-7	When querying transit accounts associated with open payment credentials, the TOT will show the payment authorization history (including aggregation), transit account balance (including negative balances), transaction history, fare capping status, and customer registration information (if applicable).
11.3.1-8	The TOT will support the capture of all data needed to validate and register reduced fare entitlement for transit accounts associated with open payment credentials.

## **11.3.2 Hardware**

### **11.3.2.1 Personal Computers**

Req #	Requirement
11.3.2.1-1	The TOT will include an integrated flat panel touchscreen display with no less than FHD resolution.
11.3.2.1-2	The touchscreen will provide suitable touch sensitivity and resolution to satisfy operator selection and input requirements.
11.3.2.1-3	The TOT will include integrated Gigabit Ethernet or a cellular broadband modem to satisfy the requirements of the configuration. The fixed-location TOT shall be configured with a hardwire ethernet connection.
11.3.2.1-4	The TOT will be designed with an adjustable monitor to accommodate the ergonomic needs of the ticket attendant.

### **11.3.2.2 Keyboard and Pointing Device**

Req #	Requirement
11.3.2.2-1	The TOT will include a separate full-sized keyboard and a mouse with scrolling wheel.
11.3.2.2-2	The TOT keyboard and pointing device will be adjustable for mouse pointer speed, sensitivity, and other user configurable options.

Req #	Requirement
11.3.2.2-3	The TOT will also be designed with an adjustable keyboard to accommodate the ergonomic needs of the ticket attendant.

### **11.3.2.3 Contactless Smartcard Reader**

Req #	Requirement
11.3.2.3-1	The contactless smartcard reader will be a separate module cabled to the TOT.
11.3.2.3-2	The TOT will support the ability to interface with two (2) contactless smartcard readers, one (1) each for the customer and the clerk.

### **11.3.2.4 2D Barcode Reader**

Req #	Requirement
11.3.2.4-1	The 2D barcode reader will be a separate module cabled to the TOT.
11.3.2.4-2	The TOT will support the ability to interface with two (2) barcode readers, one (1) each for the customer and the clerk.

### **11.3.2.5 Cash Drawer Module**

Req #	Requirement
11.3.2.5-1	The cash drawer will open only under command of the TOT, which will monitor the status of the drawer at all times.
11.3.2.5-2	The cash drawer will incorporate an insert with space for five (5) bill denominations and five (5) coin denominations.
11.3.2.5-3	When the cash drawer opens or closes, an alarm or bell will sound indicating when the drawer has released and is open, and when the drawer has been closed and is locked.
11.3.2.5-4	The cash drawer will accommodate installation under a counter, be pry-resistant and be made of high-quality, heavy-gauge steel.

### **11.3.2.6 Bank Card Processing Module**

Req #	Requirement
11.3.2.6-1	The TOT will be PCI- and EMV-certified for the acceptance of bank-issued credit and debit cards using all common formats based on the latest version of the standard at the time of Final Acceptance. TOTs will be capable of re-certification with newer versions of the PCI and EMV standards via software upgrades as necessary.
11.3.2.6-2	The bank card processing module will be an integrated module cabled to the TOT.
11.3.2.6-3	The bank card processing module will include: <ul style="list-style-type: none"> <li>• Magnetic stripe reader</li> <li>• Contactless bank card reader</li> <li>• Contact and chip bank card reader</li> <li>• PCI- and ADA-compliant Personal Identification Number (PIN) pad</li> </ul>



Req #	Requirement
11.3.2.6-4	The contactless bank card reader will read and support all open payment contactless standards, including but not limited to: <ul style="list-style-type: none"> <li>• VISA payWave®</li> <li>• MasterCard PayPass®</li> <li>• American Express ExpressPay®</li> <li>• Discover Zip®</li> <li>• Contactless EMV</li> <li>• Mobile wallets including Android Pay/Apple Pay/Samsung Pay</li> </ul>
11.3.2.6-5	The bank card processing module will include a secure bank card PIN pad. The layout of the keys on the PIN pad will be similar to those of touchtone telephones, and the central “5” key will have a raised dot or other identifying tactile feature to aid the visually impaired, in compliance with all applicable ADA requirements. The PIN pad will comply with all applicable ADA requirements.
11.3.2.6-6	The bank card processing module will employ PIN encryption as required in accordance with banking requirements. The Contractor shall supply bank card processing modules with production encryption keys injected in a secure, PCI-compliant manner.
11.3.2.6-7	The PIN keypad will support PIN entry when magnetic stripe debit cards are used, and whenever EMV-enabled cards are used and transaction procedures dictate. The PIN pad may also be used to enter ZIP codes to satisfy address verification requirements.
11.3.2.6-8	The TOT will support the ability to interface with two (2) bank card processing modules, one (1) each for the customer and the clerk.
11.3.2.6-9	The TOT will include a check reader with real-time verification capabilities.

### **11.3.2.7 Receipt Printer**

Req #	Requirement
11.3.2.7-1	The TOT receipt printer will print on a single roll of continuous thermal paper.
11.3.2.7-2	The receipt printer will provide for easy loading of a new paper roll.
11.3.2.7-3	The receipt printer will have a cutting edge to enable the operator to manually separate the receipt from the roll.
11.3.2.7-4	The configuration of receipt information including text, layout, and general design will be possible through the configuration management tool. Space for specialized text including service alerts, special events, advertisements, or other ad hoc messages will be possible. Special messages or images will be configurable centrally for all receipts systemwide.

### **11.3.2.8 Customer Display and Camera**

Req #	Requirement
11.3.2.8-1	The customer display will convey transaction price, status, and other pertinent information.
11.3.2.8-2	The customer display will separately mount on a pole or other support for optimum visibility for all customers, including those in wheelchairs.
11.3.2.8-3	The customer display will use backlit liquid crystal display (LCD), LED, or other highly visible display technology suitable for the office environment.

Req #	Requirement
11.3.2.8-4	The customer display will provide no less than two (2) lines of text, with minimum 24 characters per line, with each character no less than 0.5 inches high.
11.3.2.8-5	For card personalization, a digital camera will capture the customer images as necessary. The camera may be mounted on a tripod or other fixture that allows for convenient positioning.
11.3.2.8-6	The camera will have sufficient resolution and field of view to capture high quality images that can be printed on cards and displayed on screens clearly.

### **11.3.2.9 Scanner**

Req #	Requirement
11.3.2.9-1	When configured to issue personalized fare media, the TOTs will include a digital scanner for capturing customer eligibility documents.
11.3.2.9-2	The scanner will support the capture of black & white and color images at a resolution of at least 1200 x 1200 dpi.
11.3.2.9-3	The scanner will support the auto-feeding of documents and support double-side scanning at no less than 10 pages per minute.

### **11.3.2.10 Extended Use Smartcard Printer/Encoder**

Req #	Requirement
11.3.2.10-1	The Contractor shall include a single integrated EU smartcard printer/encoder module which will utilize re-transfer printing technology, and will encode EU smartcards with requisite data (such as an encrypted token) in coordination with the printing process.
11.3.2.10-2	The EU smartcard printer/encoder will print edge-to-edge (e.g., “full bleed”) in at least four (4) colors (YMCK), and will apply the printed images to a laminate film and then apply the laminate to either side of the card.
11.3.2.10-3	The EU smartcard printer/encoder will employ easily replaceable ribbons for the transfer printing and lamination films.
11.3.2.10-4	The EU smartcard printer/encoder will provide print resolution no less than 300 dots per inch.
11.3.2.10-5	The EU smartcard printer/encoder will produce at least 100 cards per hour.
11.3.2.10-6	The EU smartcard printer/encoder will include input and output card hoppers with a capacity of no less than 100 cards each, which will be lockable for security.
11.3.2.10-7	Upon successful printing and encoding, the EU smartcard printer/encoder will inform the TOT of the successful issuance of each card, and the identification number of each issued card.

### **11.3.2.11 Communications**

Req #	Requirement
11.3.2.11-1	The TOT will communicate with the back office via secure Internet connection.
11.3.2.11-2	For all transactions requiring back office access, the TOT will communicate with the back office in real-time using the Contractor-provided APIs (see Application Programming Interfaces section).
11.3.2.11-3	Transactions requiring back office access to a transit account will be disabled if the TOT is unable to communicate with the back office.

### **11.3.2.12 Uninterruptible Power Supply**

Req #	Requirement
11.3.2.12-1	Each TOT will receive power from a dedicated Uninterruptible Power Supply (UPS) with sufficient battery capacity to operate all components of the TOT for a minimum of 10 minutes.
11.3.2.12-2	The UPS will allow the TOT to perform a controlled shut down without any loss of data whenever the UPS determines that there has been a loss of primary power.
11.3.2.12-3	The UPS will provide no less than 500 joules of overvoltage (surge) protection for all connected devices.

## **11.3.3 Software**

### **11.3.3.1 Operating System and Application Software**

Req #	Requirement
11.3.3.1-1	The TOT will utilize a standard, current Microsoft Windows® operating system. All OEM-supplied operating system and application software will be subject to Agency review and approval during design review.
11.3.3.1-2	The TOT will use application software that is developed with a high-level language and that supports all functions described herein.
11.3.3.1-3	If risk mitigation (e.g., positive/negative) lists are employed (see Risk Mitigation Techniques section), the TOT will receive and store updated lists from the back office. If a card presented for replenishment is on a risk mitigation list, the TOT will act accordingly.
11.3.3.1-4	Once installed, the TOT will not enter service until it has communicated with the back office to receive current fare sets, application software, administrative and maintenance logins, positive/negative lists, and other configuration data.
11.3.3.1-6	On each TOT, the Contractor shall supply, install, and configure client versions of anti-virus and anti-malware software.
11.3.3.1-7	The Contractor shall submit descriptions of the TOT software design for Agency review and approval. TOT software design submittals will include: <ul style="list-style-type: none"> <li>TOT data registers</li> <li>TOT transaction, event, login, etc. records</li> <li>TOT operator interface</li> <li>TOT configuration parameters and their value range</li> <li>TOT risk mitigation list storage, update, and processing (if applicable)</li> <li>TOT transaction limitation procedures</li> <li>TOT setup and administration procedures</li> <li>TOT login types and permitted functions</li> <li>TOT anti-virus and anti-malware software and procedures</li> </ul>

### **11.3.3.2 Data Records**

Req #	Requirement
11.3.3.2-1	The TOT will generate transactions and events, including operator login and logout and diagnostics. Each data record will incorporate a unique identification number for that

Req #	Requirement
	TOT and day, and will be date/time stamped.
11.3.3.2-2	<p>Each TOT customer transaction record will consist of the following, at minimum:</p> <ul style="list-style-type: none"> <li>• Date and time</li> <li>• Device ID</li> <li>• Location ID</li> <li>• Operator (e.g., clerk) ID</li> <li>• Card/account number</li> <li>• Transaction type (e.g., card sale, value load, account inquiry)</li> <li>• Last four digits of credit/debit card (if applicable)</li> <li>• Cards sold (where applicable)</li> <li>• Stored value loaded (where applicable)</li> <li>• Fare category (e.g., full fare, reduced fare)</li> <li>• Transaction value (where applicable)</li> <li>• Payment type and amount</li> <li>• Transaction result (e.g., success, failure)</li> <li>• Transaction ID</li> </ul> <p>Transaction records details will be finalized during design review.</p>
11.3.3.2-3	<p>When a user signs on to the TOT, the following data will be stored in a data record:</p> <ul style="list-style-type: none"> <li>• Date and time</li> <li>• Device ID</li> <li>• Location ID</li> <li>• Operator ID</li> <li>• Login attempts</li> </ul> <p>When the user logs off the TOT, the device will store a similar record.</p>
11.3.3.2-4	The TOT will be capable of detecting basic internal malfunctions and will annunciate failures directly on the operator display. The malfunction detection will cover at least failure of power or control circuitry, and any failure of the contactless smartcard reader that could result in a false, incomplete, or corrupted encoding of a smartcard or ticket.
11.3.3.2-5	<p>The TOT will be capable of recording data locally representing no less than 1,000,000 events, including changes in status, communication problems, and problems detected during the automatic diagnostic testing. At a minimum, each event record will include:</p> <ul style="list-style-type: none"> <li>• Date and time</li> <li>• Device ID</li> <li>• Event code</li> <li>• Any associated event data</li> <li>• Identifier of the failed test</li> <li>• Iteration number of test</li> <li>• Reason for test failure (unique code)</li> <li>• Additional information to define the nature of the failure</li> </ul>
11.3.3.2-6	<p>Each TOT will contain audit registers that track the following information at a minimum:</p> <ul style="list-style-type: none"> <li>• The total count and value of all transactions completed by the TOT since data was last uploaded to the back office.</li> </ul>

Req #	Requirement
	<ul style="list-style-type: none"> <li>The date and time of the last successful data upload to the back office. These registers will be modified only by the TOT itself and will not be manually alterable.</li> </ul>
11.3.3.2-7	Audit register records will be transmitted to the back office at the end of service day for reconciliation, or upon a configurable time period.

### **11.3.3.3 Software Updates**

Req #	Requirement
11.3.3.3-1	When required, modification of the TOT application software and any OEM application or operating system software will be performed by downloading new software from the back office. The back office database will record and track the version number of all such software in each TOT, and the date that the software versions were downloaded and installed.
11.3.3.3-2	The back office will transmit any updates to the TOT application software. The TOT will not commence updating the application software until it has received and verified the complete update.
11.3.3.3-3	Upon receipt and verification of the software update, the TOT will apply the update (rebooting if necessary) at a time configurable by the Agency for each TOT.

### **11.3.3.4 Configuration Control**

Req #	Requirement
11.3.3.4-1	Operating parameters will be downloadable to the TOT from the back office via the wide area network provided by the Agency and cellular data networks, as appropriate for each installation or TOT configuration.
11.3.3.4-2	<p>The TOT will support configurability through numerous adjustable parameters. The TOT application software will at minimum support configuration for:</p> <ul style="list-style-type: none"> <li>Value of deposit to be collected for new or replaced fare media</li> <li>Fare products available for sale and upgrade</li> <li>Pricing</li> <li>Payment method selection</li> <li>Receipt content</li> <li>All text and touchscreen labels</li> <li>Authorized users and passwords (if stored locally at the TOT)</li> <li>All other relevant fare set entries</li> </ul>

### **11.3.3.5 Fare Media Inventory Control**

Req #	Requirement
11.3.3.5-1	Upon issuance and/or initialization of a fare media, the TOT will record an issue record, including the date, time, fare category, card identification number, and other pertinent information of the smart card and any associated account. The TOT will transmit this record to the back office.

Req #	Requirement
11.3.3.5-2	The Media Inventory Management System (see Media Inventory Management section) will track the fare media distributed to each Agency sales location. Using the list of cards issued to each sales location and the issuance and/or initialization records previously transmitted to the back office, it will be possible for authorized users to query the MIMS for the identification numbers and total quantity of smart media that remain in each sale location's inventory.

## **11.3.4 Configuration**

### **11.3.4.1 Login and Logout**

Req #	Requirement
11.3.4.1-1	The TOT will remain inactive and unable to perform any functions unless a proper login has been completed.
11.3.4.1-2	The TOT will support at least three (3) levels of logins with assigned functionality configurable by the Agency.
11.3.4.1-3	The TOT will require the operator to identify the starting cash drawer balance at the start of each shift.
11.3.4.1-4	The TOT will support relief shifts, with the replacement of the cash drawer. The TOT will also maintain statistics for the relief shift separately and will not affect the main shift information.
11.3.4.1-5	If the TOT has not been used in a number of minutes configurable by the Agency, the user will be automatically logged out. The TOT will close all files and display the login prompt screen.
11.3.4.1-6	Upon logging out or otherwise indicating an end-of-shift condition, the TOT will produce a report and receipt depicting the ending balance of the cash drawer.
11.3.4.1-7	The TOT will store a data record for each successful login, each unsuccessful login, and each logout.

### **11.3.4.2 Sales**

Req #	Requirement
11.3.4.2-1	The TOT will function as an intelligent cash register, allowing customers and clerks to interact in a manner that is as similar as possible to normal retail sales transactions. Sales transactions will include: <ul style="list-style-type: none"> <li>• Purchase of new fare media</li> <li>• Adding of value and passes to existing media and accounts</li> <li>• Supported customer service and sales functions</li> </ul> The final list of TOT functions will be finalized at design review.
11.3.4.2-2	When issuing a new EU smartcard, the TOT will permit the clerk to select whether an Agency-configurable card fee (e.g., deposit) is to be collected.
11.3.4.2-3	The TOT will support the purchase of multiple cards, tickets, and fare products in a single transaction, with payment collected once. The quantity and amount of sales that can be made in a single transaction will be configurable.
11.3.4.2-4	When configured to conduct sales, the TOT will support a variety of payment methods, including:

Req #	Requirement
	<ul style="list-style-type: none"> <li>• Cash</li> <li>• Agency and third-party issued vouchers, including transit checks</li> <li>• Bank cards (credit and debit)</li> <li>• Charge to institutional accounts</li> <li>• Money Orders</li> <li>• Any combination of the above</li> </ul>
11.3.4.2-5	The TOT will support split payments where up to two (2) payment methods, including multiple bank cards, will be able to be used to complete payment for a single sale.
11.3.4.2-6	For each sales transaction, the TOT will enable the clerk to select the payment method. If the clerk selects more than one (1) payment method, the TOT will prompt the clerk to enter the amount to be paid using each payment method.
11.3.4.2-7	Cash transactions will provide the total amount due, allow the clerk to enter amount tendered, and display the change due.
11.3.4.2-8	The TOT will control and monitor the cash drawer, and open the cash drawer upon calculation and display of the amount of change due.
11.3.4.2-9	The TOT will print a customer receipt for every completed sales transaction. Receipts will include the resulting status and value of the customer's account, where applicable.
11.3.4.2-10	For each completed transaction, a sales transaction will be stored and transmitted to the system back office using Contractor-provided fare distribution API (see Fare Distribution API).
11.3.4.2-11	The TOT will enable a clerk to display (and print via the receipt printer) totals of all completed transactions by that clerk for the current day.
11.3.4.2-12	The TOT will enable an administrative user to display (and print via the receipt printer) totals of all conducted transactions for the current and each of the prior seven (7) days. These totals will indicate daily totals by clerk and payment type. As necessary, the TOT may retrieve this data from the back office.

### **11.3.4.3 Personalized Media**

Req #	Requirement
11.3.4.3-1	When configured to do so, the TOT will include the necessary software and peripherals to enable the Agency to issue personalized cards to customers eligible for reduced fares, Agency employees, and in support of other fare programs.
11.3.4.3-2	Personalized cards will include the cardholder's name and photograph printed on one (1) side of the card, accompanied by other Agency-defined graphics and information.
11.3.4.3-3	The Contractor shall supply printing templates (also known as "masks") using Agency-supplied graphic designs for all personalized card types. The TOT will support no less than 25 pre-loaded templates from which the user will select prior to printing. Where possible, template selection will be automatic based on card type.
11.3.4.3-4	When printing a personalized card, the TOT will scale the photo image to fit within the area defined by the printing template without distorting the image or changing its native aspect ratio.
11.3.4.3-5	The TOT will support issuance of personalized cards in individual and bulk production modes.

Req #	Requirement
11.3.4.3-6	For individual card personalization, a digital camera controlled by the TOT will capture the customer images as necessary.
11.3.4.3-7	Upon successful production of the personalized smart card, the TOT will store a transaction record, including all personalization data, the identification number of the issued card, the digital photograph image, and all other transaction data. The TOT will transfer the entire transaction record, and all accompanying data, to the back office.
11.3.4.3-8	The TOT will exclusively support production runs (using data imported from an external source) for bulk card personalization in quantities of one (1) to no less than 100 cards per batch.
11.3.4.3-9	For bulk card personalization production runs, the TOT will use data files imported in a Contractor-specified format. The data files will include the customer name, digital photograph, and other information as required.
11.3.4.3-10	Upon successful production of each card, the TOT will store a transaction record similar to those created for individually personalized cards, and transmit all records to the back office.
11.3.4.3-11	The Agency will issue customers with reduced fare and paratransit smartcards with personalized information printed on the card, including a digital photograph and the name of the cardholder. Using the appropriate customized printing template for reduced fare and paratransit media, the TOT will print and issue personalized cards.
11.3.4.3-12	The TOT will support the capture of all data needed to validate, register, and issue personalized fare media for reduced fare and paratransit customers.
11.3.4.3-13	The TOT will support manual entry of reduced fare and paratransit customer account registration data using a simple graphical user interface.
11.3.4.3-14	The TOT will capture reduced fare and paratransit applications and supporting documentation using the Contractor-provided document scanner.
11.3.4.3-15	The TOT will capture reduced fare and paratransit customer photographs using the Contractor-provided camera.
11.3.4.3-16	All customer data captured and used by the TOT will be securely stored within the CRM system customer database (see Customer Database section) using the Contractor-provided APIs (see Application Programming Interfaces section) and will not be stored locally on the TOT.

#### **11.3.4.4 Fare Media Inquiry**

Req #	Requirement
11.3.4.4-1	Whenever fare media is presented to the TOT contactless smartcard reader, the TOT will read the card and query the back office using the Contractor-provided transit account management API (see Transit Account Management API section) to display the current status and value of the associated transit account on the operator display and customer display.
11.3.4.4-2	If the customer's smartcard is not functioning, the TOT will permit the clerk to manually enter the card identification number.
11.3.4.4-3	Upon request, the TOT will query the back office database for details of the most recent transactions posted to the transit account. Upon receipt of the transaction history, the TOT will display the results on the operator display.



Req #	Requirement
11.3.4.4-4	The number of prior transactions to display will be Agency-configurable, and will initially be set to the last 10 transactions.
11.3.4.4-5	For each prior transaction displayed, history details will include, at minimum: <ul style="list-style-type: none"> <li>• Date and time of transaction</li> <li>• Generating device/system (e.g., validator, retail location, autoload)</li> <li>• Transaction type (e.g., sales transaction, stored value usage, pass usage, adjustment)</li> <li>• Transaction value</li> <li>• Transaction location (e.g., station name, bus route)</li> </ul>
11.3.4.4-6	Upon request, the TOT will print a receipt of the current status and value of the account.

### **11.3.4.5 Customer Account Management**

Req #	Requirement
11.3.4.5-1	The TOT will enable operators to setup and modify customer accounts using the Contractor-provided customer account management API (see Customer Account Management API section).
11.3.4.5-2	The TOT will enable the operator to create a new customer account and register an anonymous transit account.
11.3.4.5-3	The TOT will enable the operator to modify any fields in the existing customer accounts that are deemed user-alterable.
11.3.4.5-4	The TOT will enable operators to establish, modify, and cancel customer subscriptions for autoload, including the addition and modification of funding sources.
11.3.4.5-5	To prevent manual data entry error, the identification number of the customer's card will be captured by the contactless smartcard reader, and the bank card processor module will be used to read any bank card data required for autoload subscription.
11.3.4.5-6	Reduced fare privileges are subject to expiration. The TOT will include a function to re-authorize reduced fare privileges and update the customer's account information with a new reduced fare privilege expiration date.

### **11.3.4.6 Media Replacement**

Req #	Requirement
11.3.4.6-1	The TOT will support replacing registered EU smartcards by disassociating the lost or stolen card from the account and linking a new card in its place.
11.3.4.6-2	Prior to replacing a registered EU card, the TOT will require verification of the customer's identity through the entry of the customer's account information, password, PIN, and/or answers to secret questions, as recorded in the back office.
11.3.4.6-3	If the replacement card requires no personalization, the TOT will prompt the operator to present the new card to the contactless smartcard reader.
11.3.4.6-4	When replacing a previously issued personalized card, the TOT will support use of the digital photograph, printing template, and other data from the original issue record to facilitate replacement without requiring the cardholder's presence, or the use of the digital camera to create and store a new digital image.

Req #	Requirement
11.3.4.6-5	Upon reading or issuing the replacement card, the TOT will transmit to the back office an issue record containing the card's identification number, and a corresponding record to block use of the lost card.
11.3.4.6-6	Replacing a malfunctioning smartcard will be possible. Procedures to replace a defective card will be similar to those used to replace a lost registered card, but replacement of a defective card will not require the card to be registered. The replacement process will support entry of the defective card's identification number as the means to initiate replacement.

#### **11.3.4.7 Refunds and Adjustments**

Req #	Requirement
11.3.4.7-1	TOT operators with appropriate access rights will be able to initiate transit account adjustments by reversing prior sales or fare payment transactions, or directly adding or removing stored value or passes.
11.3.4.7-2	TOT operators with appropriate access rights will be able to initiate an opt-out refund that results in the closing of a transit account and issuance of a cash or check refund to the customer. Users without refund permissions will not be able to perform refunds or cancel transactions.
11.3.4.7-3	The TOT will fully record and transmit to the back office all adjustment and reversal transactions.

## **11.4 Mobile Sales Device**

### **11.4.1 General Requirements**

Req #	Requirement
11.4.1-1	The Contractor shall provide a laptop based Mobile Sales Device (MSD), which will support mobile ticket sales and mobile reloading of value.
11.4.1-2	The MSD shall be a modular device, and will support multiple configurations, depending on the peripheral modules included. The MSD hardware will be optimized for its intended use and configuration.
11.4.1-3	MSDs shall be designed to permit rapid exchange of the device and peripheral modules to restore service in minimal time. Repairs will be performed in the field and no special tools or instruments will be required for exchange of modules.
11.4.1-4	The Contractor shall supply the MSD in the listed configurations, all of which will utilize the same Contractor-supplied application and OEM software.

Req #	Requirement
11.4.1-5	<p>The MSD shall be based on a laptop computer with a screen, keyboard and pointing device. The portable configuration will support remote sales and card personalization programs. The device will include the ability to connect to the following modules, which will be identical to those used for the Ticket Office Terminal (except where noted):</p> <ul style="list-style-type: none"> <li>• Contactless smartcard reader</li> <li>• 2D barcode reader</li> <li>• Bank card processing module</li> <li>• Ticket printer</li> <li>• Receipt printer</li> <li>• Scanner</li> <li>• Extended use smartcard printer/encoder</li> <li>• Cellular broadband data modem with cellular and Wi-Fi capability and other communications interfaces as necessary</li> </ul>
11.4.1-6	All MSD configurations and peripheral modules shall be subject to Agency review and approval.
11.4.1-7	If possible, the MSD will use the same software archive as the Ticket Office Terminal.

## **11.4.2 Hardware**

Req #	Requirement
11.4.2-1	The Contractor shall provide the MSD as a portable laptop solution that serves as an alternative to the stationary TOT.
11.4.2-2	The MSD shall include an integrated keyboard and pointing device.
11.4.2-3	The MSD shall include the ability to connect to a contactless smartcard reader. The contactless smartcard reader will meet the same requirements as the TOT contactless smartcard reader (see TOT Contactless Smartcard Reader section).
11.4.2-4	The MSD shall include the ability to connect to a 2D barcode reader. The 2D barcode reader will meet the same requirements as the TOT 2D barcode reader (see TOT 2D Barcode Reader section).
11.4.2-5	The MSD shall include the ability to connect to a bankcard processing module. The bankcard processing module will meet the same requirements as the TOT bankcard processing module (see TOT Bankcard Processing Module section).
11.4.2-6	The MSD shall include a receipt printer. The receipt printer will meet the same requirements as the TOT receipt printer (see TOT Receipt Printer section).
11.4.2-7	The MSD shall include the ability to connect to a document scanner. The document scanner will meet the same requirements as the TOT document scanner (see TOT Document Scanner section).
11.4.2-8	The MSD shall connect to an extended use smartcard printer/encoder. The printer/encoder will meet the same requirements as the TOT printer/encoder (see TOT Extended Use Smartcard Printer/Encoder section).
11.4.2-9	The MSD shall provide the option to communicate with the back office via cellular broadband data modem, Wi-Fi network, and Ethernet connection.
11.4.2-10	For all transactions or establishing a new account, the MSD will communicate with the back office in real-time using the Contractor-provided APIs (see Application Programming Interfaces section).

### **11.4.3 Software**

Req #	Requirement
11.4.3-1	The MSD shall follow all operating system and application software requirements as the TOT (see TOT Operating System and Application Software section).
11.4.3-2	The MSD shall follow all data recording requirements as the TOT (see TOT Data Records section).
11.4.3-3	The MSD shall follow all media inventory control requirements as the TOT (see TOT Fare Media Inventory Control section).
11.4.3-4	The MSD shall follow all software update requirements as the TOT (see TOT Software Updates section).
11.4.3-5	The MSD shall follow all configuration control requirements as the TOT (see TOT Configuration Control section).

### **11.4.4 Configuration**

Req #	Requirement
11.4.4-1	The MSD shall follow all login and logout requirements as the TOT (see TOT Login and Logout section).
11.4.4-2	The MSD shall follow all sales requirements as the TOT (see TOT Sales section).
11.4.4-3	The MSD shall follow all fare media inquiry requirements as the TOT (see TOT Fare Media Inquiry section).
11.4.4-4	The MSD shall follow all account management requirements as the TOT (see TOT Customer Account Management section).
11.4.4-5	The MSD shall follow all replacement requirements as the TOT (see TOT Media Replacement section).
11.4.4-6	The MSD shall follow all refund requirements as the TOT (see TOT Refunds and Adjustments section).
11.4.4-7	The MSD shall follow all personalization requirements as the TOT (see TOT Personalized Media section).

## 12 Back Office

The back office will provide all core functions to support the operation of the account-based Rider Validation System (RVS) system and integrate with third party systems as required.

### 12.1 General Requirements

Req #	Requirement
12.1-1	The back office will comply with all common design requirements in the Common Design Requirements section and all system security requirements in the System Security section.
12.1-2	The Contractor shall develop and submit a back office design specification that provides a detailed description of all components that will comprise the back office, and the purpose, functions, interdependencies, configuration, and communication requirements of each component. The specification will provide both graphical and narrative descriptions of each component and include at a minimum: <ul style="list-style-type: none"><li>• Functional description, purpose, supplier, and version of each component</li><li>• Interfaces and communication flows between components</li><li>• Installation and configuration documentation</li></ul>
12.1-3	All back office systems will provide real-time access to no less than five (5) years of historical detailed data and ten (10) years of summary data.
12.1-4	User access to all elements of the back office will be centrally-managed through a user authentication and access control platform provided by the Contractor. Individual users or user groups will have access to specific systems where appropriate for standard business operations. The control platform will store the last login date/time for all user access accounts, to enable reporting in compliance with auditing standards. All access control will comply with Agency security policies.
12.1-5	Software updates to back office software, databases, and associated modules will be centrally managed with appropriate version control in place. Software releases will only be released by authorized system administrators following Agency approval.

### 12.2 Account-Based Transaction Processor

The primary component of the back office will be the Account-Based Transaction Processor (ATP). The Contractor shall deploy an ATP that maintains all accounts, and performs real-time fare calculation and validation for closed-loop payments. Accurate and secure transaction processing will be critical to ATP operations. The ATP shall support all APIs in the Application Programming Interfaces (APIs) section.

## **12.2.1 General Requirements**

Req #	Requirement
12.2.1-1	<p>The ATP will enable core system functions, including but not limited to:</p> <ul style="list-style-type: none"> <li>• Fare media sales and issuance, and the creation of new transit accounts</li> <li>• Fare product sales and the loading of fare products to transit accounts, and identification of purchases made using transit benefits (e.g., subsidized purchases)</li> <li>• Maintenance of transit account status, balance, and transaction history</li> <li>• Real-time fare calculation and payment processing (e.g., validation) for closed-loop fare payments and open payments (see Open Payments section)</li> <li>• Real-time fare payment inspection for closed-loop fare payments and open payments as necessary (see Open Payments section)</li> <li>• Automatic reloading of value to transit accounts (e.g., autoloading)</li> <li>• Modification of transit account balances based on adjustments, refunds, reversals, and balance transfers</li> <li>• Blocking/unblocking and closing of transit accounts</li> <li>• Setting of all specified transit account management configuration parameters (e.g., fraud detection parameters, negative balance limits, etc.)</li> <li>• Integration and interfacing with third party systems and devices</li> </ul> <p>The ATP will provide all other necessary functions to support the requirements defined in this specification.</p>
12.2.1-2	All back office systems will access ATP functions using the Contractor-provided APIs (see System Architecture section) and a direct, real-time connection to the ATP.
12.2.1-3	The ATP will maintain transit accounts that store all fare products (e.g., stored value and passes) loaded by customers, and deduct value in real-time as accounts are used for payment.
12.2.1-4	The ATP will maintain separate stored value purses within the transit accounts to segregate stored value loaded using pre-tax funds through pre-tax benefit programs, or value loaded for specific purposes (e.g., transit, parking, bikes). The system will support pre-tax purses, and a post-tax (e.g., general) purse. Order of precedence rules will be able to be configured to deduct stored value from the pre-tax purses first when the service being paid is eligible for the use of pre-tax funds.
12.2.1-5	The ATP will support all customer service functions impacting transit account status and balance that are available through all customer sales channels.

## **12.2.2 Fare Distribution**

Req #	Requirement
12.2.2-1	The ATP will support the real-time loading of fare products through all fare distribution channels utilizing the Fare Distribution API.
12.2.2-2	Except where allowed under risk mitigation (See Risk Mitigation section), no loading of fare value/product to a transit account will be permitted without an active connection to the ATP.
12.2.2-3	The ATP will manage the automatic reloading of value for fare products that are configured for autoloading. Autoloading will be based on configuration parameters (see Configuration Management section), and will require the transit account to be registered with a valid funding source stored in the associated customer account.

Req #	Requirement
12.2.2-4	All payments will be accepted or authorized prior to the loading of any fare value. Following payment confirmation, the ATP will update the transit account balance in real-time to allow for immediate use by the customer.

### **12.2.3 Fare Payment**

Req #	Requirement
12.2.3-1	The ATP will support the real-time validation of fare payment through all validation channels utilizing the Fare Payment API.
12.2.3-2	When processing a fare payment, the ATP will provide a real time online server authorization, and will query the transit account, perform fare calculation, and update the account balance, prior to providing an approval or denial response to the fare payment device, subject to required communication response times (see Real-Time Communications section).
12.2.3-3	The real-time fare calculation performed by the ATP will be based on the fare structure configuration described in the Fare Structure section. The calculation will incorporate all attributes of the ride being taken or service being provided, transit account rider classification, transit account balance, available fare products and order of precedence rules, and all other factors that influence the fare to be charged. The online fare payment calculation algorithm will be presented for Agency review and approval during design review.
12.2.3-4	<p>The online fare payment response generated by the ATP will include at minimum:</p> <ul style="list-style-type: none"> <li>• Payment status (e.g., success or failure)</li> <li>• Account rider classification</li> <li>• Fare product used</li> <li>• Fare charged</li> <li>• Remaining balance</li> <li>• Transfer time remaining (if applicable)</li> </ul> <p>Other relevant transaction data may be included and identified during design review.</p>
12.2.3-5	When real-time communications are not available, device-level fare payment authorization may occur using the risk mitigation techniques (see Risk Mitigation Techniques section). Transaction data will be sent to the ATP, and processed to update the account status and balance as soon as communications are re-established. Any device-authorized transactions will be recorded as such, so that offline transactions can be easily identified and tracked. The offline fare payment authorization algorithm will be presented for Agency review and approval during design review.
12.2.3-6	The ATP will accommodate late arriving transactions through the recalculation of individual fare payments, or the total fare due for a prior accounting period. Transactions occurring within an accounting period may remain in a pending state until that account period (e.g., service day) is closed. Transit account transaction history and balance information will be updated in real-time as transactions are received, and reflect any re-calculation performed as a result of late arriving transactions.
12.2.3-7	The ATP will support the tracking of negative stored value balances that occur as a result of offline fare payment acceptance or Agency configured fare policies (see Fare Structure section).

## **12.2.4 Fare Inspection**

Req #	Requirement
12.2.4-1	The ATP will support the real-time inspection of fare payment through all validation channels utilizing the Fare Payment API.
12.2.4-2	When processing a fare inspection, the ATP will provide a real-time response and will query the transit account to determine the inspection result prior to providing a confirmation of fare payment.
12.2.4-3	Real-time fare inspection determination by the ATP will be based on the fare structure configuration described in the Fare Structure section. The determination will incorporate fare payment transactions (e.g., approved and denied) recorded by the ATP, transit account rider classification, available fare products, transfer status, and all other factors that influence possible payment by the customer. The online fare inspection algorithm will be presented for Agency review and approval during design review.
12.2.4-4	When real-time communications are not available, device-level fare inspection may occur using the risk mitigation techniques described in the Risk Mitigation Techniques section. Transaction data will be sent to the ATP as soon as communications are reestablished. Any fare inspections performed offline will be recorded as such, so that offline transactions can be easily identified and tracked. The offline fare inspection algorithm will be presented for Agency review and approval during design review.

## **12.3 System Monitoring Management**

Req #	Requirement
12.3-1	A system monitoring management tool will provide real-time performance and status monitoring for all devices, back office systems, and network nodes using the Contractor-provided device management API (see Device Management API section).
12.3-2	The monitoring management tool will monitor the operational status and performance of the devices and their components, including but not limited to: <ul style="list-style-type: none"> <li>• Mobile Fare Inspection/Validation Devices</li> <li>• Ticket Office Terminals</li> <li>• Mobile Sales Device</li> <li>• Back Office Hardware</li> <li>• Mobile Ticketing Back Office</li> <li>• Test Environment Devices</li> </ul>
12.3-3	The monitoring management tool will display device attributes, including but not limited to device type, device ID, location, status, events, and alarms.
12.3-4	The monitoring management tool will monitor and display in real-time the status of all back office systems, subsystems, applications, databases, and processes. Details of which processes will be monitored will be provided during design review.
12.3-5	Devices or systems that are not reporting status for any reason will be easily identifiable, and the last known status and history will be available. A “heartbeat” or equivalent method to determine device status may be employed and will be configurable.



Req #	Requirement
12.3-6	The monitoring management tool will automatically generate alerts and/or notifications via email and text message. The configurable alert information will include all device attributes, including but not limited to device type, device ID, location, status, and event type. The trigger and frequency of these alerts will be configurable by type, user, location, event type, or trigger condition.
12.3-7	Device status will be sent via an appropriate monitoring protocol based on industry standards, such as SNMP3, or a modern functional equivalent. The protocol chosen will be supported by all devices and systems, and consider expected network traffic and potential for intermittent communications.
12.3-8	The monitoring management tool shall provide access to all monitoring functions, and will provide all information in a clear, organized dashboard using color graphics and text. Generally, green/yellow/red colors may be used for optimal/attention/error conditions. Colors and corresponding conditions will be finalized during design review.

## 12.4 Revenue Management

The Contractor shall deploy a Revenue Management System (RMS) that maintains a general ledger of all financial activity within the system, tracks receivables, and supports funds settlement.

### 12.4.1 General Requirements

Req #	Requirement
12.4.1-1	The RMS will be built using COTS enterprise-level financial management software and, if necessary, custom software modules that interface with Contractor-designed software modules as necessary to provide the required functionality. The RMS will allow for export of relevant data into the Agency's enterprise revenue management system.
12.4.1-2	The RMS will support the full auditing of all system financial activity, including reconciliation of all system accounts, and end-to-end tracking of revenue as it is generated and recognized by the Agency.
12.4.1-3	The RMS will automatically reconcile and clear settled credit/debit transactions at an individual level based on the bank settlement file provided by the payment processor. When an authorized credit/debit transaction remains unsettled beyond a configurable time threshold, or immediately upon notification of a chargeback, the system will automatically or manually generate a reversal of the "sale" transaction, recording the bad debt in the associated Transit Account.
12.4.1-4	The RMS will automatically reconcile and clear settled retail transactions at an individual level based on a settlement file provided by the Contractor's selected retail network administrator. When an authorized retail transaction remains unsettled beyond a configurable time threshold, the Contractor will investigate and either remit payment to the Agency by the next settlement date or generate a reversal of the "sale" transaction, recording the bad debt in the associated Transit Account.

Req #	Requirement
12.4.1-5	The RMS will automatically reconcile and clear settled open payment transactions at an individual level based on the bank settlement file provided by the payment processor. When an authorized open payment transaction remains unsettled beyond a configurable time threshold, or immediately upon notification of a chargeback for an authorized open payment transaction, the system will automatically generate a reversal of the open payment “sale” transaction, recording the bad debt in the associated Transit Account and blocking the open payment credential from further use.
12.4.1-6	The Contractor shall employ an expert with the accounting and technical knowledge necessary to fully setup and configure the RMS based on accounting best practices and the specific design of the delivered system.

## **12.4.2 General Ledger**

Req #	Requirement
12.4.2-1	The RMS will include a COTS General Ledger (GL) module that will be fully installed and configured by the Contractor.
12.4.2-2	The GL shall include accounts to track deferred revenue, earned revenue, receivables, payables, and expenses based on the transactions generated by the system.
12.4.2-3	The system shall support the reconciliation of the stored value deferred revenue GL account balance to the total transit account balances maintained within the ATP at any point in time.
12.4.2-4	As part of design review, the Contractor shall be responsible for mapping each transaction type generated by the system to the appropriate general ledger entries to support automated categorization and summarization by the system.
12.4.2-5	Summary entries shall be posted to the GL automatically at the end of each closeout period, no less than daily.
12.4.2-6	The Agency will have the ability to generate manual GL postings to support corrections and the tracking of activity that is not performed by the system.

## **12.4.3 Accounts Receivable**

Req #	Requirement
12.4.3-1	The RMS will include a COTS Accounts Receivable (AR) module that will be fully installed and configured by the Contractor, and will support the creation and management of receivables within the GL.
12.4.3-2	The AR module will track receivables for prepaid and post-bill fare media and product sales initiated through the CRM system (see Customer Relationship Management section) and institutional website (see Institutional Website section) to support bulk sales and special fare programs (see Special Fare Programs section).
12.4.3-3	The AR module will support the establishment of AR customer accounts based upon billing source, event and time period, and transaction type.
12.4.3-4	The AR module will support the ability to record billing items (e.g., fare media and products) by line item in order to identify unique accounting classification codes.
12.4.3-5	The AR system will support the issuance of refunds for fare media and product sales as needed.

Req #	Requirement
12.4.3-6	The AR module will support the application of payments (full and partial), credit memos, and adjustments against AR customer accounts. The process will support batch entry of receipts and lockbox functionality.
12.4.3-7	Receivables against individual customers will be supported in instances of funding source failures or negative account balances due to an offline payment authorization.
12.4.3-8	The AR module will support the setting of configurable credit limits for institutional customers. The AR module will support the automated generation of credit holds, and automatic disabling of order privileges within the institutional website, when the credit limit is reached.
12.4.3-9	The AR module shall support a time-based assessment of fees against individual customer accounts after a defined period of inactivity. Time period, fee amount, and inactivity period shall be defined during design review, and be configurable by Agency staff.
12.4.3-10	The AR module will support the aging of receivables and an automated, fully auditable write-off process to be defined during design review.
12.4.3-11	The AR module will support the automatic generation of invoices and monthly statements detailing account activity, including consolidation of multiple AR accounts on a single customer statement.
12.4.3-12	The AR module will provide the ability to perform online queries of account activity (e.g., billing, collection, and adjustment) by customer and receivable to support the display of invoice, account, and payment status in the CRM system and on the institutional website.
12.4.3-13	User interface access to all elements of the fare collection system will be controlled through a centrally-managed user authentication and access control platform as required in the System Security section. Individual users or user groups will have access configured to allow for standard business operations. Examples include ability to execute particular types of actions, etc.

## **12.4.4 Funds Settlement**

Req #	Requirement
12.4.4-1	<p>The RMS will support funds settlement using allocation formulas based on known system elements, including but not limited to:</p> <ul style="list-style-type: none"> <li>• Ridership</li> <li>• Service Type</li> <li>• Operating Division</li> <li>• Route</li> <li>• Point of sale</li> <li>• Point of boarding</li> <li>• Pass type</li> <li>• Other external variables or allocation factors, shares, or percentages</li> </ul> <p>Allocations will be defined during design review, and will be configurable by the Agency.</p>
12.4.4-2	The RMS will perform the revenue distribution calculations and provide the necessary reporting to enable the settlement of funds.

## **12.4.5 Reporting**

Req #	Requirement
12.4.5-1	The RMS GL will serve as a sub-ledger to the general ledger maintained within the Agency's enterprise resource system.
12.4.5-2	The RMS shall produce standard summary and detail accounting reports, in both formatted and exportable formats, for the Agency.
12.4.5-3	Select reports, to be determined at design review, shall be mapped to accounts within the Agency's financial system to support manual entries and download to the Agency's general ledger.
12.4.5-4	The AR module will provide standard AR reports, including but not limited to aged trial balance (with "as-of date" functionality), customer transaction, cash on account, and AR customer listing reports.

## **12.5 Media Inventory Management & Fulfillment**

The Contractor shall deploy a Media Inventory Management System (MIMS) or set of tools for receiving, tracking, and issuing all fare media procured and issued by the Agency.

Req #	Requirement
12.5-1	The MIMS will maintain an inventory of all serialized Agency-issued fare media (e.g., EU, LU and paper media) as it is produced, held in inventory, available at the different sales channels, held by other agencies or third parties, and eventually issued to customers.
12.5-2	Fare media will be tracked when it is delivered, stored, and in use at any of the Agency sales channels. When the fare media is issued, both the batch number as well as the media serial number will be tracked to distinguish what media was issued from which device.
12.5-3	<p>The fare media inventory data maintained within the MIMS will include, but is not limited to:</p> <ul style="list-style-type: none"> <li>• Media serial number</li> <li>• Media type</li> <li>• Media/account status</li> <li>• Expiration date</li> <li>• Batch ID</li> <li>• Order ID</li> <li>• Location</li> <li>• Ship date</li> </ul> <p>Final data fields used for inventory management purposes will be determined during design review.</p>

Req #	Requirement
12.5-4	<p>The MIMs will provide central order management and fulfillment functionality for the distribution of fare media and products sold through all fare distribution channels to maintain proper fare media inventory controls.</p> <ul style="list-style-type: none"> <li>• The MIMS will support the bulk issuance of media by identifying appropriate batch IDs and serial number ranges to fulfill orders placed by the Agency, third party partners, and through the institutional website (see Institutional Website section).</li> <li>• The MIMS will support the issuance of media to fulfill orders placed by the general public through the CRM and customer websites (see CRM and Customer Website sections).</li> </ul>
12.5-5	<p>The MIMS will track the current and historical status of all media in inventory and issued by the Agency. Whenever media loading or issuance occurs, the MIMS will update all media records accordingly. A history of all updates will be maintained to provide an audit trail.</p>

## 12.6 Customer Relationship Management (CRM)

The Contractor shall deploy a Customer Relationship Management (CRM) system that provides access to all transit and customer account information, and the ability to track all customer service contacts and requests from initiation through resolution.

### 12.6.1 General Requirements

Req #	Requirement
12.6.1-1	<p>The Contractor shall deploy a CRM system that provides central management for all customer data, customer service operations, and fare media and product ordering, as well as cradle-to-grave tracking of all customer service contacts and requests.</p>
12.6.1-2	<p>The Contractor shall provide a Salesforce-based CRM solution that can leverage the Agency's existing Salesforce licenses and expand capabilities of their internal Salesforce deployment of a customer relations and case management system.</p>
12.6.1-3	<p>The core function of the CRM system will be to support call center and ticket office operations with a tool that provides a 360° view of the customer, and enables creation, viewing, and modification of customer service records related to contacts and requests, and the actions taken to resolve those requests.</p>
12.6.1-3	<p>The CRM system will be supported by an isolated customer database, which will be fully compliant with all applicable PCI standards at the time of Final Acceptance, and with all Agency, state, and local policies for the handling of Personally Identifiable Information (PII).</p>
12.6.1-4	<p>The CRM system will support the management of special fare programs, which will allow transit accounts to be linked to an institutional customer (e.g., employer or school) for account management and the loading of value (see Special Fare Programs section).</p>
12.6.1-5	<p>Access to the CRM system and tool will be password-controlled with the displayed information and allowed functions restricted based on centrally defined user-access privileges. Access to all elements of the CRM system will be controlled through a centrally-managed user authentication and access control platform as required in the System Security section.</p>

## **12.6.2 Customer Database**

Req #	Requirement
12.6.2-1	An isolated customer database will maintain customer accounts that store all customer data, including all personal and payment information, associated with both individual and institutional customers.
12.6.2-2	All data in the customer database will be encrypted using strong cryptography, such as AES, and all payment data will be stored in a tokenized form.
12.6.2-3	The customer database shall be designed to serve as the repository for all information on customers applying for a reduced fare classification and possibly paratransit access, including applications and supporting documentation, eligibility parameters, and card personalization information, such as a customer photograph.
12.6.2-4	The customer database will serve as the repository for all information on employees and contractors who are issued transit access cards, including card personalization information, such as an employee photograph.
12.6.2-5	The CRM customer database will be able to import and synchronize data from the existing CRM customer and reduced fare ID database. The reduced fare ID database may continue to be the primary source for reduced fare eligibility depending on final design.

## **12.6.3 CRM Application**

Req #	Requirement
12.6.3-1	The CRM application will support call center and in-person customer service operations by providing a complete view of the customer and related transit and customer account activity, including all activity associated with anonymous transit accounts.
12.6.3-2	The CRM application shall connect to the account based processor and customer database using the Contractor-provided APIs (see Application Programming Interfaces section), and provide a fully integrated interface for customer service staff to view and modify customer and transit account data.
12.6.3-3	<p>The CRM application will allow customer service staff to perform customer account actions, including but not limited to:</p> <ul style="list-style-type: none"> <li>• Create new individual customer account</li> <li>• Create new institutional customer account</li> <li>• View customer account status and data</li> <li>• Modify customer account data</li> <li>• Register (e.g., link) a transit account to an individual or institutional customer account</li> <li>• Unregister (e.g., unlink) a transit account from an individual or institutional customer account</li> <li>• Add a funding source to an individual or institutional customer account</li> <li>• Activate an account (e.g. for a reduced fare card that is issued remotely)</li> <li>• Close an individual or institutional customer account</li> </ul>

Req #	Requirement
12.6.3-4	<p>The CRM application will enable customer service staff to perform transit account actions, including but not limited to:</p> <ul style="list-style-type: none"> <li>• Sell all supported fare media (and create new transit accounts), and apply shipping fee as appropriate</li> <li>• Sell all supported fare products (e.g., stored value and passes) and load fare products to transit accounts</li> <li>• Query transit account status (e.g., associated rider classification, active/inactive, blocked/unblocked) for both closed-loop and open payment credentials</li> <li>• Query transit account status for open payment credentials either through the manual entry of the bankcard number or the manual entry of a receipt reference code</li> <li>• View fare payment transaction history</li> <li>• View sales transaction history</li> <li>• View adjustment transaction history</li> <li>• Enable fare product for autoloading (requires funding source in customer account)</li> <li>• Generation of fare payment reversal (e.g., cancellation)</li> <li>• Generation of sales reversal (e.g., refund)</li> <li>• Generation of an account adjustment (e.g., credit or debit)</li> <li>• Transfer of balance between two (2) accounts</li> <li>• Block/unblock card, account, or individual fare product</li> <li>• Lost, stolen, or damaged card replacement (e.g., associate new card with existing account)</li> <li>• Generation of an opt-out refund (e.g., close transit account and issue refund)</li> <li>• Extend reduced fare eligibility (e.g., expiration dates)</li> </ul>
12.6.3-5	<p>When querying transit accounts associated with open payment credentials, the CRM will show the payment authorization history (including aggregation), transit account balance (including negative balances), transaction history, fare capping status, and customer registration information (if applicable).</p>
12.6.3-6	<p>The CRM will support the capture of all data needed to validate and register reduced fare entitlement for transit accounts associated with open payment credentials.</p>
12.6.3-7	<p>Reduced fare customers will have the ability to enroll for or renew reduced fare through the website. Once customers apply for and are deemed eligible to receive reduced fares, their account will be allowed to purchase/reload reduced fares. The CRM will be able to update or modify reduced fare status dynamically as customers gain or lose eligibility.</p>
12.6.3-8	<p>The CRM application will allow viewing and modification of all customer, individual and institutional account data. A request by the customer to reset a password will require the answering of security questions or providing the Account PIN set at the time of account registration (see Account Registration section). For password resets, a temporary password will be automatically emailed to the customer.</p>
12.6.3-9	<p>The CRM application will accept credit cards, debit cards, and bank account (ACH) transfers for payment during fare media and product sales and the setup of autoloading. The CRM application will also support the payment, or partial payment, for the purchase of a pass using stored value in the same transit account where the pass is being loaded.</p>

12.6.3-10	The CRM system will support the association of multiple transit accounts with a single customer account (i.e., parent/child) for account management and the loading of value.
12.6.3-11	The CRM system will support the association of multiple institutions aligned under a single institutional account (i.e., parent/child), to account for institutions with multiple locations or program administrators.
12.6.3-12	The CRM system will support the management of institutional programs (see Special Fare Programs section), which will allow customers and the associated transit accounts to be linked to an institution or multiple institutions, if needed, for account management and the loading of value.
12.6.3-13	The CRM application will enable the bulk registration and loading of transit accounts in support of special fare programs through entry of a transit account/fare media ID range or upload of a file.
12.6.3-14	The CRM application will enable the bulk sale of EU and LU fare media, including the initialization and loading of the associated transit accounts, through entry of a transit account/fare media ID range or upload of a file.
12.6.3-15	The CRM application will enable the bulk blocking of transit accounts and issuance of transit account adjustments through entry of a transit account/fare media ID range or upload of a file.
12.6.3-16	The CRM application will enable the bulk removal of products/value from transit accounts through entry of a transit account/fare media ID range or upload of a file.

#### **12.6.4 Customer Service Records**

Req #	Requirement
12.6.4-1	The CRM system will track all customer service contacts and requests, and the actions taken to resolve those requests, in customer service records that can be created, viewed, and modified using the CRM application.
12.6.4-2	Customer service records will be created automatically based on customer-initiated actions performed through the websites.
12.6.4-3	The Contractor shall provide a mechanism (e.g., embedded hyperlink based on transit account number), to be determined at design review, for linking customer service requests through the Agency's existing SAP CRM to the new fare collection CRM for investigation and response.
12.6.4-4	Any access of customer or transit accounts by Agency staff, whether a change to the account is made or not, will automatically generate a customer service record.
12.6.4-5	Customer service staff will be able to manually create or update (e.g., add notes) to a customer service record for both registered and unregistered transit accounts when responding to customer service requests in person, over the web, or by phone.
12.6.4-6	Customer service records will be created for actions associated with both anonymous and registered transit accounts, and will be linked to a specific customer account whenever possible.
12.6.4-7	The CRM system will support the classification of customer service records by type and severity for reporting purposes, using pre-defined selections and custom text fields.



## 12.7 Data Warehouse and Reporting

The Contractor shall deploy a data warehouse that serves as a repository for all system-generated data. The data warehouse will be able to create canned reports and export all data to the Agency's existing reporting software.

Req #	Requirement
12.7-1	The data warehouse will be built using an enterprise-class ODBC-compliant relational database that is scalable to at least 200% of the anticipated transaction volumes. The data warehouse will utilize the most recent version of a commercial enterprise database. Any alternative shall be discussed and approved by the Agency during design review.
12.7-2	<p>The data warehouse will store all transaction data generated by the system. At minimum, the data warehouse will collect data from the following systems:</p> <ul style="list-style-type: none"> <li>• Account-Based Transaction Processor (ATP)</li> <li>• Customer Relationship Management (CRM) System, including customer and institutional websites</li> <li>• Monitoring Management tool</li> <li>• Media Inventory Management System (MIMS)</li> <li>• Revenue Management System (RMS)</li> <li>• Mobile ticketing application</li> <li>• </li> <li>• The list of subsystems that transmit data to the data warehouse will be finalized during design review.</li> </ul>
12.7-3	<p>Data captured in and exported from the data warehouse will include at minimum:</p> <ul style="list-style-type: none"> <li>• Fare media and product sale transaction details (e.g., time, date, location, device, amount) from the ATP</li> <li>• Fare payment transaction details (e.g., time date, location, device, amount) from the ATP</li> <li>• Fare inspection transactions from the ATP</li> <li>• Adjustment, refund, reversal, and balance transfer transactions from the ATP</li> <li>• Customer service records from the CRM system</li> <li>• Device events and alarms from the monitoring management tool</li> <li>• Back office events and alarms from the monitoring management tool</li> <li>• Device audit register data</li> <li>• Fare media inventory data from the MIMS</li> <li>• Financial data and accounting entries from the RMS</li> <li>• Other analytics data to support fraud detection/prevention</li> <li>• Details of the data fields captured by the data warehouse will be finalized during design review.</li> </ul>
12.7-4	The data warehouse will not permanently store any customer PII or PCI payment data. Any temporary storage of such data will only be in tokenized or encrypted form, if approved by the Agency. See PCI and Privacy sections for relevant requirements.
12.7-5	All data will be transmitted to the data warehouse in real-time or on a configurable frequency that can be set depending on the source, and never less than daily (all data will be transmitted to the data warehouse at least daily, which some data more

Req #	Requirement
	frequent). The Contractor will maintain a standardized data transmission specification.
12.7-6	An interface to the data warehouse will provide the ability to query the database directly and perform any read-based activity. All data will be accessible and available for use by the Agency without restriction.
12.7-7	All data in the data warehouse will be accessible using standard SQL query tools (preferred), or equivalent query language tools. All data will be retrievable as standard ASCII or binary data.
12.7-8	The data warehouse will provide online access to detailed transaction information for no less than five (5) years following the date of generation. Summary data, to be defined during design review, will be available for at least 10 years.
12.7-9	The Contractor shall supply tools that enable the Agency to archive data, and to purge old or unwanted data from the data warehouse. Purging will be an administrative function that will permanently delete data over a specified date range or based on other criteria.
12.7-10	<p>The Contractor shall provide a preliminary design specification for the data warehouse at design review, including at a minimum:</p> <ul style="list-style-type: none"> <li>• Descriptions of all data to be stored</li> <li>• Data fields with type and length</li> <li>• Searchable fields (e.g., agency, location, device)</li> <li>• Total amount of data storage available and any data compression schemes</li> <li>• Communications protocols being used</li> <li>• Timing for the transmission of data to the data warehouse</li> <li>• Test procedures to ensure that all required data is being captured and that all required capabilities are present</li> <li>• Data warehouse operating procedures</li> </ul> <p>The final design specification for the data warehouse, including the complete data dictionary and schema, will be delivered 120 days prior to the start of system integration testing.</p>
12.7-11	All systems and interfaces requiring access to real-time data, including the ATP, CRM system, monitoring management tool, RMS, and websites will capture data from the source systems directly. The data warehouse will not be used for any purpose other than data analytics, canned reports, and the export of data to external systems. The querying of the data warehouse will not impact system operations or performance in any way.
12.7-12	As part of implementation, the Contractor shall deliver a full and complete data dictionary and schema for the data warehouse. The Contractor shall also provide details for the Extract, Transform, and Load (ETL) processes used to capture data from the source systems.
12.7-13	The Contractor will provide read access for all data in the data warehouse. The Contractor may provide limited write access for fields that do not impact revenue or operations. Fields to include write access will be determined during design review.
12.7-14	The contractor will provide a system to create pre-defined (canned) reports from the data warehouse.
12.7-15	<p>Canned or predefined reports will include, but are not limited to:</p> <ul style="list-style-type: none"> <li>• Ridership reports</li> </ul>

Req #	Requirement
	<ul style="list-style-type: none"> <li>• Sales and usage (e.g. location, ticket type) reports</li> <li>• Customer service reports</li> <li>• Maintenance reports</li> <li>• Device and system performance (KPI) reports</li> <li>• Financial reconciliation reports</li> <li>• Financial settlement reports</li> <li>• Exception reports</li> <li>• Fraud detection reports</li> </ul> <p>A final list of reports and report details will be determined during design review.</p>
12.7-16	Canned reports will be able to be run and viewed through a web interface, as well as exported in several formats, including but not limited to Adobe Acrobat PDF, MS Excel, MS Word, CSV, and plain ASCII text. All file formats will include the same data and general layout where possible. Data files (e.g., Excel and CSV) will be generated such that data can be extracted without formatting and can be imported into third-party tools without manipulation.
12.7-17	The reporting system will allow all reports to be configured to run on a scheduled basis through the web interface, and automatically delivered to one (1) or multiple email addresses. Email deliveries may be scheduled on a daily, weekly, or monthly basis and in any of the available file formats.
12.7-18	Access to the reporting system web interface will be password-controlled. The ability to create and run reports will be configurable by user type. User accounts will be set up with custom access levels that define which reports can be viewed, and what data can be queried for custom reports

## 12.8 System Hosting

Req #	Requirement
12.8-1	The back office will be hosted by a third party or “cloud” hosting provider such as Amazon Web Services (AWS), Microsoft Azure, Google Cloud Platform, or equivalent local provider. The third party hosting provider will provide the performance, security, and redundancy to support the requirements of the account-based back office.
12.8-2	The cloud hosting provider will adhere to applicable Agency IT/hosting standards, including the OCTA Security recommendations.
12.8-3	The Contractor shall be responsible for installation, configuration, and testing of the hosted solution. The determination of cloud hosting capacity and functionality will be determined by the Contractor based on Agency expected transaction volumes and performance requirements.
12.8-4	All cloud hosting operations will be transparent to the Agency. The capacity and bandwidth chosen will be commensurate with the required transaction volume, and may be adjusted upon increased usage. The Agency will not be responsible for excessive cloud hosting costs that are not required to operate the system at the performance level specified in this specification.

Req #	Requirement
12.8-5	The Contractor shall be responsible for the following back office operations activities: <ul style="list-style-type: none"> <li>• System performance and health</li> <li>• Ensuring timely and accurate processing of transactions</li> <li>• Overseeing operation of all back office support systems</li> </ul>
12.8-6	The Contractor shall provide a high availability cloud-based system that offers maximum protection against data loss and system failure. Means will be provided in the system design to ensure complete recovery from the loss of any system components at any point during operation.
12.8-7	All hosted data will be protected against loss or failure at a given hosting site. The hosted solution will be equipped with the appropriate hardware, software, and procedures to provide redundancy and meet all performance requirements. Load balancing, automated failover, and data mirroring between multiple sites will be provided as necessary.
12.8-8	Processor load, memory utilization, errors, and other system performance indicators will be available in real-time to help prevent performance degradation and troubleshoot back office issues. Alarm types and thresholds will be able to be configured to allow for custom alerts.
12.8-9	In order to comply with federal cloud hosting requirements, the back office system and back office data shall be hosted in the United States.
12.8-10	The Contractor shall provide the Agency access to the hosting provider as necessary. The Contractor shall configure the hosted solution to include a static IP address to facilitate access by the Agency.
12.8-11	The Agency shall be able to perform penetration testing and vulnerability scans on the hosted solution, as per Agency standards. The Contractor shall provide an SOC 2 report on an annual basis.
12.8-12	The Contractor will notify the Agency Project Manager and/or designated Security Manager immediately following discovery of system downtime, regardless of whether or not a cause has been identified. Within five (5) days of the incident, the Contractor shall submit a detailed report to the Agency that contains the scope of the problem, cause, and actions taken to prevent it from occurring again.
12.8-13	The Contractor shall develop and submit for approval by the Agency a disaster recovery plan that describes data backup and recovery, and ensures minimal data loss in the event of a catastrophic event or system failure.
12.8-14	The disaster recovery plan will contain detailed procedures to be followed to restore the system to full operation following a disaster or failover event. The Contractor shall on a yearly basis demonstrate that the disaster recovery plan functions as expected.
12.8-15	The Contractor shall provide documentation and training for Agency staff in all procedures to maintain the hosted environment and restore the system in the case of a disaster recovery event. However, the Contractor will retain primary responsibility for disaster recovery as part of ongoing operations and maintenance (see Operations and Maintenance section).

## 13 Websites

### 13.1 Website Design

The system provided by the Contractor will include websites to be used by both the public and institutions for the distribution of fare media and products, and the management of transit and customer accounts.

#### 13.1.1 Web Design Criteria

Req #	Requirement
13.1.1-1	All interfaces between the websites and back office systems (e.g., ATP and customer database) will be the responsibility of the Contractor and will use the Contractor-provided APIs (see Application Programming Interfaces section).
13.1.1-2	The Contractor shall team or contract with a web design firm or developer with extensive experience developing e-commerce, retail, social media, and transit websites. The website will retain the design of OCTA.net to help maintain a seamless user experience.
13.1.1-3	The websites will be built using latest web design and e-commerce best practices, including dynamic design via HTML5, AJAX, and server-side programming languages. The development tools and design for the website will be subject to Agency review and approval during design review.
13.1.1-4	All transmissions of customer data, including username, password, and any customer PII, will be TLS 1.2 encrypted via the HTTPS protocol.
13.1.1-5	The websites will be designed and tested for cross platform compatibility, including but not limited to: <ul style="list-style-type: none"> <li>• Platforms: Windows, Apple, Linux</li> <li>• Browsers: Edge, Safari, Chrome, Firefox</li> </ul> The websites will support three (3) prior browser versions, with the latest specified at the time of Notice to Proceed.
13.1.1-6	The Contractor shall work closely with the Agency's marketing, IT, and web services teams to develop an approved user interface design. The Agency will lead the website design and testing throughout the implementation.
13.1.1-7	Both the public and institutional websites shall be developed as a single platform that, depending on credentials, would customize the experience by user.
13.1.1-8	The Contractor shall provide detailed screen flows depicting "snapshots" of each screen layout arranged as a logical flow chart for Agency review and approval during design review. The flow charts will depict all web screens as they will be configured for revenue service.
13.1.1-9	The websites will be compliant with all applicable ADA regulations.
13.1.1-10	The websites will be provided in multiple languages, including English, Spanish and up to three (3) other languages to be identified by the Agency during design review.
13.1.1-11	All website content and design elements will be able to be modified by the Agency. The Contractor shall provide an open-source Content Management System (CMS) needed to perform website updates. OCTA prefers the Umbraco CMS platform.
13.1.1-12	The websites will be configured with Google Analytics or another web analytics platform to help track website usage.

Req #	Requirement
13.1.1-13	The Contractor shall be responsible for all website updates, including QA/QC, throughout the term of the operations and maintenance agreement (see Operations and Maintenance section).
13.1.1-14	The Contractor shall develop automated testing scripts and utilize these scripts prior to all public, institutional and mobile-optimized website releases. The Contractor shall also submit an end-to-end regression test plan for these websites, and assign QA/QC resources for all releases.

### **13.1.2 Website Payment Processing**

Req #	Requirement
13.1.2-1	The websites will accept credit cards, debit cards, and bank account (ACH) transfers for payment during fare media and product sales and the setup of autoload. The public website will also support the payment, or partial payment, for the purchase of a pass using stored value in same transit account where the pass is being loaded.
13.1.2-2	The websites will support split payments where up to two (2) payment methods, including multiple bank cards, will be able to be used to complete payment for a single sale.
13.1.2-3	All payments initiated via the websites will be accepted using e-commerce best practices and processed in a manner that is compliant with the latest PCI standards at the time of Final Acceptance. All payment data will be encrypted for transmission using TLS 1.2, at a minimum.
13.1.2-4	The websites will support Address Verification System (AVS) for bank card payments in a configurable manner that allows the AVS feature to be turned on or off by the Agency and accommodates acceptance of both U.S. and non-U.S. issued cards.
13.1.2-5	The websites will prompt users when a payment is declined and allow entry of an alternate funding source. Failed payments will be recorded in a separate payment exception file (with denial code).
13.1.2-6	If a payment authorization is not completed within a configurable time period, or is interrupted, the websites will cancel the transaction and notify the customer. Any canceled transactions will be recorded.

## **13.2 Public Website**

The Contractor shall deliver a public website and provide all hardware and software necessary to support website operations, and interfaces to internal and external systems needed to perform the required functions.

### **13.2.1 General Requirements**

Req #	Requirement
13.2.1-1	The Contractor shall deploy a customer website that allows registered and unregistered customers to purchase fare media and products and perform transit and customer account management functions. The website will be designed to manage a smartcard account.
13.2.1-2	The public website will allow customers to perform the following functions, at a minimum:

Req #	Requirement
	<ul style="list-style-type: none"> <li>• Purchase new fare media</li> <li>• Create a new customer account</li> <li>• View and manage account settings and customer profile</li> <li>• Register an extended-use card (e.g., transit account)</li> <li>• Purchase fare products (e.g., stored value and passes)</li> <li>• Add a funding source</li> <li>• Set up, modify, and cancel autoloading of stored value and passes</li> <li>• View transit account balance and status information</li> <li>• View and download sales, usage, and adjustment transaction history</li> <li>• Initiate a customer service request (e.g., refund request)</li> <li>• Report a card lost or stolen, with configurable restrictions on when a card can be reactivated</li> <li>• Request an opt-out refund (e.g., close transit account)</li> <li>• Opt-in and -out of email notifications</li> <li>• Modify registration data</li> </ul> <p>Final customer website functions will be determined during design review.</p>
13.2.1-3	Users will be e-mailed a receipt for some website actions, including all successfully completed sales, the fulfillment of an autoloading, or other agency-defined actions. Users will have the option of opting-in and opting-out of e-mail notifications. Specific email notifications and email trigger actions will be determined during design review.
13.2.1-4	The website will have the capability of linking from or being embedded with other Agency or partner websites or trip planning tools.

## **13.2.2 Account Registration**

Req #	Requirement
13.2.2-1	Full Fare customers will have the option of registering a transit account or remaining anonymous. All transit accounts with a reduced fare rider classification will require registration.
13.2.2-2	A registered transit account will be associated with an individual and/or institutional customer account maintained within the CRM system customer database (see Customer Relationship Management section).
13.2.2-3	The system will support customer registration of Transit Accounts associated with open payment credentials, and customers will be able to manually enter their bankcard data to retrieve their Transit Account. Should a customer have multiple PARs in the RVS, or closed-loop cards in the Customer Account, the website will link all credentials into one customer account.
13.2.2-4	For registered transit accounts, the user interface and functionality will be similar for both open payment credentials and closed loop cards.
13.2.2-5	Customer data maintained in an individual customer account will include, at a minimum: <ul style="list-style-type: none"> <li>• Name</li> <li>• Address</li> <li>• Phone number</li> <li>• E-mail address</li> </ul>

Req #	Requirement
	<ul style="list-style-type: none"> <li>• Username</li> <li>• Password</li> <li>• Security questions and answers</li> <li>• Account PIN</li> </ul> <p>The final list of customer information required for account registration will be determined during design review.</p>
13.2.2-6	Individual and institutional administrators will have the option of providing payment information to be stored by the system and available for future one-time purchases or for the recurring loading of value (see Autoload section). A customer will be able to store a maximum of two (2) funding sources.
13.2.2-7	Customer account creation and transit account registration shall be supported by the websites (see Websites section), Ticket Office Terminal (see Ticket Office Terminal section), the Mobile Sales Device (see Mobile Sales Device section), the CRM system (see Customer Relationship Management section), and mobile ticketing (see Mobile Ticketing section).
13.2.2-8	The system will allow a customer account to be created without associating (e.g., registering) a transit account, and will allow multiple transit accounts to be registered to the same customer account for consolidated transit account management through all customer service channels.
13.2.2-9	Transit accounts may be associated with both individual and institutional customer accounts, and may be registered to both an individual and institutional customer at the same time.
13.2.2-10	Minimal card personalization information (e.g., customer/card name, rider classification, and DOB) may also be stored securely in the transit account, and/or on the media, to support fare processing and allow for the individual tracking of fare media registered to the same customer.

### **13.2.3 Autoload**

Req #	Requirement
13.2.3-1	Customers and Agency staff will have the ability to set up fare products (e.g., stored value and passes) for autoload, or to automatically reload based on time or value thresholds. The Contractor shall enable this functionality through the Ticket Office Terminal (see Ticket Office Terminal section), CRM system (see Customer Relationship Management section), and customer and institutional websites (see Websites section).
13.2.3-2	Enabling autoload will require that the associated transit account is registered and that an accepted funding source, such as a credit or debit card, bank account, or transit benefit allocation, is linked to the customer account.
13.2.3-3	A customer will be allowed up to two (2) funding sources associated with an autoload, a primary funding source and a secondary funding source, and may use the secondary funding source as a backup in the event that the primary fails.
13.2.3-4	The autoload feature will support both threshold-based triggers (i.e., reloading when the stored value balance, remaining trip balance, or remaining validity period falls below a configurable threshold), and calendar-based triggers (i.e., reloading on a configurable date every month).
13.2.3-5	All parameters governing threshold and calendar-based autoloads will be fully



Req #	Requirement
	configurable by the customer and Agency staff, including the enabling or disabling of an autoload, threshold value (e.g., trigger), funding source, and fare product and/or amount to be loaded. Final configuration parameters will be defined during design review.
13.2.3-6	The account-based nature of the fare collection system will allow for autoload payment authorization to occur prior to the loading of any value, and immediate use of the value by the customer once the load occurs. If payment authorization fails, the autoload will be automatically disabled and the customer notified.

## **13.2.4 Fare Media Purchase and Registration**

Req #	Requirement
13.2.4-1	The public website will allow ordering of Agency-issued EU fare media to be delivered by mail. Ordering of fare media via the website may require registration of the media (e.g., transit account) at the time the order is placed.
13.2.4-2	The public website will allow creation of a new customer account. During creation of a customer account, the website will capture all customer registration data (see Account Registration section), including the credentials (e.g., username, password) used to access website. All customer account data will be stored securely in the customer database (see Customer Database section).
13.2.4-3	During the creation of a new customer account, the website will provide the ability to register previously issued EU fare media. Fare media (e.g., transit account) registration will not be required to create a customer account.
13.2.4-4	Registered customers will be required to login to the website using a username or e-mail address, and an account password. The use of a username or e-mail address as the primary login credential will be determined during design review.
13.2.4-5	The website password will have configurable security requirements, including but not limited to minimum password length, required use of letters/numbers/symbols, and forced password reset after a configurable time period or on demand. Other password reset functionality will be determined during design review.
13.2.4-6	Registered customers will have the ability to view and modify registration data at any point in time. Password, PIN data, and the answer to the registered customer's security question will be masked when presented on the website.
13.2.4-7	The website will support the registration of multiple EU cards (e.g., transit accounts) under a single customer account. Registered customers will be able to add new cards when logged into the public website. Customers will assign each card a nickname, which will be stored in the transit account and used to differentiate cards registered to the same customer.

### **13.2.5 Fare Product Purchases**

Req #	Requirement
13.2.5-1	Registered customers will be able to initiate a load of value (e.g., stored value and passes) via the website using a credit card, debit card, or bank account (ACH) transfer. The website will have the ability to purchase passes with stored value, and will support the entry of transit account information and the selection of pass products and pre-defined or custom stored value amounts, subject to configurable minimum and maximum limits.
13.2.5-2	Registered customers will have the ability to save and modify funding sources, including credit cards, debit cards, and bank accounts for one-off purchases and autoloading payment. Funding source information will be stored securely within the customer database in a tokenized form (see Fare Payment section).
13.2.5-3	Registered customers will be able to enable, disable, and modify the autoloading of stored value and passes (see Autoloading section). As part of the autoloading setup process, the customer will select the pass or pre-defined or custom stored value amount to be loaded and the type of autoloading (e.g., threshold or periodic), subject to configurable minimum and maximum limits. Autoloading setup will require a funding source to be added or selected.
13.2.5-4	During autoloading setup, the customer will be able to select a primary and backup funding source. If payment authorization of the primary funding source fails, authorization against the backup funding source will be attempted. If payment authorization is not received, the autoloading will be automatically disabled and the customer will be notified via an e-mail notification.

### **13.2.6 Reduced Fare**

Req #	Requirement
13.2.6-1	Senior/Disabled/Medicare and Youth customers with access to reduced, personalized fare media will be offered all the same website functionality as described in this section, with the exception of the ability to order/purchase reduced fare media.
13.2.6-2	Reduced fare customers will have the ability to enroll for or renew reduced fare through the public website. The website may direct customers to the existing OCTA reduced fare application webpage, or mimic the functionality and submit the data to the OCTA reduced fare ID database.
13.2.6-3	The website will accommodate the current OCTA reduced fare process where customers must apply for an OCTA Senior Reduced Fare ID or OCTA Disabled Fare ID number to qualify for reduced fares. Once customers apply for and are deemed eligible to receive reduced fares, their account will be allowed to purchase/reload reduced fares.

### **13.2.7 Account Status and Transaction History**

Req #	Requirement
13.2.7-1	Registered and unregistered customers will be able to use the website to view transit account balance (e.g., stored value and pass) and status (e.g., rider classification, active or blocked) information by entering a card number.

Req #	Requirement
13.2.7-2	Transit account balance information will include the current stored value balance and the state (e.g., active/inactive) and remaining validity (e.g., expiration date or rides remaining) of all passes.
13.2.7-3	Registered customers will be able to view no less than two (2) years of prior transaction history, showing all sales, usage, and adjustment transactions. The transaction history will be viewable, sortable, and filterable on the website, and able to be downloaded in PDF and Excel formats. Transaction history will be further determined during design review.
13.2.7-4	When querying transit accounts associated with open payment credentials, the website will show the payment authorization history (including aggregation), transit account balance (including negative balances), transaction history, fare capping status, and customer registration information (if applicable).

### **13.2.8 Customer Service**

Req #	Requirement
13.2.8-1	The website will include general information on use of the system, including an FAQ section, information on where to purchase fare media and value, the cardholder agreement, and general program information and updates.
13.2.8-2	Customers will have the option of initiating a customer service request via the website. This action will automatically generate a request within the CRM system (see Customer Relationship Management section).
13.2.8-3	The website will allow registered customers to report a card lost or stolen within a programmable time frame (i.e. 3 months). This action will immediately result in the associated fare media being blocked from further use. The customer will have the option of being mailed a replacement card or purchasing a new card and having the balance transferred. For the mailing of a replacement card, a configurable replacement fee may be charged.
13.2.8-4	The website will allow registered customers to close a transit account and request an opt-out refund. This action will immediately result in the associated fare media being blocked from further use. The operational policies governing the issuance of a refund will be defined during design review.
13.2.8-5	The website may include links to the Agency websites with schedules, fares, the reduced fare process, and other general transit information.

### **13.2.9 Mobile-Optimized Website**

Req #	Requirement
13.2.9-1	The Contractor shall provide a mobile-optimized version of the customer website that supports all functionality described in this section. Customers will be automatically redirected to the mobile version when accessing the website using a mobile device, but will have the option to view the full desktop version.

Req #	Requirement
13.2.9-2	<p>The mobile-optimized version of the website will support all mobile platforms and browsers, including but not limited to:</p> <ul style="list-style-type: none"> <li>• Platforms: Android, iOS</li> <li>• Browsers: Safari, Chrome, Firefox, Opera</li> </ul> <p>The website will support three (3) prior browser versions, with the latest specified at the time of the Notice to Proceed.</p>

## 13.3 Institutional Website

The Contractor shall deliver an institutional website and provide all hardware and software necessary to support website operations, and interfaces to internal and external systems needed to perform the required functions.

### 13.3.1 General Requirements

Req #	Requirement
13.3.1-1	The Contractor shall deploy an institutional website that allows employers, schools, social service agencies, and other institutions to order fare media and administer transit accounts on behalf of participants in special fare programs (see Special Fare Programs section).
13.3.1-2	<p>The institutional website will provide the following functions, including but not limited to:</p> <ul style="list-style-type: none"> <li>• Register a new institution (e.g., create a new institutional customer account)</li> <li>• Add and remove administrators</li> <li>• Add participants (e.g., transit accounts) to an institutional customer account, both individually and in bulk.</li> <li>• Delete participants (e.g., transit accounts) from an institutional customer account</li> <li>• Load value (e.g., stored value and passes) to participants' transit accounts, both individually and in bulk.</li> <li>• Block/unblock participants' transit accounts (i.e. fare media) and/or use of loaded value on current or future date</li> <li>• Perform a card replacement</li> <li>• Bulk order extended-use (both personalized and non-personalized) and limited-use media, based on Agency configured expiration dates, media graphics, and authorized media</li> <li>• Make a payment</li> <li>• View and export order history, invoices, payment status, and configurable levels of ridership detail</li> <li>• Change password and conduct a password reset for users locked out of an account.</li> </ul> <p>Final institutional website functions will be determined during design review.</p>
13.3.1-3	The website will include general information on use of the system, including a FAQ section and ways to contact Agency staff.
13.3.1-4	The Agency will be able to use the institutional website to act on behalf of program administrators as necessary.

Req #	Requirement
13.3.1-5	The website will include the ability to link institutions (e.g., parent/child) for those with multiple locations and/or program administrators. This will be configured via the CRM (see Customer Relationship Management Section).
13.3.1-6	Program Administrators will be e-mailed a receipt for some website actions, including all successfully completed sales. Users will have the option of opting-out of e-mail notifications. Specific email notifications will be determined during design review.

### **13.3.2 Registration**

Req #	Requirement
13.3.2-1	Prior to using the institutional website, institutions will need to be approved by the Agency and registered through creation of an institutional customer account.
13.3.2-2	The Agency will use either the institutional website or CRM system (see Customer Relationship Management section) to register an institution and configure all parameters governing the institution's participation in a special fare program (see Special Fare Programs section).
13.3.2-3	<ul style="list-style-type: none"> <li>• Data maintained in an institutional customer account will include but not be limited to</li> <li>• Institution Name</li> <li>• Administrator Name</li> <li>• Address</li> <li>• Phone number</li> <li>• E-mail address</li> <li>• Administrator Username</li> <li>• Administrator Password</li> <li>• Security questions and answers</li> <li>• All configuration parameters governing the institution's participation in a special fare program (see Special Fare Program section).</li> </ul> <p>The final list of customer information required for account registration will be determined during design review.</p>
13.3.2-4	Following registration, an Institutional Program Administrator from the institution will be able to login to the institutional website to perform all configured functions, as well as designate another program administrator.
13.3.2-5	All data associated with institutional customer accounts will be stored securely in the customer database (see Customer Database section).

### **13.3.3 Adding and Deleting Participants**

Req #	Requirement
13.3.3-1	Institutional Program Administrators will be able to add participants (e.g., transit accounts) to their institutional customer account individually using a fare media ID, and through a bulk process using an imported file in an Agency-defined format.

Req #	Requirement
13.3.3-2	When adding participants, the institution will be able to provide card personalization information (e.g., employee name or ID) that uniquely identifies the participant in possession of the associated fare media. If personalization information is provided, it will be securely stored in the transit account and serve as a unique identifier separate from customer registration data, should the participant choose to register the card (see Fare Media Purchase and Registration section).
13.3.3-3	Registered and unregistered, including reduced fare, customers with existing fare media will be able to be added to an institutional customer account as participants.
13.3.3-4	Institutional Program Administrators will be able to delete participants from their institutional customer account, individually by selection and in bulk.

### **13.3.4 Placing Orders**

Req #	Requirement
13.3.4-1	Institutional Program Administrators will be able to initiate the loading of value (e.g., stored value and passes) to participants' transit accounts individually by selection and in bulk.
13.3.4-2	When adding value to participant accounts, Institutional Program Administrators will be able to select from the available fare products configured for their account, including products for reduced fare customers as appropriate, and choose whether to initiate a one-time or recurring load (e.g., autoloading), on an individual participant basis. The period for recurring loads will be defined in the institutional customer account configuration.
13.3.4-3	If their account is configured to allow it, Institutional Program Administrators will be able to place bulk orders for extended-use and limited-use fare media to be delivered by mail. Bulk sales will include LU fare media where the associated transit accounts are pre-loaded with value.
13.3.4-4	When processing bulk orders (for value or fare product), exceptions to the load process identifying the type of exception and the accounts to which the exception applies will be identified in a return file and made available on the website.
13.3.4-5	The fare collection system shall provide an automated means (e.g., ftp file exchange) of bulk file submission by institutions, whereby a file can be auto-generated by a participating institution and consumed by the institutional website or other tool for automatic-processing (i.e., no manual login by Agency or institution staff) of product/value loads.
13.3.4-6	The website will include ability to apply a shipping fee on fare media orders placed by administrators.
13.3.4-7	The Agency will be able to configure a minimum and maximum number of cards that Institutional Program Administrators can purchase.
13.3.4-8	When fulfilling a bulk EU fare media order, the system will automatically generate an import file pre-populated with the fare media IDs to support the addition of participants by the institution.
13.3.4-9	When fulfilling personalized card orders, the website will allow for Institutional Program Administrators to enter participant name and/or upload a photo to print on the card.

### **13.3.5 Payment**

Req #	Requirement
13.3.5-1	Payment terms for institutional customers will be configured as part of the institutional customer account setup. The Agency will be able to configure accounts such that payment is required at the time an order is placed, or to allow the institution to be invoiced based on established payment terms, or allow for the configuration for both.
13.3.5-2	For institutions where prepayment is required, the institutions will be required to provide a funding source in the form of a credit card, debit card, or bank account (e.g., ACH). Funding source information will be stored securely within the customer database in a tokenized form.
13.3.5-3	For institutional orders where invoicing is configured, an invoice will automatically be generated by the RMS (see Revenue Management section), posted to the institutional website, and sent electronically to the institution.
13.3.5-4	The RMS will track all receivables for institutional customers in the AR module (see Accounts Receivable section). The Agency will be able to configure credit limits for AR customer accounts, which will result in the automatic disabling of order privileges within the institutional website when the credit limit is reached or a hold is placed on the account. Credit limits shall be configurable by both dollar amount and time.
13.3.5-5	Institutional Program Administrators will be able to view current payment status (e.g., balance due, accrued interest, and due date) and at least 24 months of invoices, and order and payment history, via the institutional website. The invoices, orders, and payment history will be viewable, sortable, and filterable on the website, and able to be downloaded in PDF and Excel formats.
13.3.5-6	The institutional website will support the administration of transit benefit programs by employers and third-party administrators. Institutions will be required to indicate whether loads are being funded using pre-tax dollars. Stored value and fare products purchased using any pre-tax dollars will be identified as such and segregated within the transit account to ensure compliance with all applicable IRS regulations.

## 14 Integrations

### 14.1 Streetcar TVMs

Req #	Requirement
14.1-1	OC Streetcar Ticket Vending Machines (TVMs) will generate, and transmit a discrete data record for each transaction via an open API. This data record shall be processed and stored by the RVS.
14.1-2	<p>Each TVM transaction record will be unique and will include the following information at a minimum:</p> <ul style="list-style-type: none"> <li>• Date and time</li> <li>• Device ID</li> <li>• Station/Location ID</li> <li>• Card/account number</li> <li>• Transaction type (e.g., card sale, value load, account inquiry)</li> <li>• Cards sold (where applicable)</li> <li>• Stored value or fare products loaded (where applicable)</li> <li>• Tickets sold</li> <li>• Fare category (e.g., full fare, reduced fare)</li> <li>• Transaction value (where applicable)</li> <li>• Payment type and amount</li> <li>• Transaction result (e.g., success, failure)</li> <li>• Transaction ID</li> <li>• Ticket Serial #</li> </ul> <p>Transaction records details will be finalized during design review.</p>
14.1-3	When users add value to a card via the TVM it will send a sales request to the RVS in real-time via the Contractor-supplied API.
14.1-4	The TVM will be able to query the RVS for account balance and other account information via the Contractor-supplied API.
14.1-5	The final list of Contractor-Supplied APIs described in this document that the TVMs will use will be finalized during design.
14.1-6	If the TVM loses communications with the back office, upon restoration, the TVM will automatically initiate communications and send any data generated in offline mode. The RVS will accept these late transactions and reconcile any records required.

### 14.2 Regional Agencies

The Contractor shall make all reasonable efforts to integrate the RVS with neighboring transit agencies including but not limited to Metrolink and/or LOSSAN.

Req #	Requirement
14.2-1	The RVS shall share private keys, or generate specific private cryptographic keys for each agency that OCTA grants permission to read RVS smartcards and fare media.
14.2-2	The RVS shall be able to validate connected agencies smartcards or other fare media. Access to partner encryption keys and/or barcode formats will be the responsibility of OCTA.



Req #	Requirement
14.2-3	The RVS APIs shall be made available to connected agencies as necessary to facilitate the reading of each other's fare media.
14.2-4	<p>Connected agencies will be able to use the RVS APIs to:</p> <ul style="list-style-type: none"> <li>• Validate a ride</li> <li>• Check if the RVS account is valid</li> <li>• Check if the account has an active trip or was used recently</li> </ul> <p>The final list of actions and APIs available to other agencies will be determined during design review.</p>
14.2-5	APIs available to other agencies will be secured using the same requirements described in Application Programming Interfaces (APIs) and <b>Error! Reference source not found.</b> sections.
14.2-6	The RVS will be able to consume and use APIs from at least two (2) other agencies. To validate and authenticate their smartcards and/or tickets. The final partner agencies and APIs will be determined during design review.
14.2-7	The RVS will be able to decode and authenticate that a barcode from a partner agency is genuine in an offline scenario.
14.2-8	The RVS shall record all interactions with smartcards and/or tickets from partner agencies in the same database, and with the same information it would record taps/validations, sales, etc. for accounts in the RVS.
14.2-9	<p>All API requests and responses with partner agency systems shall be recorded, including but not limited to:</p> <ul style="list-style-type: none"> <li>• The API URL</li> <li>• The request parameters and body</li> <li>• The response and response body if applicable</li> <li>• The user account that sent the request</li> <li>• The date and time of the request</li> </ul>

## 14.3 Loyalty Program

OCTA has retained Brandmovers for their ridership loyalty program. The RVS shall integrate with that loyalty program, which offers incentives for existing and future riders.

Req #	Requirement
14.3-1	The RVS shall support integration with Brandmovers RESTful API endpoints to automatically send data to and receive data from the Brandmovers system.
14.3-2	The RVS shall support sending transaction and ridership data for each account to Brandmovers at regularly scheduled times and as requested through an API endpoint.
14.3-3	The RVS shall support receiving API commands through a contractor-supplied API to add, delete, and modify value and/or products on an account.
14.3-4	The final list of APIs used will be determined during design review.
14.3-5	The RVS Shall log, in the data warehouse, every time a product or stored value is added, deleted, or modified by the loyalty program.

Req #	Requirement
14.3-6	<p>The RVS shall record all API requests and responses with Brandmovers, including but not limited to:</p> <ul style="list-style-type: none"><li>• The API URL</li><li>• The request parameters and body</li><li>• The response and response body if applicable</li><li>• The user account that sent the request</li><li>• The date and time of the request</li></ul> <p>This includes both requests to the Brandmovers API, and from Brandmovers using the Contractor-supplied API.</p>

# 15 Training

## 15.1 General Requirements

Req #	Requirement
15.1-1	The Contractor shall provide a comprehensive training program to educate and train Agency personnel in all details of the Rider Validation System, enabling them to properly operate, service, and maintain the system and each of its components throughout its useful life.
15.1-2	The Contractor shall deliver a training plan that proposes the training courses to be delivered to the Agency. The course curriculum will include all instruction of Agency personnel.
15.1-3	The Contractor shall provide training to the following Agency staff, at a minimum: IT and finance professionals, supervisors, auditors, planners, customer service and transit store personnel, managers, and trainers.
15.1-4	The Contractor shall develop and deliver train-the-trainer courses that provide Agency training instructors with the necessary instruction to deliver system training in the future without additional Contractor support.
15.1-5	The training program will include classroom training provided by the Contractor's staff. The Contractor may supplement their training, as appropriate, by allowing OEM representatives to train Agency staff on subassemblies and devices.
15.1-6	The Contractor's training program will include formal and informal instruction with working equipment, manuals, and diagrams as instructional tools.
15.1-7	The Contractor shall assume that Agency staff does not have knowledge of any system features. However, the Contractor may assume that maintenance personnel have the basic skills pertinent to their crafts.
15.1-8	Course sizes will be designed to assure that all trainees have some level of one-on-one training with equipment and software.
15.1-9	Courses will be limited to a maximum of eight (8) hours per day, and should cover multiple work shifts.
15.1-10	The Contractor shall provide device training units that enable students to receive hands-on equipment operation and maintenance instruction while in a classroom setting. The training units will be powered by a standard 120V AC power source.
15.1-11	When appropriate, training will occur in the field or location of service.
15.1-12	The Contractor may use installed revenue equipment or spare parts as training aids in lieu of mockups and for demonstration and for practical exercises in replacing, testing, disassembly, and assembly of equipment. However, the Contractor shall be responsible for ensuring that such parts are not damaged or modified in any way.
15.1-13	<p>The Agency will furnish the following training-related items upon Contractor request:</p> <ul style="list-style-type: none"> <li>• Space for classroom lectures and practical training on equipment (location and class times will be set by the Agency)</li> <li>• Projectors, screens, white boards, and similar equipment</li> <li>• Shop space as needed</li> <li>• Buses or stations with installed system equipment</li> </ul> <p>Request shall be made at least two (2) weeks prior to the scheduled training.</p>
15.1-14	The Contractor will provide video of all training sessions to the Agency.

Req #	Requirement
15.1-15	The Contractor shall provide records of the training provided on a weekly basis to the Agency.
15.1-16	All materials used in the training programs, such as training rigs, fare media, manuals, simulators, and drawings, will become the property of the Agency upon completion of the training.

## 15.2 Training Plan

Req #	Requirement
15.2-1	The Contractor shall develop and submit for Agency approval a training plan that documents the design of the program for training Agency personnel and each course to be delivered.
15.2-2	<p>The training plan will include the following for each course at a minimum:</p> <ul style="list-style-type: none"> <li>• Identification and summary descriptions of each course, including lengths</li> <li>• The methods of training to be used</li> <li>• Learning objectives and outcomes</li> <li>• The sequence of activities</li> <li>• Targeted trainees for each course</li> <li>• Resources required, such as equipment, shop space, video recorders, etc.</li> </ul> <p>A minimum of two (2) training sessions for each course will be provided.</p>
15.2-3	A training schedule will be included in the Contractor's training plan. The schedule will consider the sequence of training, hours of instruction, trainee availability, limitations on course sizes, and venue for the training.
15.2-4	The training plan will address the Contractor's approach for training Agency trainers to deliver training subsequent to the Contractor's involvement. It will describe the Contractor's approach, resources and hours required, and any training aids that might be included.
15.2-5	The Contractor will develop and submit for Agency approval a Retail Network Training Plan that covers both merchant and Agency staff training. This plan will include the identification, summary descriptions, schedule, and methods of the training to be delivered.

## 15.3 Training Materials

Req #	Requirement
15.3-1	The Contractor shall provide all necessary training materials for the delivery of each course discussed in the training plan.
15.3-2	<p>The following training materials will be provided by the Contractor at a minimum:</p> <ul style="list-style-type: none"> <li>• Course agenda and objectives</li> <li>• Resources and facilities required for the course</li> <li>• Detailed lesson plans or outlined presentations</li> <li>• Student discussion guides and handouts</li> <li>• All relevant manuals</li> <li>• Quick reference guides</li> <li>• Operational system equipment</li> <li>• Computer-based presentations</li> </ul>

Req #	Requirement
15.3-3	Training documentation will be separate from the operation and maintenance manuals (see Manuals section), but may reference those manuals.
15.3-4	The Contractor will provide outreach and education materials on the OCTA fare collection system to retail merchants to familiarize them on the new program.
15.3-5	The Contractor will provide hard-copies of the training materials for all expected attendees, plus five (5) spare copies.
15.3-6	Draft training materials will be submitted at FDR. Final training materials will be submitted to the Agency at least 30 calendar days before training classes are scheduled to begin. All documentation and training material will be submitted in an electronic form specified by the Agency.
15.3-7	Training materials will be updated as required during the course of instruction to reflect the installed system.
15.3-8	During the warranty term and operations and maintenance period (see Operations and Maintenance section), the Contractor shall provide updated course instruction and materials resulting from any significant system hardware or software changes.
15.3-9	The Agency reserves the right to edit and reproduce portions or all of the training materials for internal use. If the Contractor produces an update or new training aids (e.g., video recordings, manuals, etc.) within two (2) years following the completion of the training, the Agency will receive copies of the updated material at no cost for use in Agency training programs.

## 15.4 Training Courses

The Contractor shall provide the training courses in Figure 15-1 and provide all course content and training materials in an Agency-approved format.

*Figure 15-1: Training Courses*

Training Course	Description
Operation, Configuration, and Administration	Supervisory personnel who will manage system equipment and service technicians will receive specialized training in the operation, configuration, and administration of the devices. This class will provide instruction on those activities that are limited to the administrative and maintenance logins of the field equipment, as well as activities governing the configuration of the devices.
Back Office User Training	<p>Personnel who will use the back office systems will be trained in the use of all application programs and functions provided by the system. The Contractor shall structure this training as a series of logically arranged topics so that individual users may attend only those portions of the course that are of interest. This training will include at a minimum:</p> <ul style="list-style-type: none"> <li>• General back office user procedures</li> <li>• Status monitoring functions</li> <li>• Fare set management</li> <li>• Media inventory management</li> <li>• Generation of all standard reports</li> <li>• Bankcard authorization operations and configuration</li> <li>• Interfaces with other systems</li> </ul>

Training Course	Description
Back Office Accounting	Those management personnel who will perform accounting and financial management will receive specialized training in use of the RMS and financial reporting. Using sample data created from testing or other sources, RMS data and reports will be generated from the system and used to explain the resulting output.
Back Office Administration	Systems personnel who will be responsible for administration and maintenance will be trained in all aspects of system administration to ensure optimal performance, as well as correct minor system problems. Content will include at a minimum: <ul style="list-style-type: none"> <li>• Backup and restore</li> <li>• Disaster recovery</li> <li>• Load balancing configuration</li> <li>• User administration</li> <li>• Networking configurations</li> <li>• Interfaces with other Agency computer systems</li> <li>• Merchant acquirer interface</li> <li>• Anti-virus definition updates</li> </ul>
Report and Query Generation and Customization	The Contractor shall instruct advanced users and administrators in use of the reporting system, and data warehouse design and query generation, including use of the report writer tool.
Support Systems and Special Tools	The Contractor shall provide training on the use, operation, and maintenance of all support systems and special tools.
Website Administration	The Contractor shall provide training on the website administrative functions. The course will include at a minimum: <ul style="list-style-type: none"> <li>• Discussion of the underlying website design and linking to other sites</li> <li>• Instruction on how to configure all pages of the website</li> <li>• Review of all procedures to modify database tables that affect website content</li> <li>• Demonstration on how to monitor the website status and operating conditions</li> </ul>
Customer Service Training	The Contractor shall provide customer service training on all aspects of the system that will be visible to and used by the public, and the tools that those Agency staff will employ. The course will cover at minimum: <ul style="list-style-type: none"> <li>• All fare products, policies, and transaction types</li> <li>• TOT/MSD functionality and user interfaces</li> <li>• CRM system functionality and user interfaces</li> <li>• Use of the public and institutional websites</li> <li>• Use of the mobile ticketing application</li> <li>• General account management features and functions</li> </ul>
Retail Network Training for Retailers	The Contractor will provide retail merchants training on the proper procedures for performing fare media sales and stored value load transactions
Retail Network Training for Agency	The Contractor will train Agency staff to pull sales reports, perform reconciliations, and handle discrepancies or variances

## **15.5 Manuals**

In addition to training materials and instruction, the Contractor shall provide instruction manuals on how to manage, operate, and maintain the entire fare collection system on an ongoing basis. The manuals will include detailed documentation for all equipment, systems and software.

### **15.5.1 Manual Content and Format**

Req #	Requirement
15.5.1-1	Manuals will contain all text, step-by-step procedures, illustrations, drawings, schematics, parts lists, and troubleshooting guides needed to allow the Agency to operate, maintain, diagnose, and repair all systems.
15.5.1-2	All manuals will be written in clear and concise English, will use English and metric units of measurement, and will be written to assume the reader has no more than an eighth (8th) grade education.
15.5.1-3	Care will be taken to provide easily understood explanations and step-by-step instructions with cross-references to all drawings, diagrams, and photographs.
15.5.1-8	Manuals related to back office operation and maintenance will be presented in terms that are meaningful to users. They will include functional explanations and descriptions of each application program and its use. Step-by-step procedures will be provided that explain how each parameter is configured and the effects obtained by varying each parameter. All user guidance, alarms, and error messages will be described, along with the steps necessary for recovery from error.
15.5.1-9	Operating instructions will describe procedures to be followed as a result of system restarts or failures. The documents will contain sufficient information to enable the user to restart or reconfigure the system and analyze diagnostic data dumps.
15.5.1-10	Disaster recovery procedures will be clearly specified in sufficient detail to consider all possible scenarios. Recovery instructions will describe detailed procedures to be followed in the event that system recovery is needed. Detailed data backup and recovery procedures will be provided.
15.5.1-12	All manuals will be submitted in hard copy and electronic format, which will be provided in PDF format and in a modifiable electronic format (MS Word).
15.5.1-14	Electronic files will be able to be deployed individually, or hosted on a server to allow multiple users to access the same data. Information will not be encrypted, and will be developed and delivered using standard authoring tools such as MS Word, Excel, Visio and PowerPoint, or Adobe Acrobat.
15.5.1-15	One (1) complete set of documents will be provided to the Agency 90 calendar days prior to the start of acceptance testing.
15.5.1-16	Information gathered during acceptance testing, and throughout the warranty term and operations and maintenance period, will be incorporated into the manuals for submittal to the Agency.
15.5.1-17	Revisions to the manuals will be recorded on a control list in the front of each document. The list will be issued with each revision and will show the date of each revision and the page reference. The Contractor shall maintain all updated lists for each document. The Agency will review and comment on each manual submission as required.
15.5.1-18	Sensitive information that is not to be distributed to all departments will be contained

Req #	Requirement
	in a separate document marked "Confidential." The nature of this information will be mutually agreed upon between the Contractor and Agency.
15.5.1-19	During the warranty term and operations and maintenance period (see Operations and Maintenance section), the Contractor shall provide updated manuals resulting from any significant software changes.

## 15.5.2 Required Manuals

The manuals in Figure 15-2 will be required at a minimum. The complete set of documentation will be submitted by the Contractor and approved by the Agency during design review. Additional manuals may be requested by the Agency.

*Figure 15-2: Required Manuals*

<b>Software Manuals</b>
Operating Instruction Manual
Software and Programming Manual
Software Source Code Manual
User Quick Reference Guides
OEM Manuals – As supplied
<b>Back Office Manuals</b>
Administrator's Manual
User's Manual
Fare Engine, System Configuration, and Business Rule Management Manual
Customer Relationship Management System Operations Manual
Monitoring Management Operations Manual
Revenue Management System Operations Manual
Data Warehouse Design and Database Structure Manual
Reporting System Operations Manual
OEM Manuals - As supplied
<b>Support System Manuals</b>
Operations and Maintenance Manual
OEM Manuals - As supplied
<b>Website Manuals</b>
Customer Website Design and Administration Manual
Institutional Website Design and Administration Manual
<b>Mobile Ticketing Manual</b>
Mobile Ticketing Design and Administration Manual



## 16 Testing

The Contractor shall plan for, perform, monitor, and document all tests required to prove acceptable design and delivery of the system, including all components and subsystems, and the integrated system as a whole. The Contractor shall begin no portion of system testing unless all design reviews and testing prerequisites have been successfully completed and approved in writing by the Agency. In the event that some elements of the system are rolled out prior to complete system deployment, all testing phases will be completed in their entirety for each phase of deployment.

The testing will be completed in three (2) phases: Integration Testing and Acceptance Testing. The test phases and individual tests of which those phases are comprised are summarized in Figure 16-1 and described in more detail in the following sections.

*Figure 16-1: Testing Overview*

Testing Phase	Test	Purpose	Condition for Completion
Integration	1. System Integration Test (SIT)	Test the integrated system in a lab environment.	Successful integrated system functional in lab setting.
	2. Field Integration Test (FIT)	Install integrated system in field and test functional requirements.	Successful integrated system functional test after field installation.
Acceptance	3. Pilot	To test system functionality with limited users in phases.	Each successive phase with increasing use cases must pass.
	4. System Acceptance Test (SAT)	Test that complete system fulfills performance requirements.	Requirements fulfilled for settling period (number of transactions or time elapsed)
	5. Final Acceptance	Accept fully functioning system and complete installation.	System is fully operational, all contractual conditions are met, and all issues resolved.

### 16.1 General Requirements

Req #	Requirement
16.1-1	All systems will be tested in integrated environments to ensure that they meet all technical and functional requirements in these specifications. At minimum there will be a test/lab environment for SIT testing and production/field environment for FIT testing/Pilot. The Contractor may utilize other environments (test, build, prod, etc.) as required for project success.
16.1-2	Testing will incorporate all requisite integration with existing Agency systems as described in these specifications.
16.1-3	The Contractor shall provide all labor and materials required for system testing, including but not limited to closed-loop fare media and bank cards, and all support services and testing facilities required to test all hardware and software being supplied.
16.1-4	All tests and inspections will be documented by the Contractor, and monitored and signed off by the Agency or their representatives, as well as by the Contractor or its representatives.
16.1-5	The Contractor shall test and verify that they can successfully utilize the Agency-provided communications networks for deployment of the system as designed.
16.1-6	Any and all hardware or software not passing testing will be corrected by the Contractor and retested.

Req #	Requirement
16.1-7	The Contractor shall utilize the Agency's existing test facility as specified in the Agency Test Facility section no later than the commencement of integration testing, specified in the Integration Testing section.
16.1-8	Prior to the start of any formal testing, the Contractor shall conduct "dry-run" testing to identify and resolve any issues that arise before formal testing commences.
16.1-9	Successful completion of each phase of testing will be subject to Agency approval based on approved test criteria.

## **16.2 Test Documentation**

### **16.2.1 Test Plan**

Req #	Requirement
16.2.1-1	The Contractor shall submit a draft test plan for Agency review and approval during design review and shall submit a final test plan to be used in connection with all tests described in this specification no less than 30 calendar days prior to the start of any testing.
16.2.1-2	The test plan will include a detailed schedule indicating the sequence of each test, where and when each test will take place, and the number of Contractor-provided staff covering each test.
16.2.1-3	The test plan will cover all Contractor, equipment supplier, and subcontractor inspections and tests to be performed, including those performed under the Contractor's QA program (see Quality Assurance and Control section).
16.2.1-4	The test plan will include plans for each integration test defined in this section, including System Integration Testing (SIT) and Field Integration Testing (FIT). Acceptance testing will be described in a separate acceptance test plan.
16.2.1-5	The test plan will detail the number and range of tests, as well as the criteria for acceptance of each phase of testing. All performance measurement procedures and acceptance criteria, including the number and type of failures allowed in each phase of testing, will be subject to Agency review and approval. The plan will also include any Agency-specified requirements identified during PDR.
16.2.1-6	The test plan will identify any requirements the Contractor intends to meet by any means other than the testing process described in this specification.
16.2.1-7	No tests will be performed until the Contractor has received Agency approval of the test plan and the associated schedule.

### **16.2.2 Test Procedures**

Req #	Requirement
16.2.2-1	The Contractor shall prepare and submit to the Agency a detailed procedure for each test to be performed.
16.2.2-2	Detailed test procedures will be submitted to the Agency for review and approval a minimum of 30 calendar days prior to the corresponding test, unless otherwise specified herein.
16.2.2-3	The Contractor shall conduct no test until approval of the corresponding test procedure has been granted by the Agency.

Req #	Requirement
16.2.2-4	Detailed test procedures will include mapping or references to the design documents and functional requirements related to the test.
16.2.2-5	Test procedures will include detailed test scripts for each test case to be performed as part of the test. Test scripts will include test case setup instructions and preconditions, step-by-step instructions for performing the test, and expected results for each step.
16.2.2-6	A re-test will be performed for any failed test cases and for system components requiring adjustment, repair, or replacement as a result of the testing, up to and including the entire system, if deemed necessary by the Agency.
16.2.2-7	Detailed test procedures will be delivered for each integration test defined in this section.
16.2.2-8	The Agency reserves the right to develop additional test procedures and include ad-hoc test cases to be performed by the Contractor or other designated third-parties, during all phases of testing.

### **16.2.3 Test Reports**

Req #	Requirement
16.2.3-1	The Contractor shall submit a written report for each test that is performed, including copies of all data generated during the test, for Agency review and approval.
16.2.3-2	Test reports will include the detailed test scripts from the associated procedures noting any exceptions to the stated test conditions, recording all relevant setup and configuration information (e.g., fare media serial numbers and device IDs), and marking each step as passed or failed.
16.2.3-3	Test reports will include detailed test results, including all transaction data generated, detailed failure descriptions and resolution, modifications or repairs pertaining to the components or systems being tested, and any re-test results.
16.2.3-4	All transaction data generated during testing will be submitted in Excel format to allow for simple storage and analysis by the Agency.
16.2.3-5	Detailed inspection and test reports will be delivered for each integration test defined in this section.
16.2.3-6	Reports will be submitted to the Agency for review and approval within 10 calendar days of the completion of any test.
16.2.3-7	No phase of testing will be considered complete until the associated report is approved by the Agency.

## **16.3 Agency Test Facility**

The Agency shall utilize the Agency's existing test facility for the placement of Contractor-furnished test equipment where the Agency and Contractor may test system hardware and software and includes existing hardware that the Contractor may integrate with. The Agency and its Partners will be responsible for providing and maintaining network communications to the test location(s). The Contractor shall provide all maintenance support for the test equipment, systems, and interfaces through Final Acceptance, and maintain the test software configuration throughout the warranty term and operations and maintenance period (see Operations and Maintenance section).

Req #	Requirement
16.3-1	The Contractor shall deliver all test equipment to one or more test location(s) on Agency/Partner property for both Contractor and Agency/Partner use.
16.3-2	The Contractor shall update the test location(s) software as necessary to maintain a fully mirrored environment of the production environment.
16.3-3	The test location(s) will include a separate back office, including the account-based transaction processor and all specified support systems, which fully replicates the production environment. The test location(s) back office hardware will be identical to the production system hardware, but will not require the system redundancy specified in the System Hosting section.
16.3-4	The test location(s) will include at least two (2) units of every equipment type deployed within the system, including any existing equipment (e.g., CAD/AVL system) that is integrated with the new fare collection system. The Agency will be responsible for maintaining the configuration of any test location(s) equipment that is not provided by the Contractor.
16.3-5	<p>The test location(s) will be fully installed and configured prior to the commencement of integration testing and will include at a minimum:</p> <ul style="list-style-type: none"> <li>• Fully integrated back office with ATP and all support systems (i.e., CRM system, configuration management, monitoring management, MIMS, RMS, data warehouse, reporting system, and hosting)</li> <li>• Two (2) Agency-provided bus validators, each connected to an Agency-provided driver control unit, and Agency-provided Bus-In-A-Box (BIB) with an integrated CAD/AVL system</li> <li>• Two (2) Agency-provided station validators</li> <li>• Two (2) Agency-provided TVMs (and all major internal components/modules)</li> <li>• Two (2) TOTs</li> <li>• Four (4) mobile fare inspection/validation devices</li> <li>• Two (2) MSDs</li> <li>• Two (2) internet connected PCs configured to access customer and institutional websites, and all web-based back office tools (e.g., CRM application, device configuration management, monitoring management, and reporting system)</li> <li>• The distribution of all test equipment will be determined by the Agency prior to integration testing.</li> </ul>
16.3-7	All specified formal testing will be conducted in Orange County, and all laboratory-based testing will be conducted in the test location(s).
16.3-8	The test location(s) will have the ability to connect directly to the merchant acquirer or any other processing entity to fully test the processing of credit and debit transactions.
16.3-9	The Contractor shall provide all special tools, documentation, and test and inspection equipment necessary for troubleshooting, testing, repairing, and calibrating all devices and modules in the test location(s) down to the LLRU.

## 16.4 Integration Testing

### 16.4.1 System Integration Testing

The Contractor shall conduct a System Integration Test (SIT). SIT will confirm, in a controlled laboratory environment, that when installed the fully integrated system will perform, operate, and communicate as required.

SIT is intended to demonstrate all device functionality and back office operation, monitoring, and reporting functions described in these specifications with full integration of the devices and back office, including all support systems. SIT will also test communications and data transmission over Agency and third-party networks, as required to complete the tests. With successful completion of SIT, all software and configuration files will be “frozen,” and the Contractor shall make no changes without Agency authorization.

Req #	Requirement
16.4.1-1	SIT will begin following the approval of Test Plans submitted to the Agency.
16.4.1-2	All SIT testing will be conducted by the Contractor at the Agency test facility in Orange County.
16.4.1-3	Prior to SIT, the Contractor shall complete setup of the Agency test facility, including the installation and configuration of all system components, the test facility back office, workstations required for back office operation, and all integration required in these specifications. The Contractor shall connect fare collection equipment to additional equipment or simulators as necessary to create a functional model of the system.
16.4.1-4	The Contractor shall submit detailed SIT test procedures to the Agency for review and approval no later than 30 calendar days prior to commencement of SIT. A software installation plan and system configuration diagram for the Agency test facility will be submitted as part of the SIT procedures.
16.4.1-5	For SIT, the test system will be provisioned with test data simulating the system’s operational databases under full operational load. Full operational load will be defined in the SIT test procedure and approved by the Agency prior to commencement of SIT.
16.4.1-6	The Contractor shall conduct a series of detailed transactions and other operations that will fully emulate a broad spectrum of usage and operating scenarios, in sufficient quantity to ensure the validity of the test results. The Contractor shall provide a list of operating scenarios as part of the SIT test procedure for Agency review and approval.

Req #	Requirement
16.4.1-7	<p>At a minimum, SIT will include:</p> <ul style="list-style-type: none"> <li>• 10 days of continuous testing of all system components, during which the components will be operational 24 hours a day</li> <li>• A minimum of 100 transactions at each system component type, including validators, ticket vending machines, ticket office terminals, the inspection/validation application, and mobile sales devices, testing all transaction types</li> <li>• A minimum of 100 transactions each performed through the back office, CRM system, customer website, and institutional website, testing all available functions, payment types, and all passes in the tariff.</li> <li>• Fifty (50) transactions minimum per day per retail partner network with various stored value loads</li> <li>• All alarm and boundary conditions tested at a minimum of 50 times each</li> </ul> <p>Specifics of SIT testing will be included in the SIT procedures to be reviewed and approved by the Agency.</p>
16.4.1-8	The Contractor shall conduct data transmission testing during SIT to demonstrate, exercise, and verify transaction processing and data uploads from all devices, and the download of configuration data to each of the various device types. The Contractor shall confirm proper data transfer rates between all devices and systems.
16.4.1-9	SIT will demonstrate monitoring, configuration, and control of all field devices using the configuration management and monitoring management tools.
16.4.1-10	SIT will include database accuracy testing, which will demonstrate the accuracy between the AUT (application under test) and the relational database in which application-generated data is stored. The testing shall also demonstrate atomicity, consistency, insulation, and durability of the database.
16.4.1-11	SIT will include a full system audit and settlement test, which will demonstrate the flow of all transactions through the system with the appropriate reporting, accounting, and settlement calculations demonstrated.
16.4.1-12	The Agency test facility will be connected directly to the merchant acquirer or any other processing entity to fully test the processing of purchases through all sales channels supporting credit/debit sales.
16.4.1-13	The Agency will, at their discretion, assign staff or representatives to witness and/or augment SIT tests. This could include providing ad-hoc test scripts to be undertaken by the Contractor and witnessed by the Agency.
16.4.1-14	During SIT, all software modifications will be reviewed, demonstrated, tested, and approved by the Agency. The Contractor shall record version information for all software modules including the date and time the software was created, size of each file, and version number.
16.4.1-15	The Contractor shall provide detailed test reports and “as-tested” software documentation at the conclusion of SIT for Agency review and approval.

## **16.4.2 Field Integration Test**

Upon completion of SIT and initial field installation activities, the Contractor shall conduct a Field Integration Test (FIT) wherein all devices, back office systems, websites, interfaces, and all other aspects of the system are exercised in what will become the production environment. The FIT will demonstrate that the system is ready to enter the acceptance testing phase.

Req #	Requirement
16.4.2-1	Installation of the system components at the Agency's properties will commence upon approval of SIT. The entire production back office and at least 25% of the total install base for each type of equipment shall be fully installed and configured prior to the commencement of FIT.
16.4.2-2	All FIT testing will be conducted by the Contractor in the production environment in the Orange County region.
16.4.2-3	The Contractor shall submit detailed FIT test procedures to the Agency for review and approval no later than 30 calendar days prior to commencement of FIT. Pre-and post-installation checklists and test reports will be included for all installed equipment as part of the FIT procedures.
16.4.2-4	For FIT, the production system will be provisioned with test data simulating the system's operational databases under full operational load. Full operational load will be defined in the FIT test procedure, and approved by the Agency prior to commencement of FIT.
16.4.2-5	Similar to SIT, the Contractor shall conduct a series of detailed transactions and other operations in FIT that will fully emulate a broad spectrum of usage and operating scenarios, in sufficient quantity to ensure the validity of the test results. All functional characteristics of the installed system components at each location will be tested to ensure operation of the components as specified, including interfaces with the back office and integration with Agency systems.
16.4.2-6	At a minimum, FIT will include: <ul style="list-style-type: none"> <li>• 10 days of continuous testing of all system components, during which the components will be operational 24 hours a day</li> <li>• A minimum of 100 transactions at each system component type, including validators, driver control units, ticket vending machines, ticket office terminals, the inspection/validation device application, and mobiles sales devices, testing all transaction types</li> <li>• A minimum of 100 transactions each performed through the back office, CRM system, customer website and institutional website, testing all available functions, payment types, and all passes in the tariff</li> <li>• Fifty (50) transactions minimum per day per retail partner network with various stored value loads;</li> <li>• All alarm and boundary conditions tested at a minimum of 50 times each</li> </ul> Final transaction volumes and specifics of FIT testing will be included in the FIT procedures to be reviewed and approved by the Agency.
16.4.2-7	The Contractor shall conduct a comprehensive security assessment, including penetration testing, of the public and institutional websites with an independent third party.

Req #	Requirement
16.4.2-8	The FIT procedures will identify and describe all necessary tests to verify proper installation and interfacing of the system components across all system facilities.
16.4.2-9	The Contractor shall conduct data transmission testing during FIT to demonstrate, exercise, and verify transaction processing and data uploads from all devices, and the download of configuration data to each of the various device types. The Contractor shall confirm proper data transfer rates between all devices and systems.
16.4.2-10	FIT will demonstrate monitoring, configuration, and control of all field devices using the configuration management and monitoring management tools.
16.4.2-11	FIT will include database accuracy testing, which will demonstrate the accuracy between the AUT (application under test) and the relational database in which application-generated data is stored. The testing shall also demonstrate atomicity, consistency, insulation, and durability of the database.
16.4.2-12	FIT will fully test all system redundancy measures and successfully demonstrate execution of the disaster recovery plan.
16.4.2-13	FIT will include a full system audit and settlement test, which will demonstrate the flow of all transactions through the system with the appropriate reporting, accounting, and settlement calculations demonstrated.
16.4.2-14	The system will be connected directly to the merchant acquirer or any other processing entity to fully test the processing of purchases through all sales channels supporting credit/debit sales.
16.4.2-15	Agency witnessing and participation will be required for the successful completion of FIT. This could include providing additional test scripts to be undertaken by the Contractor and witnessed by the Agency.
16.4.2-16	Contractor shall submit all FIT test reports to the Agency for approval at the conclusion of FIT.
16.4.2-17	A 30-day settling period will commence upon approval of the FIT test reports.
16.4.2-18	The Agency may, at their sole discretion, conduct additional ad-hoc testing during the 30-day settling period. Ad-hoc testing may include limited “friendly user” testing.
16.4.2-19	Installation of system devices may continue to occur throughout the 30-day settling period, but all devices shall be installed and tested prior to the start of acceptance testing.

## 16.5 Acceptance Testing

Acceptance testing will include a pilot and the System Acceptance Test (SAT). Both phases of testing will be described in detail in an acceptance test plan developed with the Agency and delivered by the Contractor.

### 16.5.1 Pilot

Following the 30-day settling period, the Agency will conduct a 30-day pilot with one (1) or more stages using a limited and controlled user population to exercise all system functions, fare products, and policies. Pilot testing will be planned with the Contractor and included as part of the Master Program Schedule.



Req #	Requirement
16.5.1-1	At least 30 calendar days prior to the scheduled start of the pilot, the Contractor shall submit an acceptance test plan, developed with the Agency that includes the structure, timing, and measurement criteria for conducting and evaluating the pilot.
16.5.1-2	The pilot will not commence until FIT has been approved and the subsequent 30-day settling period has passed.
16.5.1-3	All test data will be purged from the system prior to the start of the pilot.
16.5.1-4	The Contractor shall commence reporting on all system performance requirements defined in the Performance Measurement section at the start of the pilot.
16.5.1-5	The pilot will be designed to exercise all system functions, fare products, and policies in a phased approach. Successive phases will not be undertaken until the previous phase has been completed successfully.
16.5.1-6	The pilot period will not begin until all components and subsystems are completely functional, operational, online, and in service, and until Agency authorization is provided. This includes the installation of any system components at retail merchant properties participating in the pilot where POS systems are not fully integrated with the Contractor's system. Component installations are inclusive of any software or web-based application credentials and/or third-party devices that may be procured by the retailer.
16.5.1-7	The Contractor will be responsible for supporting all elements of the pilot, including, but not limited to, system and equipment maintenance, media distribution, funds settlement, reporting, and customer support.
16.5.1-8	Volume and stress testing will occur during the 30-day pilot, and will include at a minimum the successful processing of an equivalent of 20 days of transactions at projected peak volumes. Transaction volumes and how they will be generated will be detailed in the acceptance test plan.
16.5.1-9	During the pilot period, the Agency and the Contractor shall meet no less than two (2) times per week to discuss progress, issues, and results. The Contractor shall provide written status reports against established measurement criteria.
16.5.1-10	Each pilot stage will undergo analysis, review, and approval of data integrity and system performance by the Agency before moving to the next pilot stage. All critical issues will be recorded and corrective actions taken prior to completion of the pilot.
16.5.1-11	If all phases are completed successfully, the pilot duration will be no longer than 30 days.
16.5.1-12	Pilot shall not be completed until at least 25% of the Contractor-specified retail network commitment described in the Retail Network Coverage Plan has been deployed.
16.5.1-13	The pilot will continue for its scheduled duration unless a critical failure or failures cause suspension of the pilot (see Critical Failures section). When a critical failure has been resolved, the pilot will resume for a duration determined by the Agency, up to and including a full 30-day period.

## **16.5.2 System Acceptance Test**

When the pilot is complete, the Contractor shall commence the System Acceptance Test (SAT), which will verify that the system and all provided equipment meet the system performance requirements specified in the Performance Measurement section prior to Final Acceptance.

Req #	Requirement
16.5.2-1	SAT will commence upon successful completion of the pilot.
16.5.2-2	SAT will be performed in the production environment with all components, subsystems, and networks completely operational, online, and in service.
16.5.2-3	The Contractor shall submit any revisions necessary to the acceptance test plan as a result of the pilot at least 10 calendar days prior to the commencement of SAT for Agency review and approval.
16.5.2-4	SAT will be comprised of one (1) 30-day periods in which all system components shall meet or exceed all performance requirements defined in the Performance Measurement section. The acceptance test plan will describe in detail how the Contractor will measure and report on each of the performance requirements throughout SAT.
16.5.2-5	The level of system use during SAT will be decided by the Agency and included in the acceptance test plan, and may range from a group of friendly users to unrestricted public use.
16.5.2-6	The Contractor will be responsible for supporting all elements of SAT, including, but not limited to, system and equipment maintenance, media distribution, funds settlement, reporting, and customer support.
16.5.2-7	If the performance requirements defined in these specifications are not attained during the 30-day periods, SAT will be extended a minimum of 15 days.
16.5.2-8	The Contractor shall identify and implement remedial action at no cost to the Agency in the event that a system component does not meet the specified performance requirements during SAT.
16.5.2-9	The retail network system must include at least 50% of the full deployment of retail network described in the Retail Network Coverage Plan (See Retail Sales section).
16.5.2-10	During SAT, the Agency and the Contractor shall meet no less than two (2) times per week to discuss progress, issues, and results. The Contractor shall provide formal reports on system performance at the end of the 30-day period.
16.5.2-11	Periodically during SAT, the Agency will audit the reports generated by the system to confirm the accuracy and completeness of the information presented. All event records shall be reviewed and compared to known events such as door openings, alarms, and power outages.
16.5.2-12	Within 10 business days following the completion of SAT, the Contractor shall provide all testing data, reports, and other testing information to the Agency for review and approval.

### **16.5.3 Final Acceptance**

Final acceptance will designate the beginning of revenue service and the start of the warranty term (see Warranty section) for each phase of the implementation. Achievement of the Final Acceptance milestone will be based upon the successful completion of SAT and delivery of all contract required work, equipment, and documentation, and is subject to written approval from the Agency. The Agency will issue a certificate upon approval of the Contractor's request for Final Acceptance.

Req #	Requirement
16.5.3-1	The Contractor shall submit a request for Final Acceptance upon completion of SAT and a determination that all work has been completed in accordance with these specifications. The Agency will respond to the request within 10 business days.
16.5.3-2	<p>Final Acceptance will be contingent on satisfying all of the following conditions for each phase of the implementation. The Agency will grant Final Acceptance only when:</p> <ul style="list-style-type: none"> <li>• SAT has been successfully completed and approved by the Agency</li> <li>• All system devices are delivered, installed, and operational</li> <li>• All back office systems and software, including all required reports and the data warehouse, are installed and fully functional</li> <li>• All websites are live and fully functional</li> <li>• All spare parts have been delivered</li> <li>• Initial batches of fare media have been delivered and accepted by the Agency</li> <li>• All requisite contract deliverables, including all design documentation, have been delivered to the Agency and accepted</li> <li>• The disaster recovery plan has been successfully demonstrated and approved by the Agency</li> <li>• All required training has been provided and accepted by the Agency</li> <li>• Final resolutions to all identified critical issues (as classified by the Failure Review Board) are fully implemented and accepted by the Agency</li> </ul>
16.5.3-3	Final acceptance for each phase of the implementation will represent the formal start of revenue service and start of the warranty term.

# 17 Operations and Maintenance Agreement

## 17.1 Warranty

Req #	Requirement
17.1-1	The Contractor shall provide a one (1) year warranty that begins upon the granting of Final Acceptance by the Agency.
17.1-2	<p>The warranty will cover both hardware and software for the following devices and components:</p> <ul style="list-style-type: none"> <li>• Ticket Office Terminals</li> <li>• Mobile Fare Inspection/Validation Device Application</li> <li>• All back office components and modules</li> </ul> <p>All other hardware and software components delivered as part of the fare collection system.</p>
17.1-3	The Contractor shall warrant that all equipment, components, computer systems and software provided for the system, including those components warranted by third-party suppliers, will be free from defects in operation, material, and workmanship under normal operating use. Remedial work to correct deficiencies will include the repair or replacement of equipment, components, devices, and/or materials.
17.1-4	<p>The warranty will cover the following:</p> <ul style="list-style-type: none"> <li>• Repair or replacement of all equipment or systems required as a result of an identified hardware defect</li> <li>• Software updates or re-writes required to repair all identified software defects or bugs, and apply all necessary patches or security updates released by the Contractor or third-party software providers throughout the term of the warranty</li> <li>• All labor associated with hardware and software testing and deployment, both in the lab and field environments, needed to support warranty activities.</li> <li>• All updates, fixes, and labor associated with latent defects. That is, defects that occur during the warranty period but may not exhibit symptoms until after the warranty period expires.</li> </ul>
17.1-5	The Contractor shall provide a new component or subsystem if a particular component or subsystem was repaired or replaced three (3) times for the same failure.
17.1-6	The Contractor shall be responsible for all personnel, labor, tools, materials, replacement parts, shipping charges, and other costs associated with the activities listed as part of this Warranty section throughout the warranty term. Such costs shall be not be included in operations and maintenance payments.
17.1-7	Any equipment component repaired or replaced under terms of warranty will be warranted for at least twelve (12) months, or the remaining duration of the original warranty, whichever is longer.
17.1-8	The warranty will not apply to any equipment that has been damaged by any person other than the Contractor or Contractor's assignee. Environmental conditions described in these technical specifications will be considered normal operating conditions for this system and shall not qualify for exclusion.

17.1-9	The Agency will be held blameless for damages resulting from inadequate or inaccurate training of Agency personnel, and/or incomplete operating manuals, maintenance manuals, electrical and electronic schematics, mechanical diagrams or software documentation.
17.1-10	Spare parts used by the Contractor during the warranty term that need replacement due to normal wear from customer use or vandalism will be replaced at cost to the Agency. All modules and component costs due to defects will be at the Contractor's cost. The Contractor shall maintain sufficient spare modules and components to meet the system availability requirements through the conclusion of the warranty.
17.1-11	The Contractor shall follow proper Agency security procedures for gaining access to field equipment and facilities, and shall not engage in such procedures without having received Agency-provided training. The Contractor shall not modify or repair any equipment in revenue service without the approval of the project manager or an Agency-authorized representative.
17.1-12	The Contractor shall develop a warranty plan outlining processes and procedures to be implemented to meet all specified warranty requirements. A draft of the warranty plan will be submitted at FDR and a final version will be provided a minimum of 30 calendar days prior to the start of any warranty term.
17.1-13	The warranty will include all the software maintenance requirements in the Software Maintenance section.

## **17.2 Back Office Operations**

Req #	Requirement
17.2-1	The back office will be hosted by a third party or "cloud" hosting provider such as Amazon Web Services (AWS), Microsoft Azure, Google Cloud Platform, or equivalent local provider. The third party hosting provider will provide the performance, security, and redundancy to support the requirements of the account-based back office.
17.2-2	The cloud hosting provider will adhere to applicable Agency IT/hosting standards.
17.2-3	The Contractor shall be responsible for installation, configuration, and testing of the hosted solution. The determination of cloud hosting capacity and functionality will be determined by the Contractor based on Agency expected transaction volumes and performance requirements.
17.2-4	All cloud hosting operations will be transparent to the Agency. The capacity and bandwidth chosen will be commensurate with the required transaction volume, and may be adjusted upon increased usage. The Agency will not be responsible for excessive cloud hosting costs that are not required to operate the system at the performance level specified in this specification.
17.2-5	The Contractor shall be responsible for the following back office operations activities: <ul style="list-style-type: none"> <li>• Monitoring system performance and health</li> <li>• Ensuring timely and accurate processing of transactions</li> <li>• Overseeing operation of all back office support systems</li> </ul>
17.2-6	The Contractor shall provide a high availability cloud based system (see Performance Measurement Section) that offers maximum protection against data loss and system failure. Means will be provided in the system design to ensure complete recovery from the loss of any system components at any point during operation.

Req #	Requirement
17.2-7	All hosted data will be protected against loss or failure at a given hosting site. The hosted solution will be equipped with the appropriate hardware, software, and procedures to provide redundancy and meet all performance requirements. Load balancing, automated failover, and data mirroring between multiple sites will be provided as necessary.
17.2-8	Processor load, memory utilization, errors, and other system performance indicators will be available in real-time to help prevent performance degradation and troubleshoot back office issues. Alarm types and thresholds will be able to be configured to allow for custom alerts.
17.2-9	In order to comply with federal cloud hosting requirements, the back office system and back office data shall be hosted in the United States.
17.2-10	The Contractor shall provide the Agency access to the hosting provider as necessary. It is preferred that the hosted solution to include a static IP address to facilitate access by the Agency.
17.2-11	The Agency shall be able to perform penetration testing and vulnerability scans on the hosted solution, as per Agency standards. The Contractor shall provide an SOC 2 report on an annual basis.
17.2-12	The Contractor will notify the Agency Project Manager and/or designated Security Manager immediately following discovery of system downtime, regardless of whether or not a cause has been identified. Within five (5) days of the incident, the Contractor shall submit a detailed report to the Agency that contains the scope of the problem, cause, and actions taken to prevent it from occurring again.
17.2-13	The Contractor shall develop and submit for approval by the Agency a disaster recovery plan that describes data backup and recovery, and ensures minimal data loss in the event of a catastrophic event or system failure.
17.2-14	The disaster recovery plan will contain detailed procedures to be followed to restore the system to full operation following a disaster or failover event. The Contractor shall on a yearly basis demonstrate that the disaster recovery plan functions as expected.
17.2-15	The Contractor shall provide documentation and training for Agency staff in all procedures to maintain the hosted environment and restore the system in the case of a disaster recovery event. However, the Contractor will retain primary responsibility for disaster recovery as part of ongoing operations and maintenance (see Operations and Maintenance section).

## 17.3 Software Maintenance

Req #	Requirement
17.3-1	During the operations and maintenance term, and during any optional extensions exercised by the Agency, the Contractor shall provide software and firmware maintenance services described in this section. When referred to in this section, the term software is understood to include all software and firmware provided by the Contractor and third-party suppliers under contract with the Contractor.
17.3-2	During the operations and maintenance term, the Contractor shall be responsible for preventative and corrective software maintenance to support system operations while meeting the performance standards set forth in these specifications.
17.3-3	Software maintenance will include:

Req #	Requirement
	<ul style="list-style-type: none"> <li>• Custom software updates</li> <li>• Device firmware updates</li> <li>• Third-party device firmware updates</li> <li>• Database software updates</li> <li>• Operating system updates</li> <li>• API maintenance and updates</li> <li>• Antivirus updates</li> <li>• Updates to remain PCI compliant</li> <li>• License renewal</li> <li>• Software updates required to fix all identified software defects or bugs throughout the term of the agreement</li> <li>• Application of all necessary patches or security updates released by the Contractor or third-party software providers</li> <li>• All software testing and deployment, both in the lab and field environments.</li> <li>• Software and firmware maintenance</li> <li>• QA/QC for fixes and updates</li> <li>• Website updates including QA/QC</li> <li>• Updated software manuals</li> <li>• Other activities needed to maintain system operations and meet the performance standards set forth in these specifications</li> </ul>
17.3-4	The Contractor shall allow staff from the Agency to shadow all support activities throughout the operations and maintenance agreement.
17.3-5	Software will be maintained during the operations and maintenance term and include all required updates to the APIs and associated specifications provided by the Contractor.
17.3-6	All third-party software will be maintained at the most current or previous version at no additional charge throughout the term of the maintenance agreement, so long as it does not involve a major rewrite of the Contractor's software.
17.3-7	Performance of software maintenance activities will be completed in a manner that does not disrupt or degrade system operations, to the fullest extent possible.
17.3-8	Software and firmware updates will be clearly documented and submitted in advance of deployment for Agency review and approval.
17.3-9	Software and firmware deployment will be scheduled and planned with the Agency. Advance notification will be provided, and approval granted by the Agency, for all software maintenance activities requiring interruption of service or system operations.
17.3-10	As standard practice when repairing deficiencies and releasing device or back office system fixes or upgrades, the Contractor shall prepare and run regression testing scripts to test that each build delivered to the test environment does not result in any issues with the devices and systems currently in operation, including those that are not being updated. Any regression issues will be documented as deficiencies and resolved accordingly.
17.3-11	If the condition requiring correction affects the operation of other system components, then the Contractor shall provide repair or replacement of the system components that fail, regardless of whether the warranty term has expired for those components.

Req #	Requirement
17.3-12	Contractor shall maintain a change log of all changes that are performed, and provide this change log to the Agency on a mutually agreed upon schedule. The change log shall be sufficiently detailed to allow the Agency to determine when any feature was added or modified, and the scope of the change.
17.3-13	During the warranty term and operations and maintenance period, the Contractor shall provide updated software manuals resulting from any significant system software changes.
17.3-14	The Contractor shall provide phone number and e-mail account(s) for the reporting of software defects or malfunctions, and system outages, 24 hours a day, seven (7) days a week.
17.3-15	During the operations and maintenance term, the Contractor shall respond to reports of system outages within the time defined in the Maintenance Response Time section. A fully-qualified service representative will be onsite within 24 hours after being contacted by Agency staff, if the issue cannot be resolved remotely.
17.3-16	During the operations and maintenance term, the Contractor shall respond to a report of any software defect or malfunction within the time defined in the Maintenance Response Time section. A fully-qualified service representative will be dispatched to assist onsite if it is determined that a physical presence is needed to resolve the identified issue.



## 18 Performance Measurement

### 18.1 RVS Key Performance Indicators

The Contractor shall meet all the performance requirements contained within individual sections of these specifications in addition to those described throughout this section. The performance requirements described in this section are Key Performance Indicators (KPIs), all of which will be measured and reported on by the Contractor starting at acceptance testing, and used as the primary criteria for the granting of Final Acceptance. In addition, KPIs will be measured and reported throughout the operations and maintenance agreement, and failure to meet these requirements will result in Liquidated Damages (LD) being assessed against the monthly operations payments made to the Contractor.

#### 18.1.1 Back Office

##### 18.1.1.1 Accuracy

Back office accuracy will be determined based on any incident where a device or back office generated transaction is recorded incorrectly within the associated system.

KPI #	System	Requirement	Measurement Period	Base LD Assessed
18.1.1.1-1	Account-Based Transaction Processor	< 4 incidents	Calendar Month	15%
18.1.1.1-2	Monitoring Management	< 4 incidents	Calendar Month	10%
18.1.1.1-3	Revenue Management System	< 4 incidents	Calendar Month	15%
18.1.1.1-4	Media Inventory Management	< 4 incidents	Calendar Month	10%
18.1.1.1-5	Customer Relationship Management System	< 4 incidents	Calendar Month	15%
18.1.1.1-6	Data Warehouse and Reporting	< 4 incidents	Calendar Month	15%
18.1.1.1-7	Websites	< 4 incidents	Calendar Month	15%
18.1.1.1-8	Mobile Ticketing	< 4 incidents	Calendar Month	15%

##### 18.1.1.2 Availability

Back office availability will be calculated based on the total out of service hours for the associated system:

$$\text{Back Office Availability} = 1 - \frac{\text{Out of Service Hours for the Back Office System}}{\text{Total Operating Hours for the Back Office System}}$$

Out of service hours are defined as all hours during which the system is not in a fully operational state, and includes all time necessary to respond and repair. Scheduled maintenance hours are excluded from the calculation. Total operating hours are defined as the number of hours in a day (24) multiplied by the number of days in the month of measurement.

KPI #	System	Requirement	Measurement Period	Base LD Assessed
18.1.1.2-1	Account-Based Transaction Processor	> 99.99%	Calendar Month	20%
18.1.1.2-2	Monitoring Management	> 99.9%	Calendar Month	15%
18.1.1.2-3	Revenue Management System	> 99.9%	Calendar Month	15%
18.1.1.2-4	Media Inventory Management	> 99.9%	Calendar Month	15%
18.1.1.2-5	Customer Relationship Management System	> 99.9%	Calendar Month	15%
18.1.1.2-6	Data Warehouse	> 99.9%	Calendar Month	15%
18.1.1.2-7	Reporting System	> 99.9%	Calendar Month	15%
18.1.1.2-8	Websites	> 99.9%	Calendar Month	20%
18.1.1.2-9	Mobile Ticketing	> 99.9%	Calendar Month	20%
18.1.1.2-10	Hosting Provider	> 99.99%	Calendar Month	20%

## 18.1.2 Operations

### 18.1.2.1 High Priority Response Time

High Priority response time will be determined based on the average time for the Contractor to respond to high-priority maintenance incidents reported by the Agency, or through the back office monitoring management tool. The response will include an initial root cause analysis and corrective action plan.

The prioritization of incidents will be determined by the Failure Review Board (see Failure Review Board section).

Certain components such as mobile ticketing may require public app releases to resolve maintenance incidents and address public-facing issues. The corrective action plan for mobile ticketing incidents will include an app-release timeline.

$$\text{High Priority Response Time} = \frac{\text{Total Time to Respond to Reported Maintenance Incidents}}{\text{Number of Maintenance Incidents Requiring Attention}}$$

KPI #	System	Requirement	Measurement Period	Base LD Assessed
18.1.2.1-1	Account-Based Transaction Processor	36 hours	Calendar Month	15%
18.1.2.1-1	Monitoring Management	72 hours	Calendar Month	10%
18.1.2.1-1	Revenue Management System	48 hours	Calendar Month	10%
18.1.2.1-1	Media Inventory Management	72 hours	Calendar Month	10%
18.1.2.1-1	Customer Relationship Management System	48 hours	Calendar Month	10%
18.1.2.1-1	Data Warehouse	72 hours	Calendar Month	10%
18.1.2.1-1	Reporting System	72 hours	Calendar Month	10%
18.1.2.1-1	Websites	48 hours	Calendar Month	15%
18.1.2.1-1	Mobile Ticketing	48 hours	Calendar Month	15%
18.1.2.1-1	Hosting Provider	36 hours	Calendar Month	15%

**18.1.2.2 Report Generation**

Report generation will be based on any incident where a canned report takes more than five (5) minutes to be generated. The requirement is based on report queries limited to one (1) year of historical data.

KPI #	Report Type	Requirement	Measurement Period	Base LD Assessed
18.1.2.2-1	Canned Report Generation	< 4 incidents	Calendar Month	10%

**18.2 Performance and Failure Definition****18.2.1 General Requirements**

Req #	Requirement
18.2.1-1	The Contractor shall be responsible for measuring performance against all KPIs. The Agency will have access to the same performance measuring tools, and reserves the right to audit the measurement tools or process at any time.
18.2.1-2	System performance will be measured using the data generated by the system and stored in the data warehouse. Data generated manually will be used when it is the only option for tracking an activity associated with a particular KPI (e.g., response time).
18.2.1-3	The Contractor shall automate the capture of all necessary data and KPI calculation wherever possible. For validation purposes, the Agency will have full access to the source data and code used to perform the calculations.
18.2.1-4	The Contractor shall commence performance measurement during the pilot and continue to perform this activity throughout the operations and maintenance agreement.

**18.2.2 Failure Review Board**

A Failure Review Board (FRB) will be established to determine which issues will be chargeable against the performance KPIs. The FRB will also assess the severity of failures to determine the successful completion of relevant testing phases, and which incidents are included in the high priority response time KPI.

Req #	Requirement
18.2.2-1	The FRB will be established during the 30-day settling period prior to acceptance testing to evaluate equipment and back office failures, as well as other system issues, throughout acceptance testing.
18.2.2-2	The acceptance test plan submitted by the Contractor will include a proposed FRB structure and system performance review process.
18.2.2-3	At a minimum, the FRB will be comprised of the Agency's project manager, or a designated representative, and the Contractor's lead engineer.
18.2.2-4	The members of the FRB will attempt to settle any disputes based on the requirements in these specifications, and will use best judgment in any scenarios where the requirements are silent or unclear.
18.2.2-5	The Agency's project manager will make the final and binding decision on any disputes that remain unsettled by the FRB after a period of 5 business days.

<b>Req #</b>	<b>Requirement</b>
18.2.2-6	The FRB will be responsible for the review and approval of the acceptance test plan, and shall agree to the criteria for the execution and approval of the acceptance test phases.
18.2.2-7	During acceptance testing, the FRB shall meet no less than weekly. The FRB will review all failures and other system issues that arise during the pilot and SAT to assess their severity and impact on completion of test phases.
18.2.2-8	Following both the pilot and SAT, the FRB will make a recommendation on whether to approve or extend test phases. Final discretion for the approval of acceptance testing and the granting of Final Acceptance will reside with the Agency.
18.2.2-9	Following Final Acceptance, the FRB will continue to meet at least monthly for the remainder of the operations and maintenance agreement. During this time, the FRB will be responsible for reviewing system performance, determining which incidents are deemed high priority, and settling any disputes around measurement of the KPIs.

### **18.2.3 Chargeable Failures**

A chargeable failure is a hardware or software malfunction where the delivered equipment or systems fail to perform or perform in a way that does not meet the requirements in these specifications. Chargeable failures count against the system performance KPIs.

<b>Req #</b>	<b>Requirement</b>
18.2.3-1	<p>Chargeable failures include, but are not limited to, the following:</p> <ul style="list-style-type: none"> <li>• A malfunction which prevents the system component from performing its designated function, or meeting the performance criteria, when operated under the environmental and operational conditions stated in these specifications</li> <li>• A malfunction that might cause a threat to customers, employees, or others</li> <li>• An occurrence that does not cause the system component to become entirely inoperable, but requires some form of maintenance attention to restore normal function</li> <li>• Any occurrence where data is not successfully transmitted between elements of the system</li> <li>• Software updates or fixes that adversely affect the operation or performance of the system</li> <li>• Scheduled maintenance or repair activities that adversely affect the operation or performance of the system</li> </ul>
18.2.3-2	<p>The following conditions, at minimum, will be considered chargeable failures in any components or systems delivered:</p> <ul style="list-style-type: none"> <li>• Software anomalies and bugs (every incident of a software anomaly or bug causing a malfunction will be considered a failure)</li> <li>• Hardware failures that are not clearly a result of conditions outside the requirements of this specification</li> <li>• Data storage failures, including those due to the disk space provided</li> <li>• Failure to accurately read and/or process a card</li> <li>• Failure to accurately issue fare media</li> <li>• Failure to properly register and report any transactions</li> <li>• Data download/upload failure</li> <li>• Event or alarm transmission failure</li> </ul>

Req #	Requirement
	<ul style="list-style-type: none"> <li>• Unexpected shutdown of equipment or a system</li> <li>• All maintenance requiring module replacements</li> </ul>
18.2.3-3	Under mutual agreement, the FRB will classify additional failures as chargeable or non-chargeable as required.
18.2.3-4	Chargeable failures will affect the accuracy and availability KPI calculations.

## 18.2.4 Non-Chargeable Failures

A non-chargeable failure is a malfunction caused by a condition external to the system component under consideration. A non-chargeable failure is not expected to be encountered during normal and correct operation of the system components.

Req #	Requirement
18.2.4-1	<p>Non-chargeable failures include, but are not limited to, the following:</p> <ul style="list-style-type: none"> <li>• Mishandling of equipment or back office system components</li> <li>• Any failures caused by externally applied stress conditions outside of normal operating conditions and in excess of the requirements in these specifications</li> <li>• Failures caused by incorrectly exercised operating, maintenance or repair procedures performed by the Agency where correct procedures have been delivered by the Contractor</li> <li>• Failure caused by vandalism</li> <li>• Communications failures beyond the control of the Contractor</li> <li>• Downtime due to scheduled maintenance</li> <li>• Dependent failures as a result of a non-chargeable failure</li> </ul>
18.2.4-2	All other failures will be considered relevant and chargeable unless determined to be non-chargeable by the FRB.
18.2.4-3	Non-chargeable failures will not affect the accuracy and availability KPI calculations.

## 18.2.5 Critical Failures

Req #	Requirement
18.2.5-1	During the pilot and SAT, the FRB will evaluate failures to establish their severity as critical or non-critical. Critical failures will need to be resolved in order to approve the test phase, and in some cases, may result in an extension of the test phase.
18.2.5-2	<p>At a minimum, critical failures will include incidents that produce a major or substantial business impact, or impact to normal operations, such as:</p> <ul style="list-style-type: none"> <li>• Loss of revenue or expense</li> <li>• Significant negative customer experience</li> <li>• Limited or loss of access to a back office application</li> <li>• System operation at a degraded level, such that normal business operations cannot be conducted</li> <li>• Application or system experiencing continual or repeated issues</li> </ul>
18.2.5-3	<p>At a minimum, non-critical failures will include incidents that produce little or no business impact, or impact to normal operations, such as:</p> <ul style="list-style-type: none"> <li>• Minor customer inconvenience</li> <li>• System operating at a degraded level such that normal business operations are minimally impacted</li> </ul>

## **18.3 Retail Network Key Performance Indicators**

### **18.3.1 Retail Network Coverage**

<b>Req #</b>	<b>Requirement</b>
18.3.1-1	The Contractor will use commercially reasonable efforts to maintain through the life of the Contract a network of retail merchant locations that meets or exceeds the Contractor's proposed network coverage commitments as agreed to in the Retail Network Plan.
18.3.1-2	If Contractor's network coverage falls below that specified in the Retail Network Coverage Plan for three (3) consecutive months or for more than five (5) months in a rolling 12-month period, Contractor must address the loss of coverage via the Retail Network Coverage Review and return to KPI compliance within an additional 90 days or demonstrate to the Agency's satisfaction that there are insufficient viable retail locations to meet the network coverage commitment. Should the latter occur, the Retail Network Coverage Plan shall be updated with the new approved list of retailers and serve as the new baseline for ongoing coverage reviews and KPI evaluation.
18.3.1-3	Failure to attain KPI compliance within 90 days will result in a 0.25% commission reduction and/or a 5% reduction in fixed fee based on Contractor's approved price structure, which will be assessed each month a violation occurs.

### **18.3.2 Retail Funds Settlement**

<b>Req #</b>	<b>Requirement</b>
18.3.2-1	The Contractor shall settle funds to the Agency's designated bank account(s) no later than an average of (7) calendar days (as measured monthly) following the retail transaction date of sale.
18.3.2-2	If KPI is not met for three (3) or more days in a rolling one (1) month period, or five (5) or more days in a two (2) month period, Contractor must develop and submit a plan for cure to the Agency within 30 days and return to KPI compliance within an additional 15 days.
18.3.2-3	Failure to attain KPI compliance within 15 days will result in a 0.25% commission reduction and/or a 5% reduction in fixed fee to the Agency based on Contractor's approved price structure, which will be assessed each month a violation occurs.

### **18.3.3 Retail Financial Accuracy**

<b>Req #</b>	<b>Requirement</b>
18.3.3-1	Financial variances in excess of 0.01% among fare media sales, stored value sales, and other payments made to the Agency will be addressed and corrected within three (3) business days after month end.
18.3.3-2	Any financial variances exceeding 0.01% among fare media sales, stored value sales, and other payments made to the Agency that persist beyond that point shall be subject to a 30-day cure period.
18.3.3-3	If, after the 30-day cure period, the Service Provider fails to return to KPI compliance, a 0.25% commission reduction and/or a 5% reduction in fixed fee to the Agency based on Contractor's approved price structure, which will be assessed each month a violation occurs.

## 18.4 Performance Reporting

Req #	Requirement
18.4-1	The Contractor shall be responsible for reporting on performance against all KPIs on a monthly basis, at a minimum.
18.4-2	The Contractor shall create canned reports that can be run, viewed, and downloaded by the Agency using the reporting system.
18.4-3	At a minimum, the following reports will be provided: <ul style="list-style-type: none"> <li>• Back office Accuracy</li> <li>• Back office Availability</li> <li>• High Priority Response Time</li> <li>• Retail Network Coverage</li> <li>• Retail Network Settlement</li> <li>• Retail Network Financial Accuracy</li> </ul> Final reports will be determined during design review.
18.4-4	The reports will be generated without manual data entry by the Contractor wherever possible.
18.4-5	The reports will include tables and graphical charts showing the current and historical performance of each component under measurement.
18.4-6	The reports shall include a calculation of any LD to be assessed in the current month based on current and prior performance.
18.4-7	The Contractor shall commence performance reporting during the pilot and continue to perform this activity throughout the operations and maintenance agreement.

## 18.5 Penalty Assessment

Req #	Requirement
18.5-1	LD will be assessed for a failure to meet any KPIs identified as having an associated LD.
18.5-2	A failure will result in the percentage in the “Base LD Assessed” column being applied to the full amount of the ongoing operations and maintenance agreement payment.
18.5-3	A failure to meet the same KPI for two (2) or more months in a row after a full failure has been reached will constitute a persistent failure, and result in a multiplier being applied to the LD percentage.
18.5-4	The LD multiplier will increase by a factor of one (1) for each month that a KPI is not met, up to the full value of the associated maintenance payment (e.g., if a KPI is not met two months in a row, the LD will be doubled in the second month; if a KPI is not met three (3) months in a row, the LD will be tripled in the third month).
18.5-5	Successfully meeting a KPI will end a persistent failure and reset the LD multiplier.
18.5-6	The total LD applied to an operations/maintenance payment will not exceed the full amount of the operations/maintenance payment in that month. LD will not be carried over from month to month.
18.5-7	The Contractor shall be responsible for reporting on LD in the system performance reports and will deduct LD directly from any invoices submitted to the Agency.

## 19 Retail Network

Contractor will be responsible for recruiting and managing a vast network of retail merchants who will provide adequate coverage and who will sell fare media and stored value. The Agencies' preference is to retain current retailers as necessary to provide a comprehensive retail network with a focus on system coverage rather than number of locations (i.e. quality versus quantity). The Contractor will coordinate provisioning of the retail network in conjunction with the implementation of the fare collection system, such that the retail network will be fully operational at launch of the new system.

### 19.1 General Requirements

Req #	Requirement
19.1-1	The Contractor's retail network will provide customers with a simple and convenient experience for the purchase of fare media and loading of existing transit accounts.
19.1-2	Contractor will provision a retail network that addresses the following: <ul style="list-style-type: none"> <li>• Convenient and easy to use for customers, utilizing secure retail models such as existing gift card load networks.</li> <li>• Accessible to customers across modes, geographies, income, and race/ethnicity that is flexible to address changing conditions in the region</li> <li>• Serves unbanked and under-banked communities</li> <li>• Maintains fiscal controls and expedite sales revenue recognition</li> <li>• Protects customer privacy and secures sensitive information</li> </ul>
19.1-3	The fare collection system retail network will support: <ul style="list-style-type: none"> <li>• Fare Media Sales</li> <li>• Stored Value Loads – sales locations will support the loading of stored value to all fare media account types (e.g., various increments, full and reduced) as allowed by/configured in the fare collection system)</li> <li>• Mobile Ticketing Loads – sales locations will support the loading of stored value to mobile wallets and the ability to pay for mobile ticketing transaction with cash in the retail network</li> </ul>
19.1-4	The design and implementation of the retail network shall be included in and subject to the requirements of all significant phases, deliverables, and milestones of the overall fare collection system project including: <ul style="list-style-type: none"> <li>• Master Project Schedule</li> <li>• Project Management Plan</li> <li>• Design Review Plan</li> <li>• Design Reviews</li> <li>• System Security</li> <li>• Change Control Process</li> <li>• Testing</li> <li>• Training</li> <li>• System Acceptance</li> <li>• Data Warehouse and Reporting</li> <li>• Performance Measurement</li> </ul>



Req #	Requirement
19.1-5	The Contractor will be responsible for retail merchant management including but not limited to service quality assurance, trouble resolution, new merchant recruitment, merchant decommissioning, training, marketing materials management, and fare media distribution management.
19.1-6	The Contractor shall bear all costs of managing the retail merchants within the retail network, including equipment installations and maintenance (if necessary), employee training, testing, and merchant recruitment, replacement, and decommissioning.
19.1-7	The Contractor will provide 24/7 phone and email troubleshooting support 365 days per year to retail merchants for fare collection system operations and funds settlement, with a dedicated phone line for retailers to call should the retail merchant require assistance. This 24/7 phone and e-mail troubleshooting support may also be used by the Agency to assist with customer inquiries as needed.

## **19.2 Fare Collection System Integration**

Req #	Requirement
19.2-1	The sale of fare media by a retail merchant shall initiate the activation of the card and automatic creation of a transit account associated with that card within the fare collection system.
19.2-2	The Agency will be the card issuer of record for all fare media sold and distributed through the retail network.
19.2-3	The Contractor will monitor the health of their API connections to the retail network to ensure proper connectivity and to track performance KPIs.
19.2-4	The Contractor will collect and provide the Agency with statistics regarding successful and unsuccessful API calls (errors) throughout the terms of the Contract in a manner and frequency as agreed to by the Agency
19.2-5	The retail network shall utilize the Contractor's APIs to enable communication between the Contractor's network and the fare collection system back office.
19.2-6	The Contractor's network shall include both integrated and non-integrated retailers (See Retail Network section) and utilize the same API for interfacing with the fare collection system back office.
19.2-7	The Contractor's fare collection system will serve as the system of record for fare media and account status. Fare media sale and stored value load transactions will be communicated to the back office in real-time, enabling the cardholder to use the fare media and associated funds within five (5) seconds following authorization of the transaction with the back office.
19.2-8	The Contractor shall guarantee payment of funds to the Agency for all completed fare media sales and stored value load transactions performed via the retail network, including indemnifying the Agency against any payment fraud, NSF checks, chargebacks or bankruptcy at the retail locations.
19.2-9	The Contractor shall comply with all local, state, and federal regulatory licensing requirements.
19.2-10	Fare media sales revenue and stored value/product funds collected through the retail network will be electronically transferred to an Agency-specified bank account via wire transfer or ACH. Other forms of funds transfer are not permitted unless approved in writing by the Agency.

Req #	Requirement
19.2-11	The Contractor shall settle funds to the Agency-designated payment processor and/or bank account as frequently as possible, but no later than an average (7) calendar days (as measured monthly) following the date when the sale took place at the retail merchant location.
19.2-12	The Contractor's system used to support the sale of cards and loading of account value will provide transaction data to the fare collection system.
19.2-13	The Revenue Management System (see Revenue Management section) will automatically reconcile and clear settled retail transactions at an individual level based on a settlement file provided by the Contractor's selected retail network administrator. When an authorized retail transaction remains unsettled beyond a configurable time threshold, the Contractor will investigate and either remit payment to the Agency by the next settlement date or generate a reversal of the "sale" transaction, recording the bad debt in the associated Transit Account.
19.2-14	The transaction data will be fully compliant with Agency policies for the handling of customer Personally Identifiable Information (PII).
19.2-15	Transaction data elements will be defined by the Contractor during design review, but will include at a minimum: <ul style="list-style-type: none"> <li>• Card/Account type</li> <li>• Unique card identifier</li> <li>• Transit account number</li> <li>• Date and time of transaction</li> <li>• Transaction type</li> <li>• Transaction value</li> <li>• Beginning Transit Account Balance</li> <li>• Ending Transit Account Balance</li> <li>• Merchant ID</li> <li>• Merchant Name</li> <li>• Merchant Location</li> <li>• Receipt Reference Number</li> </ul>
19.2-16	Transaction data and information will be consistent between retail locations, whether the retailer is integrated or non-integrated (using the Contractor's web-based portal or standalone sales device).
19.2-17	Transaction data stored by the retail network will be transmitted to or available for download by the Agency on a daily basis. Transaction data will be financially auditable and provided in a format to be defined during design review.
19.2-18	The Contractor will work with the Agency to develop a set of canned operational reports generated by their system, including but not limited to: <ul style="list-style-type: none"> <li>• Sales reports (itemized and summary)</li> <li>• Transaction level detail sales reports</li> <li>• Financial settlement reports (itemized and summary)</li> <li>• Financial settlement detail reports</li> <li>• Media inventory reports including sold and unsold media</li> <li>• Lost/stolen media reports</li> <li>• Active retail locations, including store name, address, GIS coordinates, phone number, and store hour</li> </ul>

Req #	Requirement
19.2-19	<p>Inventory reports shall include the following information at a minimum:</p> <ul style="list-style-type: none"> <li>• Card stock (including central inventory)</li> <li>• Card type (e.g., Adult, Reduced) if applicable</li> <li>• Card status (sold/unsold)</li> <li>• Serial number ranges issued (sold/unsold)</li> <li>• Cards under procurement</li> <li>• Delivery dates to retail locations</li> </ul> <p>Where possible, inventory reports by location are preferred.</p>
19.2-20	Final report formats (content and layout) are subject to approval by the Agency and will be determined during design review.
19.2-21	Reports will be available in PDF and comma delimited/Excel formats at a minimum.

## 19.3 Network Requirements

Req #	Requirement
19.3-1	All locations must support both fare media (card) sales and stored value loads where feasible.
19.3-2	The Contractor will be responsible for the distribution of fare media from the fare media supplier or other third-party location to all retail merchant locations.
19.3-3	All merchants in the Contractor's network shall accept cash (at a minimum) and credit/debit card as forms of payment for fare media sales and stored value load transactions.
19.3-4	All credit/debit transactions are to be processed utilizing the Contractor's or retail merchant's payment gateway.
19.3-5	All fees for payment processing, including interchange and acquirer fees, will be borne by the Contractor or retail merchants. No fees shall be assessed to the Agency or the customers for the use of cash, bank cards, or checks.
19.3-6	The Contractor will maintain and provide the Agency with a list of all active retail locations, including retail merchant name, address, GIS coordinates, and phone number. This retail locations data file will be provided in a format to be defined by the Agency during design review and shall always be accessible to the Agency.
19.3-7	Fare media sale transactions will involve the collection of card fees. The card fee amount shall be configurable and will be established by the Agency. The retail locations may not charge customers more than the card fee established by the Agency. To change the card fee charged to the public for the sale of a smart card, the Agency shall notify the Contractor at least 90 days in advance of any change and will work with the Contractor to establish implementation policies and procedures.
19.3-8	The Agency's preference is to not allow card sales without a stored value load in the transit account.
19.3-9	The minimum and maximum transaction value for all loads shall be configurable and consistent at all stores. The minimum and maximum transaction value for stored value loads will be established by the Agency. To determine the maximum possible transaction value for a load, the System Integrator backend will be queried. The Agency will notify the Contractor at least 60 days in advance of any change in the minimum or maximum stored value load transaction value.

Req #	Requirement
19.3-10	Stored value load transactions will require the collection of funds for the amount of the load.
19.3-11	Every card sale or stored value reload transaction performed at a merchant location shall generate a customer receipt documenting the details of the transaction. The customer will then be provided the option of receiving a printed, texted, or emailed receipt, dependent upon the capabilities of the retailer's point of sale system.
19.3-12	<p>Fare media sale and add value receipt design and data elements will be defined in conjunction with the Agency during the design process. Receipt data elements are likely to include the following, but are understood to be dependent on the retailer's point of sale system:</p> <ul style="list-style-type: none"> <li>• Date and time</li> <li>• Merchant name</li> <li>• Merchant location (city and state)</li> <li>• Merchant ID</li> <li>• Form of payment</li> <li>• Truncated credit card # (if applicable)</li> <li>• Payment card brand (e.g., VISA, if applicable)</li> <li>• Authorization number (if applicable)</li> <li>• Value added</li> <li>• Transit account beginning balance</li> <li>• Transit account ending balance</li> <li>• Account type (Adult, other)</li> <li>• Truncated card serial number of all fare media purchased</li> </ul>
19.3-13	<p>A significant portion of the merchant locations in the Contractor's network are expected to have POS systems that are fully integrated with the Contractor's system supporting the sale of cards and loading of stored value. This integrated architecture will provide for consolidated reporting, increased retailer and customer convenience, and streamlined transactions that do not require specialized sales devices.</p> <ul style="list-style-type: none"> <li>• Retail network merchants utilizing a POS system that is integrated with the Contractor's system will support fare media sales and the loading of stored value.</li> <li>• The integrated system workflow will be similar to that supporting the sale and loading of gift cards and similar products to reduce merchant training needs.</li> <li>• The time and effort required by the merchant to perform a fare media sale and load on the integrated system solution will be similar to a card sale and account load of a traditional gift card.</li> <li>• When a customer chooses to purchase fare media and load stored value in the same transaction, the sales of fare media and stored value will be separate line items on the receipt within the same POS transaction where feasible. If this level of detail is not discernable within the Contractor's back office then this requirement may be relieved.</li> <li>• The Contractor's integrated network of POS terminals will seamlessly capture and submit the card number/transit account identifier via magstripe or barcode on the retail packaging and/or card.</li> </ul>

Req #	Requirement
19.3-14	<p>The Contractor will supply a method for merchants whose POS systems are not fully integrated with the Contractor's system to sell fare media and load stored value. This will allow a larger set of merchants to participate in the fare collection system. The system workflow for these non-integrated retailers will be similar in effort to fare media sale and stored value loads performed at integrated retailers.</p> <ul style="list-style-type: none"> <li>• The Contractor shall supply a web-based portal/interface or standalone sales device (i.e. smartphone or tablet) to support fare media sales at locations where POS integration is not possible. The Contractor will be responsible for maintenance of devices (if supplied) at retailers.</li> <li>• Non-integrated retail network merchants that utilize the web-interface or standalone sales device to interact with the Contractor's system will support fare media sales and the loading of stored value.</li> <li>• The non-integrated system workflow will be streamlined and similar to supporting the sale and loading of gift cards, and similar products to reduce merchant training requirements.</li> <li>• The process required by the merchant will perform a fare media sale and/or stored value sale for both the integrated and non-integrated solutions to have a very similar level of effort.</li> <li>• When a customer chooses to purchase fare media and load stored value in the same transaction, the sales of fare media and stored value will be separate line items within the same POS transaction.</li> <li>• The Contractor's web-based portal/interface or standalone unit will seamlessly capture and submit the card number/transit account identifier via magstripe or barcode on the retail packaging and/or card.</li> </ul>
19.3-15	<p>The Contractor shall prioritize enrollment of legacy Agency retailers to the maximum extent possible in the new network. High priority legacy retailers include Vons, Ralphs, and Northgate. These retailers are critical to support the core OCTA ridership.</p>
19.3-16	<p>The retail vendors included as part of the network shall include but not be limited to:</p> <ul style="list-style-type: none"> <li>• Chain grocery stores and pharmacies</li> <li>• Independent grocery stores and pharmacies</li> <li>• Convenience stores and other retail outlets providing pre-packaged items targeted at walk-in customers</li> <li>• Stores that are open during the Agency's hours of operation</li> <li>• Stores that provide extended service hours up to 24/7 operation, where possible</li> <li>• Retail locations within 1/4 mile of every transit stop to the extent possible</li> </ul>
19.3-17	<p>The Agency reserves the right to direct the Contractor to perform targeted retail vendor recruitment at specific location(s) and/or retail brands.</p>
19.3-18	<p>The Contractor may replace underperforming locations at their discretion, with a 60-day advanced notice to the Agency that must indicate the reason for the replacement (e.g., contractual disputes, non-compliance with operational policies), and identification of the replacement location to maintain coverage commitments in the Retail Network Coverage Plan. Written approval by Agency's Project Manager, or a designated representative, is required prior to making the change.</p>

Req #	Requirement
19.3-19	The Contractor will notify the Agency of any involuntary changes (e.g., sudden closure, malfeasance) in the network of participating retail merchants within (2) business days of becoming aware of such a change.
19.3-20	Agency reserves the right to remove a retailer from the network if the business purpose/nature of commerce of the retailer is not consistent with Agency standards.
19.3-21	As applicable, the Contractor will distribute Agency-approved and created marketing and signage materials to retail network merchants for placement in merchant facilities.
19.3-22	The Agency reserves the right to request the Contractor to visit retail merchants due to customer-related issues. As issues arise, the Contractor will provide the necessary re-training and communication to retail store staff and management within three (3) days of notice of the issue.
19.3-23	The network of retail locations will provide geographic coverage across the Agency's service area. Beginning at FDR (or at project phase agreed to by the Agency), the Contractor shall produce/update a Retail Network Coverage Plan that describes in detail the scope of the Contractor's proposed retail network coverage commitment and how the network will reach customers throughout the Agency's service area. The Retail Network Coverage Plan may include retailers that the Contractor has an existing relationship with, in addition to retail locations that the Contractor expects to add/recruit if selected.
19.3-24	Beginning with Pilot and continuing throughout the term of the contract, as a standing agenda item as part of the monthly progress review meetings, Contractor shall provide a monthly accounting of retailers participating in the Agency's retail network and identify any loss of coverage from Contractor's proposed network coverage commitments as agreed to in the Retail Network Coverage Plan.
19.3-25	<p>With consideration of the Agency's responsibility to comply with Title VI/Environmental Justice (EJ) requirements, the retail network shall be subject to an annual fare equity analysis and overall geographic coverage review. Any deserts/gaps found in the network shall be mutually addressed by the Contractor and the Agency as follows:</p> <ul style="list-style-type: none"> <li>• Provide a list of potential additional retail locations in identified deserts, and document where no viable candidates exist</li> <li>• Investigate potential retail locations</li> <li>• Document good faith efforts to engage these locations in retail network discussions/negotiations</li> <li>• Enlist the assistance of the Agency project manager or his/her designee to participate in discussions/negotiations with potential retail locations as needed</li> <li>• For viable candidates, provide onboarding status and estimated launch date</li> <li>• Continue discussions with the networks/retailers to support card sales to maximize full-service availability in all communities</li> <li>• Strategize with the Agency as to alternative card distribution/sales strategies.</li> </ul>

## 20 Mobile Ticketing Application (Option)

The Contractor will provide a Mobile Ticketing Application (MTA) option that includes a mobile device application to purchase/validate fares along with other customer tools. The mobile ticketing application will be a front end that utilizes the RVS back office and common accounts with other RVS fare media.

### 20.1 RVS Integration

Req #	Requirement
20.1-1	The Mobile Ticketing Application (MTA) will share a common back office with the RVS. All mobile ticketing accounts will utilize the same transit accounts defined in the Back Office section. Where possible all database, reporting, configuration, and user interfaces will be common.
20.1-2	If there are back office components that are unique to mobile ticketing, those will be distinctive and designed not to be confused with non-mobile ticketing components.
20.1-3	Common account and configuration parameters will be consistent between the mobile ticketing application and customer website. Common parameters include but are not limited to: required registration fields, minimum and maximum load amounts, autoloading thresholds, ability to block/suspend accounts, transferring funds between accounts, and other customer tools.
20.1-4	<p>All applicable requirements in the RVS specification will apply to the mobile ticketing, including but not limited to:</p> <ul style="list-style-type: none"> <li>• Design Reviews</li> <li>• Common Design Requirements</li> <li>• System Architecture</li> <li>• Fare Structure</li> <li>• Back Office</li> <li>• Training</li> <li>• Testing</li> <li>• Operations and Maintenance</li> <li>• System Performance</li> </ul> <p>In the cases where the RVS requirements may conflict with mobile ticketing requirements, these mobile ticketing requirements will take precedence.</p>
20.1-5	The RVS will prevent a customer from utilizing two forms of media for the same product, in order to prevent fraud and misuse. e.g., a monthly pass purchased through the mobile ticketing application will not be available for use through that customer's smartcard.

### 20.2 Mobile Compatibility

Req #	Requirement
20.2-1	The MTA will be developed for both Android and iOS mobile platforms and follow all mobile OS platform guidelines and developer best practices.
20.2-2	Operating System (OS) support will include the current and the previous two (2) versions of the Android and iOS operating systems released at any given time.
20.2-3	The mobile application code shall be portable to alternative mobile phone platforms if the Agency decides to support other platforms in the future.

Req #	Requirement
20.2-4	The Agency prefers the mobile application to be developed using native development tools per platform. All developer guidelines will be followed, and the app will be updated as guidelines evolve: <a href="https://developer.apple.com/app-store/review/guidelines/">https://developer.apple.com/app-store/review/guidelines/</a> <a href="https://developer.android.com/guide">https://developer.android.com/guide</a>
20.2-5	As new OS versions and security updates are released, the Contractor will provide app and back office updates that will ensure compatibility and up-to-date security. For each new release, the Contractor shall perform QA/QC and regression testing via each platform's developer program and release fixes to address bugs prior to public release.
20.2-6	If previous versions of the OS are no longer supported, the Contractor shall notify the Agency at least 2 months in advance with specific features that will be impacted.
20.2-7	The MTA will be able to operate within the varying indoor/outdoor environmental and lighting conditions associated with rail vehicles, stations, buses, and bus stops. In geographic areas without cellular service reception, or where service is intermittent, the MTA will be able to purchase and display fares, and validate a fare electronically.
20.2-8	The MTO will be scalable and extensible to support growth based on increasing customer adoption of the system.

## 20.3 Mobile Design

Req #	Requirement
20.3-1	The mobile application will employ a user interface that is based on industry-accepted user interface design standards, and consider ergonomics, human factors, and graphic design best practices to assist in development of the application layout and interaction.
20.3-2	The user display, instructions and selection keys of the mobile application will be easy to read, understand and use. All text will have a high contrast color to its background to ensure easy legibility.
20.3-3	The mobile application will be designed to provide quick and easy customer-initiated transactions that are consistent across mobile platforms.
20.3-4	All selection keys and other hyperlinks in the mobile application will be accessible, responsive, and consistent. The majority of design elements will not differ between platforms (iOS and Android).
20.3-5	Screen layouts will be constructed to minimize the likelihood that a user will activate the incorrect key or more than one key with one touch. Menus and other common interfaces will be consistent between iOS and Android.
20.3-6	The mobile application will follow the common user experience guidelines and adhere to Agency branding requirements. A common set of screens and style guides will be used across all supported OSs.
20.3-7	The App will follow the latest Americans with Disabilities Act (ADA) and accessibility guidelines for each OS.
20.3-8	The mobile application interface will allow customers to easily view all of their fare products, value, and capping status. Order of precedence rules, to be defined during design review, will determine which fare products are used first and under which scenarios.



Req #	Requirement
20.3-9	Customers will be able to select their fare/value and rider type via drop down menus. Multiple quantities of different rider and ticket types will be able to be purchased in one transaction.
20.3-10	All customer facing interfaces will be designed to adhere to the aesthetic standards of the Agency. All designs will be submitted for review and approval.
20.3-11	Mobile ticketing will be designed to operate within the varying indoor/outdoor environmental and lighting conditions associated with rail vehicles, stations, buses, and bus stops.
20.3-12	Mobile ticketing will be scalable and extensible to support growth based on increasing customer adoption of the system.
20.3-13	All graphics and logos will be in accordance with the graphics standards employed by and subject to approval by the Agency.
20.3-14	Mobile ticketing will comply with all ADA standards and will comply with the most recent version of the ADAAG at the time of Final Acceptance.
20.3-15	The mobile application shall be compliant with the WCAG 2.0 standard for usability.
20.3-16	The mobile application will be available in English, Spanish, and up to three (3) other languages to be identified by the Agency during design review.

## 20.4 Mobile Distribution

Req #	Requirement
20.4-1	The Contractor shall be responsible for offering and maintaining the MTA in the appropriate app stores for both the iOS and Android mobile operating systems. The Agency may choose to submit the app under the Agency owned app store accounts.
20.4-2	The Contractor shall be responsible for designing and developing the store content utilizing artwork and branding supplied and approved by the Agency.
20.4-3	The Contractor shall support the maintenance of the mobile ticketing application in the appropriate app stores for both the iOS and Android mobile operating systems.
20.4-4	The Contractor shall be responsible for designing and developing the store content utilizing artwork and branding supplied and approved by the Agency.
20.4-5	The Contractor shall be responsible for making the mobile ticketing application available and maintain updates during the duration of the contract.
20.4-6	For every app release the Contractor shall submit an MTA release plan detailing the specific app updates/fixes, QA/QC testing results, and timeline for release. The release plan must be approved by the Agency prior to App submission.
20.4-7	Prior to public release of the mobile application on the app stores, the Contractor will provide a standalone test version of the mobile application for testing purposes, such as an Android Application Package (APK) and iOS equivalent. A testing app distribution platform (i.e. Firebase) may be utilized to distribute test apps.

## 20.5 Mobile Fare Structure

Req #	Requirement
20.5-1	Mobile ticketing will support all rider types (e.g., full fare, reduced fare) and fare policies specified in the Fare Structure section (e.g., service-based fares, location-based fares, etc.).

<b>Req #</b>	<b>Requirement</b>
20.5-2	Mobile ticketing fare products will be distinct from their equivalent smartcard fare products. For example, a day pass purchased through a mobile ticketing account and made available in the customer's MTA will be distinct and separate from a day pass purchased by that same customer and loaded onto their smartcard.
20.5-3	Mobile ticketing will permit the addition, deletion, and modification of fare products and their parameters (e.g., validity periods, business rules, activation conditions) by authorized Agency personnel through the fare configuration management tool (see Fare Management section).
20.5-4	Fare products that have been added, removed, or modified by the Agency will be available on the mobile ticketing application within 72 hours of publication.
20.5-5	The default fare set will be associated with transit accounts that have a Full Fare rider classification. Additional rider classifications, such as reduced fare, will be able to be defined and associated with unique fare products.
20.5-6	Rider classifications will be able to be modified manually, or automatically based on customer date of birth or the granting of a temporary classification with a configurable end date.
20.5-7	The MTA will support the offering of discounted fares on a temporary or permanent basis, up to and including the offering of free fares. Discounted fare pricing will be able to be configured for specific fare media types, rider classifications, modes, service types, and routes, and put into effect indefinitely or for a defined period.
20.5-8	Mobile ticketing will provide the Agency the capability to add new modes or participants (e.g., parking and bike share) with unique fare pricing as needed.
20.5-9	Mobile ticketing will support stored value (electronic cash) and fare capping, which will limit charging of stored value above a predetermined configurable limit. The implementation of stored value/capping will be consistent with all other RVS sales channels.
20.5-10	Mobile ticketing shall support the ability to apply upcharges using stored value when a pass product is not sufficient for the service being used. For example, when a monthly pass is validated on an express bus route, an upcharge for the difference will be deducted from stored value.

## **20.6 Mobile Accounts**

<b>Req #</b>	<b>Requirement</b>
20.6-1	All MTA customers will be required to register an account before purchasing fares. The account will be common with other RVS smartcard accounts, so existing accounts can be accessed from the MTA.

Req #	Requirement
20.6-2	<p>Customer information requested during account registration may include:</p> <ul style="list-style-type: none"> <li>• E-mail address (required)</li> <li>• Password (required)</li> <li>• Name</li> <li>• Address</li> <li>• Phone number</li> <li>• Security questions and answers</li> <li>• Account PIN</li> </ul> <p>All requested account fields will be consistent with the customer website. The account registration fields will be finalized during design review.</p>
20.6-3	An active account can only be active on one mobile device at a time. If the user of an active account attempts to sign in on a new mobile device, the application will prompt the user that the account is already active on another device, and the customer must transfer their account to the new device via the application.
20.6-4	Customers will be able to transfer their account from one mobile device to another in case of a lost or new device. All purchased fare products and transaction history will transfer to the new device, and the account will be disabled from the old device. There will be a configurable number of times an account can be transferred within a period to prevent fraud (e.g. 5 times a year or 2 times a month).
20.6-5	Agency staff will have the ability to verify, remove, transfer, and create accounts through common RVS back office tools.

## **20.6.1 Reduced Fares**

Req #	Requirement
20.6.1-1	Reduced fare purchases will be possible and require an initial registration of the user account to validate eligibility before reduced fare purchases are allowed. For example, a senior customer will have to input their valid reduced fare ID number in order to validate that their account is eligible to purchase reduced fares in the mobile application. The existing approval/application process including eligibility verification is managed by OCTA.
20.6.1-2	Once the customer inputs the reduced fare smartcard ID number and their ID is verified, the customer will be provided with the full set of mobile reduced fare products specific to their eligibility for purchase.
20.6.1-3	When a customer is registered for reduced fares through the mobile ticketing application, their ability to load/reload reduced fares on smartcards linked to that account will be disabled. Customers will be notified of this change, and will need to agree (“accept” the mobile notification) for mobile reduced fare products to become available for purchase.
20.6.1-4	The fare collection system will support the ability for customers to switch between reduced fares on mobile and smartcard. The system will prevent one (1) customer from having two (2) active forms of reduced fare media at any time. Rules for switching between media shall be defined during design review.
20.6.1-5	A reduced fare ID number may be linked to only one (1) mobile account. Once a valid ID number is used, it may not be used to activate another reduced fare transit account.

<b>Req #</b>	<b>Requirement</b>
20.6.1-6	The Contractor may import or ingest valid reduced fare ID numbers on a regular basis but no less than daily. The mobile ticketing back office will store these eligible IDs and assign them to active accounts as they are registered.
20.6.1-7	Eligible reduced fare IDs may be checked against other customer information to prevent fraud. For example, a senior ID may be associated with a customer phone number. If a customer's mobile phone has a number that is different than the mobile number associated with their reduced fare ID, the mobile application may choose to prevent the registration of that account as reduced fare. Verification of such customer information will be determined during design review.
20.6.1-8	Depending on the reduced fare ID number, the mobile application will enable the purchase of corresponding reduced fare products. For example, if a valid college ID number is used to register for reduced fares through mobile ticketing, the customer will have the capability to purchase college products.
20.6.1-9	The reduced fare registration process can occur during initial account creation, or after the account has already been created.
20.6.1-10	Once the account is registered as a reduced fare account, it will maintain that status until an expiration date or other configurable parameter is met.
20.6.1-11	Agency staff will have the ability to verify, remove, transfer, and create reduced fare ID accounts through the back office. Bulk creation of reduced fare accounts will be possible by uploading a spreadsheet or files with reduced fare registration information.

## **20.6.2 Institutional Programs**

<b>Req #</b>	<b>Requirement</b>
20.6.2-1	The MTA will support special fare programs, or institutional programs, with unique fare distribution channels, fare products, and business rules.
20.6.2-2	The MTA will support the current range of special fare programs described in section 9 (see Special Fare Programs).
20.6.2-3	The special fare program configuration parameters will be set by the Agency during registration of an institutional customer and will be stored in the institutional customer account. Special fare programs and their associated fare media, fare products, and business rules will be defined during design review.
20.6.2-4	Special fare programs will include post-bill programs where the institution is invoiced based on the participants' actual usage of the system. For these programs, the participants' accounts will be loaded with an unlimited-ride pass, and the system will calculate the amount due on a monthly basis using ridership data and pricing agreements.
20.6.2-5	Special fare programs will include fare sales using pre-tax transit benefits funds. Products loaded through transit benefit programs will be identified as such and segregated within the transit account to ensure compliance with all applicable IRS regulations.
20.6.2-6	The MTA shall support the migration of data from any existing databases used for the administration of special fare programs, including data on qualified schools, employers, government agencies, and social service agencies.

## 20.7 Mobile Purchasing

Req #	Requirement
20.7-1	<p>The MTA will accept the following forms of payment:</p> <ul style="list-style-type: none"> <li>• Credit Cards (Visa/MasterCard/American Express/Discover)</li> <li>• Debit cards (including prepaid gift cards)</li> <li>• Mobile Wallets (PayPal, Android/Apple/Samsung Pay)</li> </ul> <p>The final list of mobile payment types will be determined during design review.</p>
20.7-2	The Contractor will be responsible for the development, testing and certification to any required gateway/acquirer/processor.
20.7-3	Customers will automatically receive their receipt after purchase via email and/or SMS.
20.7-4	Once a successful payment is made, the purchased value/product will become available in the customer's mobile wallet. Activation of the product shall be configurable such that the Agency may choose to enable activation upon purchase, or allow the product to stay inactive until the customer validates the product (see Mobile Validation section).
20.7-5	Customers will also be able to store multiple fare products in their product wallet, and will be able to navigate quickly and easily between them. The products can be used individually or in groups. For example, after purchasing three (3) tickets, a customer can validate one (1) ticket immediately and the remaining two (2) tickets on a different day.
20.7-6	The mobile ticketing application will be architected and designed to allow customers to choose and purchase a fare product in 15 seconds or less (initial purchase/account set-up may take longer) under normal cellular data connectivity conditions.
20.7-7	The MTA will use tokenization for all cardholder data. This will include strong SSL for web interfaces and Internet Protocol Security (IPsec), Secure Shell (SSH) network protocol, Pretty Good Privacy (PGP) encryption for Financial Institution interfaces.

## 20.8 Mobile Validation

Req #	Requirement
20.8-1	Mobile fare products initially purchased will not be immediately valid for riding. Customers will have to scan the MTA 2D barcode at the bus or rail validator to make it valid. Upon activation, the relevant pass information, rider type, fraud prevention animation, and expiration information will be displayed.
20.8-2	The validation screen will include a 2D barcode, an animation (or other fraud prevention technique), and standard proof of payment information including but not limited to account ID, activation date/time, expiration date/time, rider class, and other relevant fraud prevention information.
20.8-3	For subsequent rides on an activated pass product (e.g. weekly pass, monthly pass, etc.), customers must open the active pass product prior to boarding and display the 2D barcode for validation.

Req #	Requirement
20.8-4	<p>For validation a 2D barcode will be dynamically generated and will have the ability to automatically “refresh” periodically to prevent duplication or fraud. Information in the barcode will be enough to verify electronically that the ticket is valid for travel. Possible data elements to embed in the barcode include but are not limited to:</p> <ul style="list-style-type: none"> <li>• Account ID</li> <li>• Account status</li> <li>• Product type</li> <li>• Rider class</li> <li>• Activation time/date</li> <li>• Expiration time/date</li> <li>• Geolocation (latitude/longitude)</li> </ul>
20.8-5	The MTA may utilize a persistent validation barcode that is associated with the account, not a specific product or pass. If this approach is adopted, then the MTA will have a “Use” or “Validate” screen that will have all relevant fraud prevention in this section.
20.8-6	If the customer has more than one (1) active ticket at a time, one (1) scan can access information for all of the active tickets if necessary.
20.8-7	When validating, the mobile application will set the screen brightness at 100%, after which the device screen will revert to its original brightness setting.
20.8-8	Validators will be able to validate fare products presented via mobile ticketing with no interaction from operators. It will not require that Agency personnel touch customer devices.
20.8-9	The response time from reading of the mobile ticket barcode by the validator to display of the result will not exceed 750 milliseconds.
20.8-10	For the first three (3) minutes (or configurable period) after validation, unique features will be visible on the ticket that indicate it was only recently validated, in order to deter customers from waiting for the presence of inspection staff to purchase and/or validate. The state of the ticket will always be apparent on the ticket.
20.8-11	The fare collection system shall have a means to detect when a fare product is activated and be able to filter out multiple uses (e.g., the same pass is opened multiple times at the same geographic location and within a short, configurable time frame).
20.8-12	Unused fare products will automatically expire after a certain number of programmable days. The Agency will have the ability to adjust the expiration date. Customers will receive a notification on their device and/or email a configurable number of days before the expiration of their unused fare product(s).
20.8-13	Once a product expires, whether used or unused, the product will automatically be removed from the customer’s product wallet.
20.8-14	Mobile ticketing will support offline ticket validation. In geographic areas without cellular service reception, or where service is intermittent, the application will be able to display and validate fares.
20.8-15	The mobile ticketing application shall support other forms of validation technology, including ISO 18092 (NFC) and Bluetooth Low Energy (BLE). The Contractor shall demonstrate NFC and Bluetooth validation capabilities and describe potential benefits and limitations prior to implementation.

<b>Req #</b>	<b>Requirement</b>
20.8-16	The electronic validation technology will be transparent to the customer, and will not require selection or additional complexity in the user interface.

## **20.9 Fraud Prevention and Security**

<b>Req #</b>	<b>Requirement</b>
20.9-1	The mobile ticketing application will display unique animation(s) designed for the Agency with interactive features to minimize the risk of fraudulent tickets through screenshots or other means.
20.9-2	At minimum, the mobile ticketing application will support dynamic generation of 2D barcodes and real-time validation of fares to prevent duplication or sharing of tickets.
20.9-3	The mobile ticketing application will support configurable rules to prevent the sharing of fares and accidental payments through passback, or a configurable time period in which a transit account will not be accepted for payment at a device after an initial tap. Passback protection will be able to be configured by fare product and rider classification, and will be configurable in the back office.
20.9-4	All fraud prevention tools will comply with Agency security standards in addition to PCI and ADA compliance regulations.
20.9-5	In order to prevent misuse, an active user account can only be active on one mobile device at a time. If the user of an active account attempts to sign in on a new phone, the mobile ticketing application will prompt them that the account is already active on another phone, and the customer must transfer their account to the new phone via the customer website.
20.9-6	Mobile ticketing will employ ongoing fraud detection and monitoring through real-time analysis of mobile ticketing activity. These techniques will help protect the data system from unknown cyber-attacks or computer viruses.
20.9-7	All 2D barcode images or other validation techniques (NFC, Bluetooth, etc.) will be secured via encryption or another method to ensure the integrity of issued tickets, and the system will utilize various features to minimize the risk of fraudulent tickets.
20.9-8	Mobile ticketing will contain a variety of security features to allow applicable personnel to identify easily any visually invalid, expired or fraudulent mobile tickets. The Contractor shall provide potential alternatives to help mitigate the risk of customers making on-board purchases or waiting to activate tickets upon the presence of inspection staff.
20.9-9	Mobile ticketing will follow all applicable security, PCI, and privacy measures (see System Architecture section).
20.9-10	Measures will be taken to ensure that any data stored on external devices, including users' mobile devices, will not compromise any components of the mobile ticketing application.
20.9-11	Data security for the mobile ticketing application will ensure that all data is safeguarded from unauthorized access or use and programs are protected from any known cyber-attack or computer virus.
20.9-12	The mobile ticketing application will be able to detect and report any attempts to gain access to the system, whether authorized or unauthorized.
20.9-13	Username, passwords, and any other security credentials will never be transmitted or stored as unencrypted text.

<b>Req #</b>	<b>Requirement</b>
20.9-14	All personal and financial data as well as the transmission of said data, will be safeguarded from unauthorized access or use through the employment of strong encryption such as Advance Encryption Standard (AES).
20.9-15	Passwords shall be stored using a high-level encryption (e.g., AES), and shall be both salted and hashed as per the U.S. Department of Defense regulations.
20.9-16	The underlying technology of the MTA will be kept up to date and all security issues will be addressed as they arise. As part of the ongoing MTO support, Operating System (OS) updates, software patches, bug notifications, and refinements to address identified security issues will be provided.

## **20.10 Trip Planning**

<b>Req #</b>	<b>Requirement</b>
20.10-1	<p>The mobile ticketing application will include trip planning functionality that may be provided via:</p> <ul style="list-style-type: none"> <li>• An embedded mobile-optimized trip planning website that seamlessly appears within application frame.</li> <li>• A native trip planning functionality that incorporates fare purchases seamlessly with trip planning.</li> </ul> <p>The final trip planning solution will be determined during design review.</p>
20.10-2	The trip planning functionality will either be accessed from a common menu bar, or in an intuitive matter that improves the customer experience. The interface will be as seamless as possible to provide a consistent mobile ticketing experience.
20.10-3	The trip planner shall utilize the Agency's GTFS, GTFS-R, or equivalent feed for a consistent experience across trip planning tools (i.e. Google Maps).
20.10-4	The trip planner may include origin/destination route options with corresponding fare purchase options.
20.10-5	The trip planner will allow bookmarks or favorites for commonly used routes or stops such that those routes are preferred or easily identified.
20.10-6	If customers type in station or route names, the mobile ticketing application will use predictive text for suggestions.
20.10-7	The trip planning solution will have the option to use the device's GPS for current location. The trip planner will include features to provide a rich customer experience, including information about the fare required for that trip.



## **20.11 Rider Tools**

<b>Req #</b>	<b>Requirement</b>
20.11-1	<p>The mobile ticketing application will allow customers to manage their accounts, and will support the following functions, at a minimum:</p> <ul style="list-style-type: none"> <li>• Create a new account</li> <li>• View and manage account profile</li> <li>• Add/remove a funding source</li> <li>• View account balance and status</li> <li>• View sales, usage, and transaction history</li> <li>• Delete/Close account (that conforms with iOS and Android requirements)</li> </ul> <p>These functions will be consistent with website tools, and be finalized during design review.</p>
20.11-2	<p>Other tools in the mobile ticketing application will include but are not limited to:</p> <ul style="list-style-type: none"> <li>• Frequently Asked Questions (FAQs)</li> <li>• System maps and timetables</li> <li>• Customer service and support contact information</li> <li>• Service disruption and security alerts</li> <li>• Ability to sign up for custom alerts (agency, line, etc.)</li> <li>• Agency terms and conditions</li> </ul> <p>A final list of rider tools will be determined during design review.</p>
20.11-3	<p>Customers will be able to view Agency contact information including customer service, law enforcement, application feedback, etc.</p>
20.11-4	<p>The ability to include couponing, event branding, and advertisements in the application will be possible. The Contractor shall address how they could manage these possible features.</p>
20.11-5	<p>Customers will be able to provide feedback on the application and provide suggestions for future improvements.</p>

## **20.12 Quality Assurance**

<b>Req #</b>	<b>Requirement</b>
20.12-1	<p>The third party hosting provider (see System Hosting section) will provide all necessary hardware, software, database maintenance, security, technical support, and support services such that the MTA system is available at all times (24/7/365).</p>
20.12-2	<p>Per the Performance Measurement section, the MTA will be available to support all functionality requirements no less than 99.9% of the time, excluding scheduled maintenance, as measured monthly.</p>
20.12-3	<p>The Contractor will track all MTA issues and bugs reported by the Agency or users. Each issue will be assigned a severity level based on the nature of the bug and how many customers are impacted.</p>
20.12-4	<p>Per the Performance Measurement section, the Contractor shall submit a root cause analysis and corrective action plan for all high priority issues within 48 hours. High priority issues will be resolved within 14 calendar days of initial reporting. Lower priorities issues will be resolved quarterly at minimum. The Failure Review Board will determine the prioritization of issues.</p>

<b>Req #</b>	<b>Requirement</b>
20.12-5	If a new app release is required to resolve an issue, the Contractor will submit a QA/QC plan that includes the corrective actions and regression testing results. These results will ensure that app fixes will not introduce new issues or unexpected customer impacts.
20.12-6	The Contractor will release maintenance builds on a regular basis that include security, performance, and feature updates common to the mobile platform. Maintenance builds will be released at least quarterly but may occur more frequently.
20.12-7	For each app release, the Contractor will provide a release plan that include what changes are included in the release, any store descriptions or updated graphics, QA/QC testing results, and a release schedule. The release plan will be presented to the Agency for approval prior to any public publishing.
20.12-8	As new mobile OS versions and security updates are released, the Contractor will provide app and back office updates to ensure compatibility. For each new release, the Contractor shall perform QA/QC and regression testing via each platform's developer program and release fixes to address bugs prior to public release. If previous versions of the OS are no longer supported, the Contractor shall notify the Agency at least 2 months in advance with specific features that will be impacted.

## **20.13 Cash Payments**

<b>Req #</b>	<b>Requirement</b>
20.12-1	Mobile ticketing will optionally provide the ability to pay fares with cash via a network of retailers with existing POS devices. The cash payment option will exist alongside credit/debit payments.
20.12-2	The mobile ticketing application will launch an interactive map of retail locations where customers can pay with cash.
20.12-3	After cash payment, the retailer POS will immediately communicate with the back office to add the fare product to the account.
20.12-4	The Contractor may partner with a retail network provider or payment processor that currently offers cash payment options on mobile platforms.
20.12-5	All fees associated with cash payments will be negotiated by and transparent to the Agency.

## Appendix A Current Fare Policy Summary

The following summary of the existing OCTA fare policy is for reference only. The fare structure to be supported by the RVS is detailed in Section 9.

### Cash Fares

Fare Category	Local Fixed Route
Regular	\$2.00
Senior	\$0.75
Disabled	\$0.75

### Magnetics

Fare Type	Day Pass	30-Day Pass	Senior Day Pass	Senior 30-Day Pass
Price	\$4.50 (\$5 onboard)	\$69.00	\$1.35 (\$1.50 onboard)	\$22.25
Fixed Route	Yes	Yes	Yes	Yes
ADA ACCESS	No	No	No	No

### OC Bus Mobile App

Fare Type	Single Ride	Day Pass	30-Day Pass
Price	\$2.00	\$4.50	\$69.00
Fixed Route	Yes	Yes	Yes
ADA ACCESS	No	No	No

## **Appendix B Current Retail Network Vendors**

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Appendix B includes the current list of retail pass sales locations from the website below. This list is for reference only. Retail Network requirements are contained in Section 19.

<https://www.octa.net/pdf/passloc.pdf>





# PASS SALES LOCATIONS

**Did you know you can order your pass directly from**  
**OCTA?** Online Orders: [Octa.net/BuyMyPass](http://Octa.net/BuyMyPass)  
 Phone orders: (714) 560-5932 (Monday-Friday 8:00am-2:00pm)  
 Mail Orders: OCTA, Pass Sales, P.O. Box 14184, Orange, CA 92863-9831

**Passes may be sold on a cash only basis at the following locations. Not all pass types are sold at every location. Please call the retailer to check the availability of the pass you want to purchase.**

CITY	Address and Cross Streets	Phone #
<b>ALISO VIEJO</b>		
Ralphs Grocery Store	26901 Aliso Creek Road/Pacific Park Drive	949-362-3727
<b>Anaheim</b>		
Anaheim Cash Company	148 W Lincoln Avenue/Anaheim Blvd	714-635-6200
Big Bob's Liquor	1336 S. Magnolia Avenue/Ball Road	714-828-6172
Cash Plus	2223 W. Ball Road/Brookhurst Street	714-563-2274
Five Points Liquor Store	3079 W. Lincoln Avenue/Grand Avenue	714-826-4750
Guadalajara Meat Market	2950 W. Ball Road/Gaymont Street	714-826-1021
Northgate Markets	522 E. Vermont Avenue/Melrose Street	714-491-4653
Northgate Markets	722 N. Anaheim Blvd/E Wilhelmina Street	714-774-1178
Northgate Markets	929 S. Euclid Avenue/Ball Road	714-991-1950
Northgate Markets	1150 N. East Street/Romneya Drive	714-956-7890
Northgate Markets	720 W. La Palma Avenue/Harbor Blvd	714-991-1950
Orange Liquor Market	511 W. Chapman Avenue/Harbor Blvd	714-750-1485
Parcel Mail Center	211 S. State College Blvd/E Lincoln Avenue	714-491-2628
Ralphs Grocery Store	915 S. Brookhurst Street/Ball Road	714-635-3670
Stanton Liquor Market	9001 Katella Avenue/Magnolia Avenue	714-761-9693







Veeco Food Store	1500 S. Euclid Street/Cerritos Avenue	714-535-3622
Vons Grocery Store	5600 Santa Ana Canyon Road/Imperial Hwy	714-998-3751
Vons Grocery Store	130 W. Lincoln Avenue/Anaheim Blvd	714-535-2288
Water to Drink & Cashing Exp.	1125 S. Anaheim Blvd/Ball Road	714-563-0476
<b>Anaheim Hills</b>		
Ralphs Grocery Store	711 S. Weir Canyon Road/Serrano Avenue	714-283-8711
Pavilions Grocery Store	8010 E. Santa Ana Canyon Rd/Weir Canyon	714-282-7064
<b>Brea</b>		
Ralphs Grocery Store	305 W. Imperial Hwy/Brea Blvd	714-529-4505
Vons Grocery Store	780 N Brea Blvd/Central Avenue	714-529-4941
<b>Buena Park</b>		
Buena Park Mall Customer Service	8308 On the Mall/Stanton Avenue	714-828-7722
Northgate Markets	6991 Lincoln Avenue/Knott Avenue	714-252-8022
Sunshine Check Cashing	7301 Orangethorpe Avenue/Oran Circle	714-522-3670
<b>Cerritos</b>		
Ralphs Grocery Store	13321 E. South Street/Carmenita Road	562-860-5635
<b>Costa Mesa</b>		
Albertson's Grocery Store	2300-C Harbor Blvd/Wilson Street	949-515-7227
Cash Plus	600 W. 19 <sup>th</sup> Street/Anaheim Avenue	949-645-3278
JEM Check Cashing	745 W. 19 <sup>th</sup> St. Ste. D/Pomona Ave.	949-722-7305
Mesa Village Gift Shop	1215 Baker Street #1/Fairview Road	714-429-0197
Ralphs Grocery Store	380 E. 17 <sup>th</sup> Street/Tustin Avenue	949-645-8283
Vons Grocery Store	2701-B Harbor Blvd/Adams Avenue	714-751-4270
Vons Grocery Store	185 E. 17 <sup>th</sup> Street/Newport Blvd	949-515-3444
<b>Cypress</b>		
Ralphs Grocery Store	4033 Ball Road/Bloomfield Street	714-827-7947



<b>Dana Point</b>		
Albertson's Grocery Store	33601 Del Obispo Street/Stone Hill Drive	949-496-7900
Ralphs Grocery Store	24871 Del Prado/Golden Lantern	949-661-4145
Ralphs Grocery Store	32555 Golden Lantern/Camino del Avion	949-661-6334
<b>Foothill Ranch</b>		
Ralphs Grocery Store	26751 Portola Pkwy/Bake Pkwy	949-457-9349
<b>Fountain Valley</b>		
Ralphs Grocery Store	18405 Brookhurst Street/Ellis Avenue	714-964-7566
<b>Fullerton</b>		
Cash Plus	1317 S. Harbor Blvd/Orangethorpe Avenue	714-526-2274
Continental Currency	1312 S. Harbor Blvd/Orangethorpe Avenue	714-871-5222
Cool Cash Loans	139 N. Raymond Ave./E. Commonwealth Ave.	714-871-9114
Ralphs Grocery Store	1121 N. Harbor Blvd/Valley View Drive	714-992-2591
<b>Garden Grove</b>		
DSK Pharmacy Inc	9580 Garden Grove Blvd #108/Abbott Ct	714-537-6619
Hanshaw Liquor	10971 Westminster Avenue/Euclid Street	714-537-8178
Ralphs Grocery Store	12051 Euclid Avenue/Chapman Avenue	714-636-6523
Vons Grocery Store	11861 Valley View Street/Chapman Avenue	714-889-9955
Vons Grocery Store	12961 W. Chapman Avenue/Haster Street	714-750-3663
<b>Hawaiian Gardens</b>		
EZ Money Express Inc	12173 Carson Street/Norwalk Blvd	562-467-7488
<b>Huntington Beach</b>		
Ralphs Grocery Store	19081 Goldenwest Street/Garfield Avenue	714-960-8756
Stater Bros Market	7101 Warner Avenue/Goldenwest Street	714-841-3612
Vons Grocery Store	5922 Edinger Avenue/Springdale Street	714-846-6356
Vons Grocery Store	8891 Atlanta Avenue/Magnolia Street	714-960-4747



<b>Irvine</b>		
Albertson's Grocery Store	4541 Campus Drive/California Avenue	949-854-8282
Ralphs Grocery Store	14400 Culver Drive/Walnut Avenue	949-552-3065
Ralphs Grocery Store	5345 Alton Pkwy/Jeffrey Road	949-552-0597
Ralphs Grocery Store	6300 Irvine Blvd/Sand Canyon Avenue	949-559-1139
<b>La Habra</b>		
Vons Grocery Store	2101 W. Imperial Hwy/Beach Blvd	562-905-2800
<b>Laguna Beach</b>		
Ralphs Grocery Store	700 S. Coast Highway/Cleo Street	949-497-6410
Pavilions Grocery Store	600 N. Pacific Coast Hwy/Boat Canyon Drive	949-494-3020
<b>Laguna Hills</b>		
Ralphs Grocery Store	25539 Paseo De Valencia/La Paz Road	949-951-0966
<b>Laguna Niguel</b>		
Ralphs Grocery Store	28231 Crown Valley Pkwy/Greenfield Drive	949-831-0767
Vons Grocery Store	27320 Alicia Pkwy/Market Place Drive	949-448-9244
<b>Lake Forest</b>		
Ralphs Grocery Store	21751 Lake Forest Drive/Trabuco Road	949-855-1242
Ralphs Grocery Store	23716 El Toro Road/Rockfield Blvd	949-380-0179
<b>Los Alamitos</b>		
Vons Grocery Store	11322 Los Alamitos Blvd/Harrisburg Road	562-493-3567
<b>Mission Viejo</b>		
Pavilions Grocery Store	26022 Marguerite Pkwy/Oso Pkwy	949-582-0672
Ralphs Grocery Store	25104 Marguerite Pkwy/La Paz Road	949-830-3066
Ralphs Grocery Store	27730 Santa Margarita Pkwy/Marguerite	949-837-0380
<b>Newport Beach</b>		
Ralphs Grocery Store	1150 Irvine Avenue/17 <sup>th</sup> Street	949-646-1411

Ralphs Grocery Store	2555 Eastbluff/Vista Del Sol	949-644-6751
Pavilions Grocery Store	21181 Newport Coast Drive/Ridge Park Rd	949-718-4990
Pavilions Grocery Store	2660 San Miguel Drive/Ford Road	949-759-3880
Vons Grocery Store	1000 Bayside Drive/Jamboree Road	949-760-0975
Pavilions Grocery Store	3100 W. Balboa Blvd/32 <sup>nd</sup> Street	949-675-2395
<b>Orange</b>		
Cool Cash Loans	3403 E. Chapman Ave./N. Prospect St.	714-288-9551
Ralphs Grocery Store	1435 W. Chapman Avenue/Main Street	714-634-2905
St. Joseph Hospital/Gift Shop	1100 W. Stewart Drive/Main Street	714-771-8058
Vons Grocery Store	2684 N. Tustin Street/Lincoln Avenue	714-637-6651
<b>Placentia</b>		
Northgate Markets	710 W. Chapman Avenue/Parker Street	714-528-1171
Ralphs Grocery Store	710 N. Rose Drive/Alta Vista Street	714-524-3984
<b>Rancho Santa Margarita</b>		
Ralphs Grocery Store	31481 S. Margarita Pkwy/Antonio Pkwy	949-589-0156
Pavilions Grocery Store	22451 Antonio Pkwy/La Promesa	949-858-0164
<b>San Clemente</b>		
Ralphs Grocery Store	638 Camino de Los Mares/Camino de Estrella	949-496-8616
Ralphs Grocery Store	903 S. El Camino Real/I-5	949-361-8729
Ralphs Grocery Store	811 Avenida Talega/Calle Campanero	949-492-1648
<b>San Juan Capistrano</b>		
Ralphs Grocery Store	31874 Del Obispo St./Ortega Hwy	949-661-6101
Vons Grocery Store	32401 Camino Capistrano/Del Obispo Street	949-661-7594
<b>Santa Ana</b>		
California Money Express Inc.	901 South Bristol Street #B/ W Brook Street	714 550 0333
Cash Plus	1900 N. Grand Avenue/21 <sup>st</sup> Street	714-972-2274







Continental Currency	2222 S. Bristol Street/Warner Avenue	714-540-5001
Continental Currency	231 E. 17 <sup>th</sup> Street/Spurgeon Street	714-565-0758
El Farol Market	1840 S. Standard Avenue/Occidental Street	714-648-0534
El Toro Market	1412 W. 1 <sup>st</sup> Street/Bristol Street	714-836-1393
Jimenez Market	1303 N. Main Street/Washington Avenue	714-541-6270
Northgate Markets	1623 W. 17 <sup>th</sup> Street/Bristol Street	714-479-0125
Northgate Markets	409 E. 4 <sup>th</sup> Street/N. Main Street	714-647-9310
Northgate Markets	1120 S. Bristol Avenue/McFadden Avenue	714-957-2529
Northgate Markets	1010 S. Main Street/Cubbon Street	714-542-3322
Northgate Markets	770 S. Harbor Blvd/McFadden Avenue	714-775-5555
R-Ranch Market	2521 W McFadden Avenue/Sullivan Street	714 541-4356
Vons Grocery Store	3650 S. Bristol Street/MacArthur Blvd	714-540-0510
<b>Seal Beach</b>		
Ralphs Grocery Store	12470 Seal Beach Blvd/Lampson Avenue	562-598-3128
Pavilions Grocery Store	1101 Pacific Coast Hwy/10 <sup>th</sup> Street	562-370-1937
<b>Stanton</b>		
Stanton Liquor and Mart #1	8501 Cerritos Ave./Dale	714-821-7932
<b>Tustin</b>		
Cool Cash Loans	13662 Newport Ave./E. Main St.	714-730-6220
Ralphs Grocery Store	13321 Jamboree Road/Irvine Blvd	714-544-0491
<b>Villa Park</b>		
Ralphs Grocery Store	17801 Santiago Blvd/Wanda Road	714-988-0004
<b>Westminster</b>		
Continental Currency	15456 Beach Blvd/McFadden Avenue	714-893-7710
Digital Minilab - 1 hr Photo	9353 Bolsa Avenue / Bushard Street	714-891-1668
Pavilions Grocery Store	16450 Beach Blvd/Heil Avenue	714-842-8515
<b>Yorba Linda</b>		
Vons Grocery Store	20445 Yorba Linda Blvd/Village Center Drive	714-777-0781





**EXHIBIT B: COST AND PRICE FORMS**

## PRICE SUMMARY SHEET

### REQUEST FOR PROPOSALS (RFP) 2-2980

Offerors shall complete the Excel File entitled **OCTA RVS PriceSheet.xlsm**. Offerors shall only enter pricing as directed by the Price Summary Sheet instructions below; Offerors shall make no other changes to the Price Summary Sheet form.

Offerors shall only edit shaded cells. “LS” means lump sum and “EA” means each.

For any line item requiring explanation or additional information, enter a number into the “Table 6 Note Number” column for the line item corresponding to the Note Number in Table 6 – Notes tab where the explanation/information shall be provided.

The Price Sheet file is comprised of the following tabs:

#### SUMMARY

Provides a summary of all proposed costs. All cost figures are auto-calculated based on entries in the remaining tabs. Offerors shall not edit this tab.

#### TABLE 1 - CAPITAL

Include all capital costs from issues of Notice to Proceed (NTP) through Final Acceptance for all items listed in the tab.

The equipment and fare media quantities are for scoring purposes only. Final quantities may be adjusted prior to final award, and will follow the As Needed pricing in Table 5.

#### TABLE 2 - O&M

Operations and Maintenance (O&M) costs for the ten (10)-year operations and maintenance period – five (5)-year base term and five (5)-year option term. Separate annual pricing for software maintenance and hosting will be provided.

#### TABLE 3 - RETAIL NETWORK

Provide both commission (as a percentage), and card fees (per card) for each year of the operating term. The monthly values and card sale quantities are estimates only, and subject to change depending on the retail network coverage and demand. Any rows that require further explanation should be noted in Table 6.

#### TABLE 4 - OPTIONS

Provide pricing for the optional components/services described in the scope of work. Each option should be priced as a lump sum.

#### TABLE 5 - AS NEEDED MEDIA

Provide As Needed Fare Media pricing by quantity. Pricing for both packaged (for retail network distribution) and unpackaged Extended Use (EU) cards should be provided, as well and Limited Use (LU) fare media.

**TABLE 6 - NOTES**

For any line items in all tabs that require additional clarification, description, or explanation, annotate the line item with a note number and enter the information on this tab.

**PRICE SUMMARY SHEET****REQUEST FOR PROPOSALS (RFP) 2-2980**

**\*\*\*Offerors are to fill out this form in addition to the Excel file entitled  
OCTA RVS PriceSheet.xlsm.\*\*\***

- 
1. I acknowledge receipt of RFP 2-2980 and Addenda No.(s) \_\_\_\_\_
2. This offer shall remain firm for \_\_\_\_\_ days from the date of proposal  
(Minimum 120)

COMPANY NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

TELEPHONE \_\_\_\_\_

FACSIMILE # \_\_\_\_\_

EMAIL ADDRESS \_\_\_\_\_

SIGNATURE OF PERSON  
AUTHORIZED TO BIND OFFEROR \_\_\_\_\_

NAME AND TITLE OF PERSON  
AUTHORIZED TO BIND OFFEROR \_\_\_\_\_

DATE SIGNED \_\_\_\_\_

**RFP 2-2980 Rider Validation System****PRICE SUMMARY****PROPOSERS: DO NOT ENTER PRICING HERE. ENTER IN THE GREY CELLS IN THE FOLLOWING TABLES.**

Rider Validation System Pricing Proposal	
Section	Amount
<b>TABLE 1 - CAPITAL COSTS</b>	
Section 1.0 Program Management	\$ -
Section 2.0 System Software and Design	\$ -
Section 3.0 Equipment	\$ -
Section 4.0 Testing	\$ -
Section 5.0 Installation	\$ -
Section 6.0 Integrations	\$ -
Section 7.0 Training & Manuals	\$ -
<i>Capital Costs Subtotal</i>	<b>\$ -</b>
<b>TABLE 2 - OPERATIONS &amp; MAINTENANCE COSTS</b>	
Section 7.0 Software Maintenance	\$ -
Section 8.0 Hosting	\$ -
<i>Operations and Maintenance Subtotal</i>	<b>-</b>
<b>TABLE 3 - RETAIL NETWORK COSTS</b>	
Section 9.0 Retail Network Commission	\$ -
Section 10.0 Retail Network Card Fees	\$ -
<i>Retail Network Subtotal</i>	<b>\$ -</b>
<b>TABLE 4 - OPTIONS</b>	
Section 11.0 Mobile Ticketing Option	\$ -
<i>Options Subtotal</i>	<b>\$ -</b>



RFP 2-2980 Rider Validation System

TABLE 1 - CAPITAL COSTS

Offeror Name: \_\_\_\_\_

See Instructions in Exhibit B of the RFP. Proposers shall only edit shaded cells.						
Rider Validation System Pricing Proposal						
Price Sheet Item #	Description	Unit	Estimated Quantity	Unit Price	Amount	Table 6 Note Number
<b>Section 1.0 Program Management</b>						
1.01	Project Management (NTP to Final Acceptance)	LS	1		\$ -	
<b>SUBTOTAL PROGRAM AND CONTRACT MANAGEMENT</b>					\$ -	
<b>Section 2.0 System Software and Design</b>						
2.01	Software Licenses	LS	1		\$ -	
2.02	Account-Based Transaction Processor	LS	1		\$ -	
2.03	Application Programming Interfaces	LS	1		\$ -	
2.04	Payment Processor Interface	LS	1		\$ -	
2.05	Inspection/Validation Device Application	LS	1		\$ -	
2.06	Ticket Office Terminal / Mobile Sales Device Software	LS	1		\$ -	
2.07	Configuration Management Module	LS	1		\$ -	
2.08	Revenue Management System	LS	1		\$ -	
2.09	Media Inventory Management System	LS	1		\$ -	
2.10	Customer Relationship Management System	LS	1		\$ -	
2.11	Data Warehouse	LS	1		\$ -	
2.12	Reporting System	LS	1		\$ -	
2.13	Public Website	LS	1		\$ -	
2.14	Institutional Website	LS	1		\$ -	
2.15	Retail Network Integration	LS	1		\$ -	
2.16	Open Payments Acceptance	LS	1		\$ -	
<b>SUBTOTAL SYSTEM SOFTWARE AND DESIGN</b>					\$ -	
<b>Section 3.0 Equipment</b>						
3.05	Ticket Office Terminals	EA	7		\$ -	
3.06	Mobile Sales Devices	EA	3		\$ -	
3.07	Contactless Fare Media (EU) (1 year) - Unpackaged	EA	400,000		\$ -	
3.08	Contactless Fare Media (EU) (1 year) - Retail Packaged	EA	600,000		\$ -	
3.09	Contactless Fare Media (LU) (1 year) - Unpackaged	EA	200,000		\$ -	
<b>SUBTOTAL EQUIPMENT</b>					\$ -	
<b>Section 4.0 Testing</b>						
4.01	Testing Documentation	LS	1		\$ -	
4.02	Integration Testing	LS	1		\$ -	

RFP 2-2980 Rider Validation System

TABLE 1 - CAPITAL COSTS

Offeror Name: \_\_\_\_\_

See Instructions in Exhibit B of the RFP. Proposers shall only edit shaded cells.						
Rider Validation System Pricing Proposal						
Price Sheet Item #	Description	Unit	Estimated Quantity	Unit Price	Amount	Table 6 Note Number
4.03	Acceptance Testing	LS	1		\$ -	
SUBTOTAL TESTING					\$ -	
Section 5.0 Installation						
5.01	Back Office Configuration and Installation	LS	1		\$ -	
5.02	TOT Installation	EA	7		\$ -	
5.03	Test Facility Configuration and Installation	LS	1		\$ -	
SUBTOTAL INSTALLATION					\$ -	
Section 6.0 Integrations						
6.01	OC Streetcar Ticket Vending Machines (TVM)	LS	1		\$ -	
6.02	Regional Agencies	EA	2		\$ -	
6.03	Loyalty Program	LS	1		\$ -	
SUBTOTAL INSTALLATION					\$ -	
Section 7.0 Training & Manuals						
7.01	Training	LS	1		\$ -	
7.02	Manuals	LS	1		\$ -	
SUBTOTAL TRAINING & MANUALS					\$ -	
CAPITAL COSTS SUBTOTAL					\$ -	

## RFP 2-2980 Rider Validation System

TABLE 2 - OPERATIONS &amp; MAINTENANCE COSTS

Offeror Name: *See Instructions in Exhibit B of the RFP. Proposers shall only edit shaded cells.***Rider Validation System Pricing Proposal**

Price Sheet Item #	Description	Unit	Estimated Quantity	Unit Price	Amount	Table 6 Note Number
<b>Section 7.0 Software Maintenance</b>						
<b>Initial 5 Year Term</b>						
7.01	Annual - Year 2 of Agreement (starting first year after Warranty term)	LS	1		\$ -	
7.02	Annual - Year 3 of Agreement	LS	1		\$ -	
7.03	Annual - Year 4 of Agreement	LS	1		\$ -	
7.04	Annual - Year 5 of Agreement	LS	1		\$ -	
<b>Subtotal - Initial 5 Year Term</b>					\$ -	
<b>Five Year Option</b>						
7.05	Annual - Year 6	LS	1		\$ -	
7.06	Annual - Year 7	LS	1		\$ -	
7.07	Annual - Year 8	LS	1		\$ -	
7.08	Annual - Year 9	LS	1		\$ -	
7.09	Annual - Year 10	LS	1		\$ -	
<b>Subtotal - Five Year Option</b>					\$ -	
<b>SUBTOTAL SOFTWARE MAINTENANCE</b>					\$ -	
<b>Section 8.0 Hosting</b>						
<b>Initial 5 Year Term</b>						
8.01	Annual - Year 1	LS	1		\$ -	
8.02	Annual - Year 2	LS	1		\$ -	
8.03	Annual - Year 3	LS	1		\$ -	
8.04	Annual - Year 4	LS	1		\$ -	
8.05	Annual - Year 5	LS	1		\$ -	
<b>Subtotal - Initial 5 Year Term</b>					\$ -	
<b>Five Year Option</b>						
8.06	Annual - Year 6	LS	1		\$ -	
8.07	Annual - Year 7	LS	1		\$ -	
8.08	Annual - Year 8	LS	1		\$ -	
8.09	Annual - Year 9	LS	1		\$ -	
8.10	Annual - Year 10	LS	1		\$ -	
<b>Subtotal - Five Year Option</b>					\$ -	
<b>SUBTOTAL HOSTING</b>					\$ -	
<b>OPERATIONS &amp; MAINTENANCE SUBTOTAL</b>					\$ -	

## RFP 2-2980 Rider Validation System

TABLE 3 - RETAIL NETWORK COSTS

Offeror Name: *See Instructions in Exhibit B of the RFP. Proposers shall only edit shaded cells.***Rider Validation System Pricing Proposal**

Price Sheet Item #	Description	Unit	Monthly Value (est)	Commission (%)	Amount	Table 6 Note Number
<b>Section 9.0 Retail Network Commission</b>						
<b>Initial 5 Year Term</b>						
9.01	Commission - Year 1	12	200,000		\$ -	
9.02	Commission - Year 2	12	220,000		\$ -	
9.03	Commission - Year 3	12	235,400		\$ -	
9.04	Commission - Year 4	12	242,462		\$ -	
9.05	Commission - Year 5	12	249,736		\$ -	
<b>Subtotal - Initial 5 Year Term</b>					\$ -	
<b>Five Year Option</b>						
9.06	Annual - Year 1 (Year 6)	12	257,228		\$ -	
9.07	Annual - Year 2 (Year 7)	12	264,945		\$ -	
9.08	Annual - Year 3 (Year 8)	12	272,893		\$ -	
9.09	Annual - Year 4 (Year 9)	12	281,080		\$ -	
9.10	Annual - Year 5 (Year 10)	12	289,512		\$ -	
<b>Subtotal - Five Year Option</b>					\$ -	
<b>SUBTOTAL RETAIL COMMISSION</b>					\$ -	
<b>Section 10.0 Retail Network Card Fees</b>						
		Unit	Unit Price	Estimated Quantity	Amount	Table 6 Note Number
<b>Initial 5 Year Term</b>						
10.01	Card Fees - Year 1	EA		40,000	\$ -	
10.02	Card Fees - Year 2	EA		25,000	\$ -	
10.03	Card Fees - Year 3	EA		25,000	\$ -	
10.04	Card Fees - Year 4	EA		25,000	\$ -	
10.05	Card Fees - Year 5	EA		25,000	\$ -	
<b>Subtotal - Initial 5 Year Term</b>					\$ -	
<b>Five Year Option</b>						
10.06	Card Fees - Year 6	EA		24,000	\$ -	
10.07	Card Fees - Year 7	EA		23,000	\$ -	
10.08	Card Fees - Year 8	EA		22,000	\$ -	
10.09	Card Fees - Year 9	EA		21,000	\$ -	
10.10	Card Fees - Year 10	EA		20,000	\$ -	
<b>Subtotal - Five Year Option</b>					\$ -	
<b>SUBTOTAL RETAIL CARD FEES</b>					\$ -	
<b>RETAIL NETWORK SUBTOTAL</b>					\$ -	

RFP 2-2980 Rider Validation System

TABLE 4 - OPTIONS

Offeror Name:

<p><i>See Instructions in Exhibit B of the RFP. Proposers shall only edit shaded cells.</i></p> <p><b>Rider Validation System Pricing Proposal</b></p>						
Price Sheet Item #	Description	Unit	Estimated Quantity	Unit Price	Amount	Table 6 Note Number
<b>Section 11.0 Mobile Ticketing Option</b>						
11.01	Mobile Ticketing Application	LS	1		\$ -	
11.02	Mobile Ticketing Trip Planner	LS	1		\$ -	
11.03	Mobile Ticketing Cash Payments	LS	1		\$ -	
<b>SUBTOTAL OPTIONS</b>					\$ -	

## RFP 2-2980 Rider Validation System

TABLE 5 - AS NEEDED MEDIA

Offeror Name: *See Instructions in Exhibit B of the RFP. Proposers shall only edit shaded cells.***Rider Validation System Pricing Proposal**

Price Sheet Item #	Description	Unit	Unit Price	Table 6 Note Number
<b>Section 12.0 As Needed Media</b>				
12.01	Contactless Media (EU), 1-50,000 quantity - Unpackaged	EA		
12.02	Contactless Media (EU), 50,001-100,000 quantity - Unpackaged	EA		
12.03	Contactless Media (EU), 100,001-500,000 quantity - Unpackaged	EA		
12.04	Contactless Media (EU), 500,001-1,000,000 quantity - Unpackaged	EA		
12.05	Contactless Media (EU), 1,000,001-5,000,000 quantity - Unpackaged	EA		
12.06	Contactless Media (EU), 1-50,000 quantity - Retail Packaged	EA		
12.07	Contactless Media (EU), 50,001-100,000 quantity - Retail Packaged	EA		
12.08	Contactless Media (EU), 100,001-500,000 quantity - Retail Packaged	EA		
12.09	Contactless Media (EU), 500,001-1,000,000 quantity - Retail Packaged	EA		
12.10	Contactless Media (EU), 1,000,001-5,000,000 quantity - Retail Packaged	EA		

RFP 2-2980 Rider Validation System

TABLE 6 - NOTES

Offeror Name:	
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See Instructions in Exhibit B of the RFP. Proposers shall only edit shaded cells.		
Rider Validation System Pricing Proposal		
Note Number	Spec Section Reference	Clarification/Description/Explanation
1		
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**EXHIBIT C: PROPOSED AGREEMENT**





EXHIBIT C

relinquishment of AUTHORITY's right to such performance or to future performance of such terms or conditions and CONSULTANT's obligation in respect thereto shall continue in full force and effect. Changes to any portion of this Agreement shall not be binding upon AUTHORITY except when specifically confirmed in writing by an authorized representative of AUTHORITY by way of a written amendment to this Agreement and issued in accordance with the provisions of this Agreement.

**ARTICLE 2. AUTHORITY DESIGNEE**

The Chief Executive Officer of AUTHORITY, or designee, shall have the authority to act for and exercise any of the rights of AUTHORITY as set forth in this Agreement.

**ARTICLE 3. SCOPE OF WORK**

A. CONSULTANT shall perform the work necessary to complete in a manner satisfactory to AUTHORITY the services set forth in Exhibit A, entitled "Scope of Work," attached to and, by this reference, incorporated in and made a part of this Agreement. All services shall be provided at the times and places designated by AUTHORITY.

B. CONSULTANT shall provide the personnel listed below to perform the above-specified services, which persons are hereby designated as key personnel under this Agreement.

**Names**

**Functions**

C. No person named in paragraph B of this Article, or his/her successor approved by AUTHORITY, shall be removed or replaced by CONSULTANT, nor shall his/her agreed-upon function or level of commitment hereunder be changed, without the prior written consent of AUTHORITY. Should the services of any key person become no longer available to CONSULTANT, the resume and qualifications of the proposed replacement shall be submitted to AUTHORITY for approval as soon as possible, but in no event later than seven (7) calendar days prior to the departure of the incumbent key

1 person, unless CONSULTANT is not provided with such notice by the departing employee. AUTHORITY  
2 shall respond to CONSULTANT within seven (7) calendar days following receipt of these qualifications  
3 concerning acceptance of the candidate for replacement.

#### 4 **ARTICLE 4. TERM OF AGREEMENT**

5 A. This Agreement shall commence upon execution by both parties, and shall continue in full  
6 force and effect through \_\_\_\_\_ (Initial Term), unless earlier terminated or extended as provided  
7 in this Agreement.

8 B. AUTHORITY, at its sole discretion, may elect to extend the term of this Agreement an  
9 additional five (5) years, commencing \_\_\_\_\_, and continuing through \_\_\_\_\_ (Option  
10 Term), and thereupon require CONSULTANT to continue to provide services, and otherwise perform, in  
11 accordance with Exhibit A, entitled "Scope of Work," and at the rates set forth in Article 5, "Payment."

12 C. AUTHORITY's election to extend the Agreement beyond the Initial Term shall not diminish its  
13 right to terminate the Agreement for AUTHORITY's convenience or CONSULTANT's default as provided  
14 elsewhere in this Agreement. The "maximum term" of this Agreement shall be the period extending  
15 through \_\_\_\_\_, which period encompasses the Initial Term and Option Term.

#### 16 **ARTICLE 5. PAYMENT**

17 A. For CONSULTANT's full and complete performance of its obligations under this Agreement  
18 and subject to the maximum cumulative payment obligation provisions set forth in Article 6, AUTHORITY  
19 shall pay CONSULTANT on a firm-fixed price basis in accordance with the following provisions.

20 B. Exhibit B, entitled "Price Summary Sheet," shall establish the firm-fixed payment to  
21 CONSULTANT by AUTHORITY for each work task set forth in the Scope of Work. The schedule shall  
22 not include any CONSULTANT expenses not approved by AUTHORITY including but not limited to  
23 reimbursement for local meals.

24 C. CONSULTANT shall invoice AUTHORITY on a monthly basis for payments corresponding to  
25 the work actually completed by CONSULTANT. Percentage of work completed shall be documented in  
26 a monthly progress report prepared by CONSULTANT, which shall accompany each invoice submitted

## EXHIBIT C

1 by CONSULTANT. CONSULTANT shall also furnish such other information as may be requested by  
2 AUTHORITY to substantiate the validity of an invoice. At its sole discretion, AUTHORITY may decline to  
3 make full payment for any task listed in paragraph **Error! Reference source not found.** of this Article  
4 until such time as CONSULTANT has documented to AUTHORITY's satisfaction, that CONSULTANT  
5 has fully completed all work required under the task. AUTHORITY's payment in full for any task  
6 completed shall not constitute AUTHORITY's final acceptance of CONSULTANT's work under such task;  
7 final acceptance shall occur only when AUTHORITY's release of the retention described in paragraph D.

8 D. As partial security against CONSULTANT's failure to satisfactorily fulfill all of its obligations  
9 under this Agreement, AUTHORITY shall retain ten percent (10%) of the amount of each invoice  
10 submitted for payment by CONSULTANT. All retained funds shall be released by AUTHORITY and shall  
11 be paid to CONSULTANT within sixty (60) calendar days of payment of final invoice, unless AUTHORITY  
12 elects to audit CONSULTANT's records in accordance with Article 16 of this Agreement. If AUTHORITY  
13 elects to audit, retained funds shall be paid to CONSULTANT within thirty (30) calendar days of  
14 completion of such audit in an amount reflecting any adjustment required by such audit. During the term  
15 of the Agreement, at its sole discretion, AUTHORITY reserves the right to release all or a portion of the  
16 retained amount based on CONSULTANT's satisfactory completion of certain milestones.  
17 CONSULTANT shall invoice AUTHORITY for the release of the retention in accordance with Article 5.

18 E. Invoices shall be submitted by CONSULTANT on a monthly basis and shall be submitted in  
19 duplicate to AUTHORITY's Accounts Payable office. CONSULTANT may also submit invoices  
20 electronically to AUTHORITY's Accounts Payable Department at [vendorinvoices@octa.net](mailto:vendorinvoices@octa.net). Each invoice  
21 shall be accompanied by the monthly progress report specified in paragraph C of this Article.  
22 AUTHORITY shall remit payment within thirty (30) calendar days of the receipt and approval of each  
23 invoice. Each invoice shall include the following information:

- 24 1. Agreement No. C-2-2980;
- 25 2. Specify the task number for which payment is being requested;
- 26 3. The time period covered by the invoice;

EXHIBIT C

4. Total monthly invoice (including project-to-date cumulative invoice amount); and retention;

5. Monthly Progress Report;

6. Certification signed by the CONSULTANT or his/her designated alternate that a) The invoice is a true, complete and correct statement of reimbursable costs and progress; b) The backup information included with the invoice is true, complete and correct in all material respects; c) All payments due and owing to subcontractors and suppliers have been made; d) Timely payments will be made to subcontractors and suppliers from the proceeds of the payments covered by the certification and; e) The invoice does not include any amount which CONSULTANT intends to withhold or retain from a subcontractor or supplier unless so identified on the invoice.

7. Any other information as agreed or requested by AUTHORITY to substantiate the validity of an invoice.

**ARTICLE 6. MAXIMUM OBLIGATION**

Notwithstanding any provisions of this Agreement to the contrary, AUTHORITY and CONSULTANT mutually agree that AUTHORITY's maximum cumulative payment obligation (including obligation for CONSULTANT's profit) shall be \_\_\_\_\_ Dollars (\$\_\_\_\_\_.00) which shall include all amounts payable to CONSULTANT for its subcontracts, leases, materials and costs arising from, or due to termination of, this Agreement.

**ARTICLE 7. NOTICES**

All notices hereunder and communications regarding the interpretation of the terms of this Agreement, or changes thereto, shall be effected by delivery of said notices in person or by depositing said notices in the U.S. mail, registered or certified mail, returned receipt requested, postage prepaid and addressed as follows:

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To CONSULTANT:

To AUTHORITY:

Orange County Transportation Authority

550 South Main Street

P.O. Box 14184

Orange, CA 92863-1584

ATTENTION:

ATTENTION: Iris Deneau

Title:

Title: Senior Contract Administrator

Phone:

Phone: (714) 560 - 5786

Email:

Email: ideneau@octa.net

**ARTICLE 8. INDEPENDENT CONTRACTOR**

A. CONSULTANT's relationship to AUTHORITY in the performance of this Agreement is that of an independent contractor. CONSULTANT's personnel performing services under this Agreement shall at all times be under CONSULTANT's exclusive direction and control and shall be employees of CONSULTANT and not employees of AUTHORITY. CONSULTANT shall pay all wages, salaries and other amounts due its employees in connection with this Agreement and shall be responsible for all reports and obligations respecting them, such as social security, income tax withholding, unemployment compensation, workers' compensation and similar matters.

B. Should CONSULTANT's personnel or a state or federal agency allege claims against AUTHORITY involving the status of AUTHORITY as employer, joint or otherwise, of said personnel, or allegations involving any other independent contractor misclassification issues, CONSULTANT shall defend and indemnify AUTHORITY in relation to any allegations made.

**ARTICLE 9. INSURANCE**

A. CONSULTANT shall procure and maintain insurance coverage in full force and effect during the entire term of the Agreement. Coverage shall be full coverage and not subject to self-insurance provisions. CONSULTANT shall provide the following insurance coverage:

1. Commercial General Liability, to include Products/Completed Operations,

EXHIBIT C

1 Independent Contractors', Contractual Liability, Advertising (if applicable to Scope of Work) and Personal  
2 Injury Liability, and Property Damage with a minimum limit of \$1,000,000 per occurrence, \$2,000,000  
3 general aggregate and \$2,000,000 Products/Completed Operations aggregate;

4 2. Automobile Liability Insurance to include owned, hired and non-owned autos with  
5 a combined single limit of \$1,000,000 for each accident;

6 3. Workers' Compensation with limits as required by the State of California including  
7 a Waiver of Subrogation in favor of AUTHORITY, its officers, directors and employees; and

8 4. Employers' Liability with minimum limits of \$1,000,000 per accident, \$1,000,000  
9 policy limit-disease, and \$1,000,000 policy limit employee-disease.

10 5. Professional Liability with minimum limits of \$1,000,000 per claim.

11 6. Cyber Liability with minimum limits of \$1,000,000 per claim.

12 B. Proof of such coverage, in the form of a certificate of insurance and an insurance policy  
13 blanket additional insured endorsement, designating AUTHORITY, its officers, directors and employees  
14 as additional insureds on general liability and automobile liability, as required by Agreement. Proof of  
15 insurance coverage must be received by AUTHORITY within ten (10) calendar days from the effective  
16 date of the Agreement and prior to commencement of any work. Such insurance shall be primary and  
17 non-contributive to any insurance or self-insurance maintained by AUTHORITY. Furthermore,  
18 AUTHORITY reserves the right to request certified copies or review all related insurance policies, in  
19 response to a related loss.

20 C. CONSULTANT shall include on the face of the certificate of insurance the  
21 Agreement No. C-2-2980 and, the Senior Contract Administrator's Name, Iris Deneau.

22 D. CONSULTANT shall also include in each subcontract, the stipulation that subconsultants shall  
23 maintain insurance coverage in the amounts required of CONSULTANT as provided in the Agreement.  
24 Subconsultants will be required to include AUTHORITY as additional insureds on the Commercial  
25 General Liability, and Auto Liability insurance policies.

26 E. Insurer must provide AUTHORITY with at least thirty (30) days' prior notice of cancellation or

material modification of coverage, and ten (10) days' prior notice for non-payment of premium.

**ARTICLE 10. ORDER OF PRECEDENCE**

Conflicting provisions hereof, if any, shall prevail in the following descending order of precedence:

(1) the provisions of this Agreement, including all exhibits; (2) the provisions of RFP 2-2980; (3) CONSULTANT's proposal dated \_\_\_\_\_; (4) all other documents, if any, cited herein or incorporated by reference.

**ARTICLE 11. CHANGES**

By written notice or order, AUTHORITY may, from time to time, order work suspension and/or make changes in the general scope of this Agreement, including, but not limited to, the services furnished to AUTHORITY by CONSULTANT as described in the Scope of Work. If any such work suspension or change causes an increase or decrease in the price of this Agreement, or in the time required for its performance, CONSULTANT shall promptly notify AUTHORITY thereof and assert its claim for adjustment within ten (10) calendar days after the change or work suspension is ordered, and an equitable adjustment shall be negotiated. However, nothing in this clause shall excuse CONSULTANT from proceeding immediately with the Agreement as changed.

**ARTICLE 12. DISPUTES**

A. Except as otherwise provided in this Agreement, when a dispute arises between CONSULTANT and AUTHORITY, the project managers shall meet to resolve the issue. If project managers do not reach a resolution, the dispute will be decided by AUTHORITY's Director of Contracts Administration and Materials Management (CAMP), who shall reduce the decision to writing and mail or otherwise furnish a copy thereof to CONSULTANT. The decision of the Director, CAMP, shall be the final and conclusive administrative decision.

B. Pending final decision of a dispute hereunder, CONSULTANT shall proceed diligently with the performance of this Agreement and in accordance with the decision of AUTHORITY's Director, CAMP. Nothing in this Agreement, however, shall be construed as making final the decision of any AUTHORITY official or representative on a question of law, which questions shall be settled in



1 accordance with the laws of the State of California.

2 **ARTICLE 13. TERMINATION**

3 A. AUTHORITY may terminate this Agreement for its convenience at any time, in whole or part,  
4 by giving CONSULTANT written notice thereof. Upon said notice, AUTHORITY shall pay CONSULTANT  
5 its allowable costs incurred to date of termination and those allowable costs determined by AUTHORITY  
6 to be reasonably necessary to effect such termination. Thereafter, CONSULTANT shall have no further  
7 claims against AUTHORITY under this Agreement.

8 B. In the event either Party defaults in the performance of any of their obligations under this  
9 Agreement or breaches any of the provisions of this Agreement, the non-defaulting Party shall have the  
10 option to terminate this Agreement upon thirty (30) days' prior written notice to the other Party. Upon  
11 receipt of such notice, CONSULTANT shall immediately cease work, unless the notice from AUTHORITY  
12 provides otherwise. Upon receipt of the notice from AUTHORITY, CONSULTANT shall submit an invoice  
13 for work and/or services performed prior to the date of termination. AUTHORITY shall pay  
14 CONSULTANT for work and/or services satisfactorily provided to the date of termination in compliance  
15 with this Agreement. Thereafter, CONSULTANT shall have no further claims against AUTHORITY under  
16 this Agreement. AUTHORITY shall not be liable for any claim of lost profits or damages for such  
17 termination.

18 **ARTICLE 14. INDEMNIFICATION**

19 A. CONSULTANT shall indemnify, defend and hold harmless AUTHORITY, its officers, directors,  
20 employees and agents (indemnities) from and against any and all claims (including attorneys' fees and  
21 reasonable expenses for litigation or settlement) for any loss or damages, bodily injuries, including death,  
22 damage to or loss of use of property caused by the negligent acts, omissions or willful misconduct by  
23 CONSULTANT, its officers, directors, employees, agents, subconsultants or suppliers in connection with  
24 or arising out of the performance of this Agreement.

25 **ARTICLE 15. ASSIGNMENTS AND SUBCONTRACTS**

26 A. Neither this Agreement nor any interest herein nor claim hereunder may be assigned by

EXHIBIT C

CONSULTANT either voluntarily or by operation of law, nor may all or any part of this Agreement be subcontracted by CONSULTANT, without the prior written consent of AUTHORITY. Consent by AUTHORITY shall not be deemed to relieve CONSULTANT of its obligations to comply fully with all terms and conditions of this Agreement.

B. AUTHORITY hereby consents to CONSULTANT's subcontracting portions of the Scope of Work to the parties identified below for the functions described in CONSULTANT's proposal. CONSULTANT shall include in the subcontract agreement the stipulation that CONSULTANT, not AUTHORITY, is solely responsible for payment to the subcontractor for the amounts owing and that the subcontractor shall have no claim, and shall take no action, against AUTHORITY, its officers, directors, employees or sureties for nonpayment by CONSULTANT.

**Subcontractor Name/Addresses**

**Subcontractor Amounts**

.00

.00

**ARTICLE 16. AUDIT AND INSPECTION OF RECORDS**

CONSULTANT shall provide AUTHORITY, or other agents of AUTHORITY, such access to CONSULTANT's accounting books, records, payroll documents and facilities, as AUTHORITY deems necessary. CONSULTANT shall maintain such books, records, data and documents in accordance with generally accepted accounting principles and shall clearly identify and make such items readily accessible to such parties during CONSULTANT's performance hereunder and for a period of four (4) years from the date of final payment by AUTHORITY. AUTHORITY's right to audit books and records directly related to this Agreement shall also extend to all first-tier subcontractors identified in Article 15 of this Agreement. CONSULTANT shall permit any of the foregoing parties to reproduce documents by any means whatsoever or to copy excerpts and transcriptions as reasonably necessary.

**ARTICLE 17. CONFLICT OF INTEREST**

A. CONSULTANT agrees to avoid organizational conflicts of interest. An organizational conflict of interest means that due to other activities, relationships or contracts, CONSULTANT is unable, or

EXHIBIT C

1 potentially unable, to render impartial assistance or advice to AUTHORITY; CONSULTANT's objectivity  
2 in performing the work identified in the Scope of Work is or might be otherwise impaired; or  
3 CONSULTANT has an unfair competitive advantage. CONSULTANT is obligated to fully disclose to  
4 AUTHORITY in writing Conflict of Interest issues as soon as they are known to CONSULTANT. All  
5 disclosures must be submitted in writing to AUTHORITY pursuant to the Notice provision herein. This  
6 disclosure requirement is for the entire term of this Agreement.

7 B. If the AUTHORITY determines that CONSULTANT, its employees, or subconsultants are  
8 subject to disclosure requirements under the Political Reform Act (Government Code section 81000 et  
9 seq.), CONSULTANT and its required employees and subconsultants shall complete and file Statements  
10 of Economic Interest (Form 700) with AUTHORITY's Clerk of the Board disclosing all required financial  
11 interests.

12 **ARTICLE 18. CODE OF CONDUCT**

13 CONSULTANT agrees to comply with AUTHORITY's Code of Conduct as it relates to Third-  
14 Party contracts which is hereby referenced and by this reference is incorporated herein.  
15 CONSULTANT agrees to include these requirements in all of its subcontracts.

16 **ARTICLE 19. PROHIBITION ON PROVIDING ADVOCACY SERVICES**

17 CONSULTANT and all subconsultants performing work under this Agreement, shall be  
18 prohibited from concurrently representing or lobbying for any other party competing for a contract with  
19 AUTHORITY, either as a prime consultant or subconsultant. Failure to refrain from such  
20 representation may result in termination of this Agreement.

21 **ARTICLE 20. FEDERAL, STATE AND LOCAL LAWS**

22 CONSULTANT warrants that in the performance of this Agreement, it shall comply with all  
23 applicable federal, state and local laws, statutes and ordinances and all lawful orders, rules and  
24 regulations promulgated thereunder.

25 **ARTICLE 21. EQUAL EMPLOYMENT OPPORTUNITY**

26 In connection with its performance under this Agreement, CONSULTANT shall not discriminate

1 against any employee or applicant for employment because of race, religion, color, sex, age or national  
2 origin. CONSULTANT shall take affirmative action to ensure that applicants are employed, and that  
3 employees are treated during their employment, without regard to their race, religion, color, sex, age or  
4 national origin. Such actions shall include, but not be limited to, the following: employment, upgrading,  
5 demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other  
6 forms of compensation; and selection for training, including apprenticeship.

7 **ARTICLE 22. PROHIBITED INTERESTS**

8 CONSULTANT covenants that, for the term of this Agreement, no director, member, officer or  
9 employee of AUTHORITY during his/her tenure in office or for one (1) year thereafter shall have any  
10 interest, direct or indirect, in this Agreement or the proceeds thereof.

11 **ARTICLE 23. OWNERSHIP OF REPORTS AND DOCUMENTS**

12 A. The originals of all letters, documents, reports and other products and data produced under  
13 this Agreement shall be delivered to, and become the property of AUTHORITY. Copies may be made  
14 for CONSULTANT's records but shall not be furnished to others without written authorization from  
15 AUTHORITY. Such deliverables shall be deemed works made for hire and all rights in copyright therein  
16 shall be retained by AUTHORITY.

17 B. All ideas, memoranda, specifications, plans, manufacturing, procedures, drawings,  
18 descriptions, and all other written information submitted to CONSULTANT in connection with the  
19 performance of this Agreement shall not, without prior written approval of AUTHORITY, be used for any  
20 purposes other than the performance under this Agreement, nor be disclosed to an entity not connected  
21 with the performance of the project. CONSULTANT shall comply with AUTHORITY's policies regarding  
22 such material. Nothing furnished to CONSULTANT, which is otherwise known to CONSULTANT or is or  
23 becomes generally known to the related industry shall be deemed confidential. CONSULTANT shall not  
24 use AUTHORITY's name, photographs of the project, or any other publicity pertaining to the project in  
25 any professional publication, magazine, trade paper, newspaper, seminar or other medium without the  
26 express written consent of AUTHORITY.

## EXHIBIT C

1 C. No copies, sketches, computer graphics or graphs, including graphic artwork, are to be  
2 released by CONSULTANT to any other person or agency except after prior written approval by  
3 AUTHORITY, except as necessary for the performance of services under this Agreement. All press  
4 releases, including graphic display information to be published in newspapers, magazines, etc., are to be  
5 handled only by AUTHORITY unless otherwise agreed to by CONSULTANT and AUTHORITY.

6 **ARTICLE 24. PATENT AND COPYRIGHT INFRINGEMENT**

7 A. In lieu of any other warranty by AUTHORITY or CONSULTANT against patent or copyright  
8 infringement, statutory or otherwise, it is agreed that CONSULTANT shall defend at its expense any claim  
9 or suit against AUTHORITY on account of any allegation that any item furnished under this Agreement  
10 or the normal use or sale thereof arising out of the performance of this Agreement, infringes upon any  
11 presently existing U.S. letters patent or copyright and CONSULTANT shall pay all costs and damages  
12 finally awarded in any such suit or claim, provided that CONSULTANT is promptly notified in writing of  
13 the suit or claim and given authority, information and assistance at CONSULTANT's expense for the  
14 defense of same. However, CONSULTANT will not indemnify AUTHORITY if the suit or claim results  
15 from: (1) AUTHORITY's alteration of a deliverable, such that said deliverable in its altered form infringes  
16 upon any presently existing U.S. letters patent or copyright; or (2) the use of a deliverable in combination  
17 with other material not provided by CONSULTANT when such use in combination infringes upon an  
18 existing U.S. letters patent or copyright.

19 B. CONSULTANT shall have sole control of the defense of any such claim or suit and all  
20 negotiations for settlement thereof. CONSULTANT shall not be obligated to indemnify AUTHORITY  
21 under any settlement made without CONSULTANT's consent or in the event AUTHORITY fails to  
22 cooperate fully in the defense of any suit or claim, provided, however, that said defense shall be at  
23 CONSULTANT's expense. If the use or sale of said item is enjoined as a result of such suit or claim,  
24 CONSULTANT, at no expense to AUTHORITY, shall obtain for AUTHORITY the right to use and sell  
25 said item, or shall substitute an equivalent item acceptable to AUTHORITY and extend this patent and  
26 copyright indemnity thereto.

**ARTICLE 25. FINISHED AND PRELIMINARY DATA**

A. All of CONSULTANT's finished technical data, including but not limited to illustrations, photographs, tapes, software, software design documents, including without limitation source code, binary code, all media, technical documentation and user documentation, photoprints and other graphic information required to be furnished under this Agreement, shall be AUTHORITY's property upon payment and shall be furnished with unlimited rights and, as such, shall be free from proprietary restriction except as elsewhere authorized in this Agreement. CONSULTANT further agrees that it shall have no interest or claim to such finished, AUTHORITY-owned, technical data; furthermore, said data is subject to the provisions of the Freedom of Information Act, 5 USC 552.

B. It is expressly understood that any title to preliminary technical data is not passed to AUTHORITY but is retained by CONSULTANT. Preliminary data includes roughs, visualizations, software design documents, layouts and comprehensives prepared by CONSULTANT solely for the purpose of demonstrating an idea or message for AUTHORITY's acceptance before approval is given for preparation of finished artwork. Preliminary data title and right thereto shall be made available to AUTHORITY if CONSULTANT causes AUTHORITY to exercise Article 11, and a price shall be negotiated for all preliminary data.

**ARTICLE 26. HEALTH AND SAFETY REQUIREMENT**

CONSULTANT shall comply with all the requirements set forth in Exhibit \_\_, Level 1 Safety Specifications.

**ARTICLE 27. LIMITATION ON GOVERNMENTAL DECISIONS**

CONSULTANT shall not make, participate in making, or use its position to influence any governmental decisions as defined by the Political Reform Act, Government Code section 8100 et seq., and the implementing regulations in Title 2 of the California Code of Regulations section 18110 et seq. CONSULTANT's personnel performing services under this Agreement shall not authorize or direct any actions, votes, appoint any person, obligate, or commit AUTHORITY to any course of action or enter into any contractual agreement on behalf of AUTHORITY. In addition, CONSULTANT's personnel shall not

provide information, an opinion, or a recommendation for the purpose of affecting a decision without significant intervening substantive review by AUTHORITY personnel, counsel, and management.

**ARTICLE 28. FORCE MAJEURE**

Either party shall be excused from performing its obligations under this Agreement during the time and to the extent that it is prevented from performing by an unforeseeable cause beyond its control, including but not limited to: any incidence of fire, flood; acts of God; commandeering of material, products, plants or facilities by the federal, state or local government; national fuel shortage; or a material act or omission by the other party; when satisfactory evidence of such cause is presented to the other party, and provided further that such nonperformance is unforeseeable, beyond the control and is not due to the fault or negligence of the party not performing.

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**ORANGE COUNTY TRANSPORTATION AUTHORITY**

By: \_\_\_\_\_

**APPROVED AS TO FORM:**

James M. Donich  
General Counsel

By: \_\_\_\_\_

Page 16 of 16



**EXHIBIT D: STATUS OF PAST AND PRESENT CONTRACTS FORM**

**STATUS OF PAST AND PRESENT CONTRACTS FORM**

On the form provided below, Offeror/Bidder shall list the status of past and present contracts where the firm has either provided services as a prime vendor or a subcontractor during the past five (5) years in which the contract has been the subject of or may be involved in litigation with the contracting authority. This includes, but is not limited to, claims, settlement agreements, arbitrations, administrative proceedings, and investigations arising out of the contract.

A separate form must be completed for each contract. Offeror/Bidder shall provide an accurate contact name and telephone number for each contract and indicate the term of the contract and the original contract value. Offeror/Bidder shall also provide a brief summary and the current status of the litigation, claims, settlement agreements, arbitrations, administrative proceedings, or investigations. If the contract was terminated, list the reason for termination.

Offeror/Bidder shall have an ongoing obligation to update the Authority with any changes to the identified contracts and any new litigation, claims, settlement agreements, arbitrations, administrative proceedings, or investigations that arise subsequent to the submission of the bid. Each form must be signed by an officer of the Offeror/Bidder confirming that the information provided is true and accurate.

<b>Project city/agency/other:</b>	
<b>Contact Name:</b>	<b>Phone:</b>
<b>Project Award Date:</b>	<b>Original Contract Value:</b>
<b>Term of Contract:</b>	
<b>(1) Litigation, claims, settlements, arbitrations, or investigations associated with contract:</b>	
<b>(2) Summary and Status of contract:</b>	
<b>(3) Summary and Status of action identified in (1):</b>	
<b>(4) Reason for termination, if applicable:</b>	

By signing this Form entitled "Status of Past and Present Contracts," I am affirming that all of the information provided is true and accurate.

\_\_\_\_\_  
Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Date

**EXHIBIT E: CAMPAIGN CONTRIBUTION DISCLOSURE FORM**

**CAMPAIGN CONTRIBUTION DISCLOSURE FORM**

**Information Sheet**

**ORANGE COUNTY TRANSPORTATION AUTHORITY**

The attached Campaign Contribution Disclosure Form must be completed by applicants for, or persons who are the subject of, any proceeding involving a license, permit, or other entitlement for use pending before the Board of Directors of the OCTA or any of its affiliated agencies. (Please see next page for definitions of these terms.)

**IMPORTANT NOTICE**

**Basic Provisions of Government Code Section 84308**

- A. If you are an applicant for, or the subject of, any proceeding involving a license, permit, or other entitlement for use, you are prohibited from making a campaign contribution of more than \$250 to any board member or his or her alternate. This prohibition begins on the date your application is filed or the proceeding is otherwise initiated, and the prohibition ends three months after a final decision is rendered by the Board of Directors. In addition, no board member or alternate may solicit or accept a campaign contribution of more than \$250 from you during this period.
- B. These prohibitions also apply to your agents, and, if you are a closely held corporation, to your majority shareholder as well. These prohibitions also apply to your subcontractor(s), joint venturer(s), and partner(s) in this proceeding. Also included are parent companies and subsidiary companies directed and controlled by you, and political action committees directed and controlled by you.
- C. You must file the attached disclosure form and disclose whether you or your agent(s) have in the aggregate contributed more than \$250 to any board member or his or her alternate during the 12-month period preceding the filing of the application or the initiation of the proceeding.
- D. If you or your agent have in the aggregate contributed more than \$250 to any individual board member or his/or her alternate during the 12 months preceding the decision on the application or proceeding, that board member or alternate must disqualify himself or herself from the decision. However, disqualification is not required if the board member or alternate returns the campaign contribution within 30 days from the time the director knows, or should have known, about both the contribution and the fact that you are a party in the proceeding. The Campaign Contribution Disclosure Form should be completed and filed with your proposal, or with the first written document you file or submit after the proceeding commences.

1. A proceeding involving "a license, permit, or other entitlement for use" includes all business, professional, trade and land use licenses and permits, and all other entitlements for use, including all entitlements for land use, all contracts (other than competitively bid, labor or personal employment contracts), and all franchises.
2. Your "agent" is someone who represents you in connection with a proceeding involving a license, permit or other entitlement for use. If an individual acting as an agent is also acting in his or her capacity as an employee or member of a law, architectural, engineering, consulting firm, or similar business entity, both the business entity and the individual are "agents."
3. To determine whether a campaign contribution of more than \$250 has been made by you, campaign contributions made by you within the preceding 12 months must be aggregated with those made by your agent within the preceding 12 months or the period of the agency, whichever is shorter. Contributions made by your majority shareholder (if a closely held corporation), your subcontractor(s), your joint venturer(s), and your partner(s) in this proceeding must also be included as part of the aggregation. Campaign contributions made to different directors or their alternates are not aggregated.
4. A list of the members and alternates of the Board of Directors is attached.

This notice summarizes the major requirements of Government Code Section 84308 of the Political Reform Act and California Code of Regulations, Title 2 Sections 18438-18438.8.

ORANGE COUNTY TRANSPORTATION AUTHORITY  
CAMPAIGN CONTRIBUTION DISCLOSURE FORM

RFP Number: \_\_\_\_\_ RFP Title: \_\_\_\_\_

Was a campaign contribution made to any OCTA Board Member within the preceding 12 months, regardless of dollar amount of the contribution by either the proposing firm, proposed subconsultants and/or agent/lobbyist?      Yes \_\_\_\_\_      No \_\_\_\_\_

**If no**, please sign and date below.

**If yes**, please provide the following information:

Prime Contractor Firm Name: \_\_\_\_\_

Contributor or Contributor Firm's Name: \_\_\_\_\_

Contributor or Contributor Firm's Address: \_\_\_\_\_

Is Contributor:

- |   |           |          |
|---|-----------|----------|
| <input type="radio"/> The Prime Contractor  | Yes _____ | No _____ |
| <input type="radio"/> Subconsultant   | Yes _____ | No _____ |
| <input type="radio"/> Agent/Lobbyist hired by Prime<br>to represent the Prime in this RFP | Yes _____ | No _____ |

Note: Under the State of California Government Code section 84308 and California Code of Regulations, Title 2, Section 18438, campaign contributions made by the Prime Contractor and the Prime Contractor's agent/lobbyist who is representing the Prime Contractor in this RFP must be aggregated together to determine the total campaign contribution made by the Prime Contractor.

Identify the Board Member(s) to whom you, your subconsultants, and/or agent/lobbyist made campaign contributions, the name of the contributor, the dates of contribution(s) in the preceding 12 months and dollar amount of the contribution. Each date must include the exact month, day, and year of the contribution.

Name of Board Member: \_\_\_\_\_

Name of Contributor: \_\_\_\_\_

Date(s) of Contribution(s): \_\_\_\_\_

Amount(s): \_\_\_\_\_

Name of Board Member: \_\_\_\_\_

Name of Contributor: \_\_\_\_\_

Date(s) of Contribution(s): \_\_\_\_\_

Amount(s): \_\_\_\_\_

Date: \_\_\_\_\_

\_\_\_\_\_  
Signature of Contributor

\_\_\_\_\_  
Print Firm Name

\_\_\_\_\_  
Print Name of Contributor

**ORANGE COUNTY TRANSPORTATION AUTHORITY  
AND AFFILIATED AGENCIES**

**Board of Directors**

**Gene Hernandez, Chairman**  
**Tam Nguyen, Vice Chairman**  
**Doug Chaffee, Director**  
**Jose Diaz, Director**  
**Andrew Do, Director**  
**Jon Dumitru, Director**  
**Jamey Federico, Director**  
**Katrina Foley, Director**  
**Brian Goodell, Director**  
**Patrick Harper, Director**  
**Michael Hennessey, Director**  
**Steve Jones, Director**  
**Fred Jung, Director**  
**Farrah N. Khan, Director**  
**Jessie Lopez, Director**  
**Vicente Sarmiento, Director**  
**Donald P. Wagner, Director**

**EXHIBIT F: SAFETY SPECIFICATIONS**



## **LEVEL 1 STANDARD HEALTH, SAFETY AND ENVIRONMENTAL SPECIFICATIONS**

### **PART I – GENERAL**

#### **1.1 GENERAL HEALTH, SAFETY & ENVIRONMENTAL REQUIREMENTS**

- A. The Contractor, its subcontractors, suppliers, and employees have the obligation to comply with all Authority health, safety and environmental compliance department (HSEC) requirements of this safety specification, project site requirements, bus yard safety rules, as well as all federal, state, and local regulations pertaining to scope of work, contracts or agreements with the Authority. Additionally, manufacturer requirements are considered incorporated by reference as applicable to this scope of work.
- B. Observance of repeated unsafe acts or conditions, serious violation of safety standards, non-conformance of Authority health, safety and environmental compliance department (HSEC) requirements, or disregard for the intent of these safety specifications to protect people and property, by Contractor or its subcontractors may be cause for termination of scope or agreements with the Authority, at the sole discretion of the Authority.
- C. The health, safety, and environmental requirements, and references contained within this scope of work shall not be considered all-inclusive as to the hazards that might be encountered. Safe work practices shall be planned and performed, and safe conditions shall be maintained during this work scope.
- D. The Authority Project Manager shall be responsible to ensure a safety orientation is conducted of known potential hazards and emergency procedures for all Contractor personnel, subcontractors, suppliers, vendors, and new employees assigned to the project prior to commencement of the project.
- E. The Contractor shall ensure that all Contractor vehicles, including those of its subcontractors, suppliers, vendors and employees are parked in designated parking areas, and comply with traffic routes, and posted traffic signs in areas other than the employee parking lots.
- F. California Code of Regulations (CCR) Title 8 Standards are minimum requirements; each Contractor is encouraged to exceed minimum requirements. When the Contractor's safety requirements exceed statutory standards, the more stringent requirements shall be applied for the safeguard of public and employees.

#### **1.2 REGULATORY**

- A. Injury/Illness Prevention Program  
The Contractor shall comply with CCR Title 8, Section with California Code of Regulations (CCR) Title 8, Section 3203. The intent and elements of the IIPP shall be implemented and enforced by the Contractor and its sub-tier contractors, suppliers, and vendors. The program shall be provided to the Authority's Project Manager, upon request, within 72 hours.

- B. Substance Abuse Prevention Program  
Contractor shall comply with the Policy or Program of the Company's Substance Abuse Prevention Policy that complies with the most recent Drug Free Workplace Act. The program shall be provided to the Authority's Project Manager, upon request, within 72 hours.
- C. Heat Illness Prevention Program  
Contractor shall comply with CCR Title 8, Section, Section 3395, Heat Illness Prevention. The program shall be provided to the Authority's Project Manager, upon request, within 72 hours.
- D. Hazard Communication Program  
Contractor shall comply with CCR Title 8, Section 5194 Hazard Communication Standard. Prior to use on Authority property and/or project work areas Contractor shall provide the Authority Project Manager copies of SDS for all applicable chemical products used, if any. The program shall be provided to the Authority's Project Manager, upon request, within 72 hours.
  - a. All chemicals including paint, solvents, detergents and similar substances shall comply with South Coast Air Quality Management District (SCAQMD) rules 103, 1113, and 1171.
- E. Storm Water Pollution Prevention Plan  
The Contractor shall protect property and water resources from fuels and similar products throughout the duration of the contract. Contractor shall comply with Storm Water Pollution Prevention Plan (SWPPP) requirements. The program or plan if required by scope shall be provided to the Authority's Project Manager, upon request, within 72 hours.

### **1.3 INCIDENT NOTIFICATION AND INVESTIGATION**

- A. The Authority shall be promptly notified of any of the following types of incidents including but not limited to:
  - 1. Damage incidents of property (incidents involving third party, contractor or Authority property damage);
  - 2. Reportable and/or Recordable injuries (as defined by the U. S. Occupational Safety and Health Administration), a minor injury, and near miss incidents;
  - 3. Incidents impacting the environment, i.e. spills or releases on Authority projects or property.
  - 4. Outside Agency Inspections; agencies such as Cal/OSHA, DTSC, SCAQMD, State Water Resources Control Board, FTA, CPUC, EPA, USACE and similar agencies.
- B. Notifications shall be made to Authority representatives, employees and/or agents. This includes incidents occurring to contractors, vendors, visitors, or members of the public that arise from the performance of Authority contract work. An immediate verbal notice followed by an initial written incident investigation report shall be submitted to the Authority's Project Manager within 24 hours of the incident.

- C. A final written incident investigative report shall be submitted within seven (7) calendar days and include the following information. The Current Status of anyone injured, photos of the incident area, detailed description of what happened, Photos of the existing conditions and area of the injury/incident, the contributing factors that lead to the incident occurrence, a copy of the company policy or procedure associated with the incident and evaluation of effectiveness, copy of task planning documentation, copy of the Physician's first report of injury, copy of Cal/OSHA 300 log of work related injuries and illnesses, the Cal/OSHA 301 Injury Illness Incident Report, and corrective actions initiated to prevent recurrence. This information shall be considered the minimum elements required for a comprehensive incident report provided to OCTA.
- D. A Serious Injury, Serious Incident, OSHA Recordable Injury/Illness, or a Significant Near Miss shall require a formal incident review at the discretion of the Authority's Project Manager. The incident review shall be conducted within seven (7) calendar days of the incident. This review shall require a company senior executive, company program or project manager from the Contractors' organization to participate and present the incident review as determined by the OCTA Project Manager. The serious incident presentation shall include action taken for the welfare of the injured, a status report of the injured, causation factors that lead to the incident, a root cause analysis (using 5 whys and fishbone methods), and a detailed recovery plan that identifies corrective actions to prevent a similar incident, and actions to enhance safety awareness.
1. Serious Injury: includes an injury or illness to one or more employees, occurring in a place of employment or in connection with any employment, which requires inpatient hospitalization for a period in excess of twenty-four hours for other than medical observation, or in which an employee suffers the loss of any member of the body, or suffers any serious degree of physical disfigurement. A serious injury also includes a lost workday or reassignment or restricted injury case as determined by the Physician's first report of injury or Cal/OSHA definitions.
  2. Serious Incident: includes but not limited to property damage of \$500.00 or more, an incident requiring emergency services (local fire, paramedics and ambulance response), news media or OCTA media relations response, and/or incidents involving other agencies (Cal/OSHA, EPA, AQMD, DTSC, Metrolink, FTA, FRA etc.) notification or representation.
  3. OSHA Recordable Injury / Illness: includes and injury / illness resulting in medical treatment beyond First Aid, an injury / illness which requires restricted duty, or an injury / illness resulting in days away from work.
  4. Significant Near Miss Incident: includes incidents where no property was damaged and no personal injury sustained, but where, given a slight shift in time or position, damage and/or injury easily could have occurred.

#### 1.4 DESIGNATED HEALTH AND SAFETY REPRESENTATIVE

- A. Upon contract award, the contractor within 10 business days shall designate a health and safety representative and provide a resume and qualifications to the Authority project manager, upon request, within 72 hours.
- B. This person shall be a competent or qualified individual as defined by the Occupational, Safety, and Health Administration (OSHA), familiar with applicable CCR Title 8 Standards (Cal/OSHA) and has the authority to affect changes in work procedures that may have associated cost, schedule and budget impacts.

#### **1.5 PERSONAL PROTECTIVE EQUIPMENT**

- A. The Contractor, its subcontractors, suppliers, and employees are required to comply with applicable personal protective equipment (PPE) requirements while performing work at any Authority project or property. Generally minimum PPE requirements include eye protection; hearing protection, head protection, class 2 or 3 safety reflective vests, and appropriate footwear.
- B. The Contractor, its subcontractors, suppliers, and employees are required to provide their own PPE, including eye, head, foot, and hand protection, safety vests, or other PPE required to perform their work safely on Authority projects or property. The Authority requires eye protection on construction projects and work areas that meet ANSI Z-87.1 Standards.

#### **1.6 REFERENCES**

- A. CCR Title 8 Standards (Cal/OSHA)
- B. FCR Including 1910 and 1926 Standards
- C. NFPA, NEC, ANSI, NIOSH Standards
- D. Construction Industry Institute (CII)
- E. OCTA Yard Safety Rules

**END OF SECTION**

**EXHIBIT G: PROPOSAL EXCEPTIONS AND/OR DEVIATIONS**

**PROPOSAL EXCEPTIONS AND/OR DEVIATIONS**

The following form shall be completed for each technical and/or contractual exception or deviation that is submitted by Offeror for review and consideration by Authority. The exception and/or deviation must be clearly stated along with the rationale for requesting the exception and/or deviation. If no technical or contractual exceptions or deviations are submitted as part of the original proposal, Offerors are deemed to have accepted Authority’s technical requirements and contractual terms and conditions set forth in the Scope of Work (Exhibit A) and Proposed Agreement (Exhibit C). Offerors will not be allowed to submit this form or any contractual exceptions and/or deviation after the proposal submittal date identified in the RFP. Exceptions and/or deviations submitted after the proposal submittal date will not be reviewed by Authority.

Offeror:\_\_\_\_\_

RFP No.:\_\_\_\_\_ RFP Title: \_\_\_\_\_

Deviation or Exception No. : \_\_\_\_\_

Check one:

- Scope of Work (Technical) \_\_\_\_\_
- Proposed Agreement (Contractual) \_\_\_\_\_

Reference Section/Exhibit: \_\_\_\_\_ Page/Article No. \_\_\_\_\_

Complete Description of Deviation or Exception:

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Rationale for Requesting Deviation or Exception:

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Area Below Reserved for Authority Use Only:

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