

SEPTA Key 2.0 Fare Payment System Scope of Services

Acronyms & Glossary

ACH – Automated Clearing House
ADA – Americans with Disabilities Act
ADAAG – ADA Accessibility Guidelines
AFC – Automated Fare Collection
AP – Accounts Payable
API – Application Programming Interface
APN – Access Point Name
AoC – Attestation of Compliance
AR – Accounts Receivable
ATC – Automatic Train Control
ATP – Account-Based Transaction Processor
AUT – Application Under Test
AVL – Automatic Vehicle Location
AVS – Address Verification System
BCPU – Bank Card Processing Unit
BOA – Back-Office Operations Agreement
BRU – Bill Recycling Unit
BU – Beneficial Use
CAD – Computer-Aided Dispatch
CCR – Contactless Card Reader
CCT – Customized Community Transportation
CDA – Combined Dynamic Data Authentication
CDR – Conceptual Design Review
CDRL – Contract Data Requirements List
CHU – Coin Handling Unit
CMP – Cybersecurity Management Plan
CMS – Content Management System
COTS – Commercial-Off-The-Shelf
CRM – Customer Relationship Management
CRO – Clerk Remittance Office
CST – Customer Service Terminals
DBE – Disadvantaged Business Enterprises
DDA – Dynamic Data Authentication
DLP – Data Loss Prevention
DOB – Date of Birth
DOE – Department of Education
DSM – Disposable Smart Media
DSS – Data Security Standard
E2E – End-to-End
ECR – Engineering Change Request
ECU – Electronic Control Unit
EFT – Electronic Funds Transfer
EMA – Equipment Maintenance Agreement
EMI – Electromagnetic Interference
EMV – Europay, MasterCard, Visa

ESN – Electronic Serial Number
EU – Extended Use
EV – Earned Value
FACI – First Article Configuration Inspection
FAT – Factory Acceptance Test
FAQ – Frequently Asked Questions
FDR – Final Design Review
FIT – Field Integration Test
FMI – Field Modification Instructions
FMS – Financial Management System
FPAN – Funding Primary Account Number
FPV – Fare Payment Validator
FRB – Failure Review Board
FTA – Federal Transit Administration
FUT – Functional Unit Testing
FVM – Fare Vending Machine
GFCI – Ground Fault Circuit Interrupter
GIS – Geographic Information Systems
GL – General Ledger
GPS – Global Positioning System
GUI – Graphical User Interface
HA – High Availability
HD – High-definition
HSM – Hardware Security Module
ICD – Interface Control Documentation
ID – Identification
IIN – Issuer Identification Number
IP – Intellectual Property
IRS – Internal Revenue Service
IT – Information Technology
iOS – Operating System for Apple products
IVR – Interactive Voice Response
KPI – Key Performance Indicator
LCD – Liquid Crystal Display
LED – Light-Emitting Diode
LLRU – Lowest Level Replaceable Unit
LU – Limited Use
MaaS – Mobility as a Service
MID – Merchant identification
MIL – Master Issues List
MIMS – Media Inventory Management System
MFA – Multi-Factor Authentication
MTT – Mobility and Transport Transaction
MVP – Minimum Viable Product
NEC – National Electric Code
NFC – Near Field Communication
NIST – National Institute of Standards and Technology
NJT – New Jersey Transit

NOA – Network Operations Agreement
NTD – National Transit Database supported by FTA
NTP – Notice to Proceed
OEM – Original Equipment Manufacturer
ODA – Offline Data Authentication
OLED – Organic Light Emitting Diode
OS – Operating System
OSHA – Occupational Safety and Health Administration
P2PE – Point-to-Point Encryption
PAR – Payment Account Reference
PAT – Production Acceptance Test
PATCO – Port Authority Transit Corporation
PC – Personal Computer
PCI – Payment Card Industry
PDR – Preliminary Design Review
PII – Personally Identifiable Information
PIN – Personal Identification Number
PM – Project Manager
PMO – Project Management Office
PMP – Project Management Plan
POAM – Plans of Action and Milestones
POS – Point of Sale
PSP – Payment Service Provider
QA – Quality Assurance
QC – Quality Control
QR – Quick Response
QSA – Qualified Security Assessor
RAID – Risks, Assumptions, Issues, and Dependencies
RAM – Random Access Memory
RFI – Radio Frequency Interference
RMA – Return Merchandise Authorization
RMAT – Reliability, Maintainability, and Accuracy Testing
RMS – Revenue Management System
RoC – Report On Compliance
SAC – Station Agent Console
SAE – Society of Automotive Engineers
SAM – Security Access Module
SAT – System Acceptance Test
SBC – Single Board Computer
SCADA – Supervisory Control and Data Acquisition
SED – Smartcard Encoder/Dispenser
SEPTA – Southeastern Pennsylvania Transportation Authority
SIEM – Security Incident and Event Management
SIT – System Integration Test
SLA – Service Level Agreement
SMA – Software Maintenance Agreement
SMMA – System Monitoring and Management Application
SMS – Short Message Service

SOS – Scope of Services
SRD – Smartcard Reader/Dispenser
SSDD – Solid State Disk Drive
SSP – System Security Plan
TSM – Trusted Service Manager
TTS – Text to Speech
TTY – Teletype Writing
U.S. – United States
UI – User Interface
UID –Unique Identification Number
UL – Underwriter’s Laboratories
UPS – Uninterruptible Power Supply
USB – Universal Serial Bus
UX – User Experience
VAS – Voice Announcement System
VCMS – Virtual Credential Management System
VDC – Volts of Direct Current
VMD – Variable Message Display
VPN – Virtual Private Network
WBS – Work Breakdown Structure
WCAG – Web Content Accessibility Guidelines

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1. Introduction

The Southeastern Pennsylvania Transportation Authority (SEPTA), is seeking to engage an experienced and qualified design/build vendor (“Contractor”) to develop, install, and operate a multimodal account-based Automated Fare Collection (AFC) System (“Fare Collection System”) and support SEPTA with a methodical transition from their current AFC System, Key. The technical specifications within this Scope of Services (SOS) describe the back-office, equipment, and services required for the design, manufacture, fabrication, testing, installation, acceptance, operation, and maintenance of the new AFC System.

1.1 Project Stakeholders

Due to the comprehensive and complex nature of the Project, SEPTA has assembled a broad team of cross-functional stakeholders involved in fare collection technology, finance, policy, operations, and maintenance. Current integration with regional partner transit authorities (i.e., Agencies), including New Jersey Transit (NJT), Amtrak, and Port Authority Transit Corporation (PATCO), is expected to be maintained for the new AFC System and therefore will also participate in the development of the AFC System. Table 1 below provides the full list of SEPTA departments that are working collaboratively to design the new AFC System.

Table 1: SEPTA Stakeholders

Working Committee	
Communications and Marketing	Planning
Customer Service	Procurement
Customized Community Transportation	Program Management
Finance	Revenue Operations
Information Technology	Sales and Ridership
Legal	Operations

2. Future System Overview

The core objectives of this Project are to deploy a next-generation, multimodal fare collection system that drives customer adoption, reduces fare collection costs, increases revenue, and improves existing fare collection operations. The existing in-scope public transit system consists of fixed-route bus service, trolley, Metro subway, regional rail, and paratransit service.

At a minimum, SEPTA expects the characteristics of its new AFC System to include, without limitation:

- Account-based
- Designed and implemented using an open architecture (encompassing all fare media, applications, and devices deployed within the system and include all fare media formats, transaction formats, security protocols, and communications necessary to support critical system functions)
- Support current and future fare policy features for SEPTA and its regional partners, including flat fares, distance-based fares, zone-based fares, time-based transfers, and fare capping.
- Leverage real-time fare calculation, and real-time communication interfaces that support:

- Immediate use of fare products (e.g., product and stored value) loaded through all fare distribution channels
- Fare payment validation onboard buses and at rail stations (with real-time fare calculation and customer information)
- Real-time distribution of hotlists to mitigate offline scenarios risks
- Real-time monitoring of device and system performance
- Support both closed-loop and open-loop payment options
- Maintain PCI-compliance and support other required physical and logical security measures
- Support both agency-issued and third-party-issued fare media
- Integrate with existing systems and programs (onboard router, cash room, etc.)
- Provide a contractor-managed cloud-hosted high availability (e.g., active-active, multi-site, load-balanced) back-office solution, which uses Commercial-Off-The-Shelf (COTS) software where appropriate, and includes the following components:
 - COTS Customer Relationship Management (CRM) System
 - Tariff Management
 - System Monitoring and Management Application (SMMA)
 - COTS Financial Management System (FMS)
 - Data Warehouse
 - Reporting System
 - Media Inventory Management System (MIMS)
 - Test Systems
- Provide an Interactive Voice Response (IVR) System that will interface with SEPTA's call center equipment
- Provide Contractor managed and cloud-hosted websites for both individual and institutional customers (Option)
- Fare payment and account management mobile application (Option)
- Retail Network (Option)
- Provide all fare equipment needed to operate the new AFC System, including and not limited to:
 - Turnstile Readers – Metro and Railroad
 - Americans with Disabilities Act (ADA) Faregates (including Readers) – Metro and Railroad
 - Validators – Vehicle, Platform, and Rotogate
 - Station Agent Console (SAC)
 - Handheld Validation, Inspection, and Sales Devices
 - Fare Vending Machines (FVM) (Option)
 - Customer Service Terminal (CST)/Point of Sales (POS) Devices
 - Agency Test Lab
 - Initial batch of Extended-Use (EU) Media
 - Initial batch of Limited-Use (LU) Media

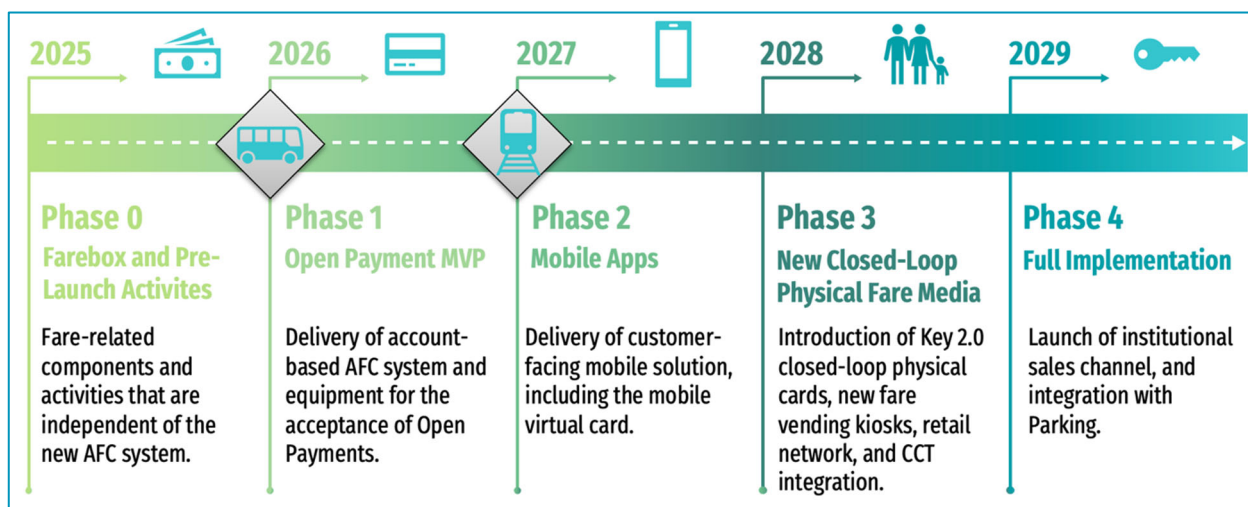
2.1 Phased Implementation

Following Design Review, the Contractor will deploy AFC System features, functions, and equipment in a phased public rollout intended to minimize rider disruption while the system transitions from the legacy to the new solution. This phased rollout also allows the Contractor to stagger development, manufacturing, installation, and testing for the new AFC System across each phase. The phased approach provides SEPTA with a working system by focusing on the delivery of a Minimum Viable Product (MVP) for Phase 1. The MVP for SEPTA deploys the back-office and supports open payments,

allowing riders to pay fare by tapping their bank card directly on a fare payment device (i.e., validator) without the need to pre-purchase or load a fare product prior to boarding.

All the fare system components are expected to be delivered during Phase 1 as a base delivery to support the identified features. As each phase progresses, the Contractor will provide solution updates to support the new features and equipment delivered during the subsequent phases, with all system components and integrations operational in Phase 4. While it is intended that the initial solution design is comprehensive of all equipment, features and functions within this SOS the Contractor may find it necessary to update system design documents at each subsequent phase to ensure that the documentation accurately reflects the delivered solution. Figure 1 below provides an overview of the anticipated public rollout for the features and functions within each phase.

Figure 1: Deployment Phase Timeline



The deployment is divided into four (4) Phases, with all phases delivered and supported by the future AFC System Contractor. A summary of each phase is provided in Table 2. SEPTA has prioritized Transit installations first occurring during Phase 1, followed by Regional Rail installation occurring in Phase 2.

Table 2: Deployment Phase Summary

Phase	Phase Name	Summary
Phase 1	Open Payments, Minimum Viable Product (MVP)	This phase of the project includes the delivery and implementation of the core back-office solution, open payments, and new validation equipment required for a functioning account-based AFC System. This phase supports the device first strategy as part of the transition to the new AFC System. Once delivered, SEPTA may elect to begin onboarding select users to the new AFC System.

Phase	Phase Name	Summary
Phase 2	Mobile Applications and Parking System	This phase expands the number of users from Phase 1 Open Payments, Minimum Viable Product (MVP), by adding more features, specifically mobile applications, and digital fare media to the AFC System. This phase will also deploy a non-fare related parking system which is independent of, and integrated with the AFC System.
Phase 3	New Closed-Loop Physical Fare Media	This phase is the most critical phase of the project and adds more advanced features, equipment, and sales channels to the AFC System, including closed-loop physical media, fare vending kiosks, retail network, and CCT integration. This Phase provides a robust AFC System that includes all required equipment.
Phase 4	Full Implementation	This phase expands the new AFC System to support new modes and sales channels (i.e., institutional customers and parking integration).

2.1.1 Phase 1 – Open Payments MVP

Phase 1 will support the deployment of Open Payments for the city transit modes, bus, subway, and trolley, excluding regional rail services. Open Payments is the ability of a system to accept credit and debit cards as payment at the point of validation.

- Account-Based Back-office
- Account Based Payment Processor
- System Monitoring System
- Public Cloud Hosting
- Financial Management System (FMS)
- Data Warehouse
- Reporting System
- Customer Relationship Management (CRM) System
- Turnstile Readers
- ADA Faregates
- Validators - Vehicle, Platform, and Rotogate
- Station Agent Console (SAC)
- Handheld Validation, Inspection, and Sales Device
- User Interface (UI)/User Experience (UX) Services
- Farebox and Operator Display Unit Integration
- Onboard Router Integration
- Civil Work and Equipment Repairs

Phase 1 will support the deployment of Open Payments for the city transit modes, bus, subway, and trolley, excluding regional rail services.

2.1.2 Phase 2 – Mobile Application and Parking System Integration

Phase 2 will develop and deploy the following core system(s), equipment, and functions:

- Contactless Mobile Payment Application and Supporting Services
- Parking System Integration

Phase 2 will support the deployment of a contactless mobile payment application, as well as all the Phase 1 components for regional rail services.

2.1.3 Phase 3 – New Closed-Loop Physical Fare Media

Phase 3 will develop and deploy the following core system(s), equipment, and functions:

- Media Inventory Management System (MIMS)
- Consumer Website
- Full-service Customer Service Terminal (CST)
- Streamlined Customer Service Terminal (CST)
- Extended-Use (EU) Fare Media
- Limited-Use (LU) Fare Media
- Fare Vending Machines (FVMs) or Fare Kiosks
- Retail Network
- Customized Community Transportation (CCT) Integration

Phase 3 will support the deployment of the new closed-loop physical extended-use and limited-use fare media.

2.1.4 Phase 4 – Full Implementation

Phase 4 “Full Implementation” will deliver all remaining components of the AFC System to enhance the equipment features deployed during the previous phases. This includes:

- Institutional Website
- Portable Customer Service Terminal (CST)
- Bulk Fulfillment Customer Service Terminal (CST)

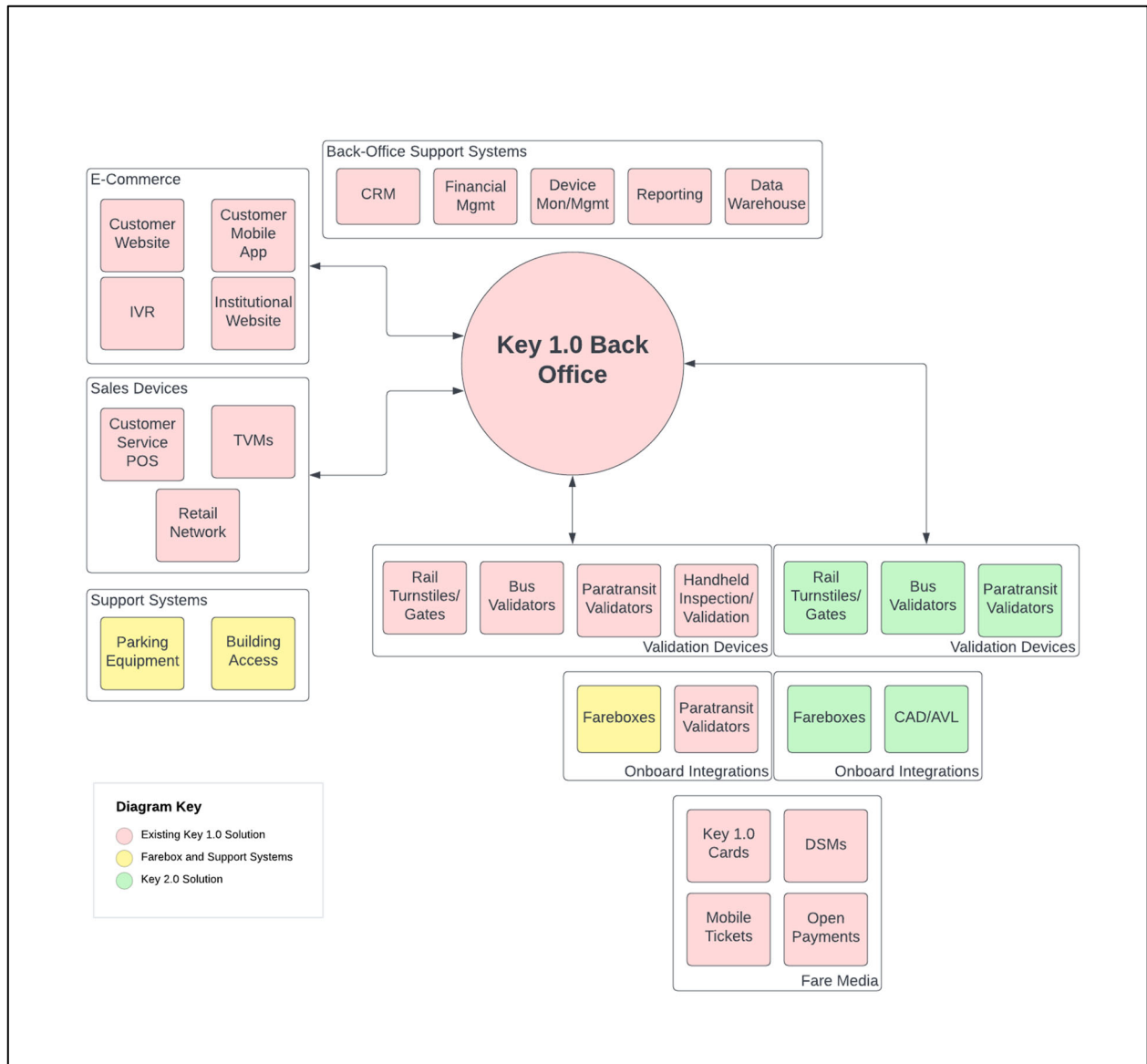
2.2 Transition Approach

The procurement of a new AFC System and transition to the future AFC System (Key 2.0) requires a strategic and coordinated effort to support customer migration and the introduction of new devices throughout the planned and phased deployment. The objective of the transition is to mitigate customer disruptions during transition for an experience that allows continued use of issued SEPTA Key fare media, for a transitional period, until all customers are migrated to the new SEPTA Key 2.0 closed-loop fare media. To accomplish this, several system transition strategies were developed.

SEPTA selected a backwards compatible approach for their transition strategy. This transition strategy will reduce customer disruption and supports a key objective allowing usage of Key 1.0 fare media during the transition period to Key 2.0 fare media.

Figure 2 illustrates the Installation Phase and the backwards compatible validation devices enabling installation flexibility through a rolling upgrade. Current Key 1.0 fare media, including open payments will be accepted through the Key 1.0 back-office.

Figure 2: Installation Phase



After the installation is complete, and all vehicles and stations have new equipment processing transactions through the old back-office, the Key 2.0 back-office can be stood up. The Key 2.0 Back-office Support Systems, E-Commerce, and Sales Devices begin to be introduced through additional phasing as illustrated in Figure 3: Transition Period. The transition includes:

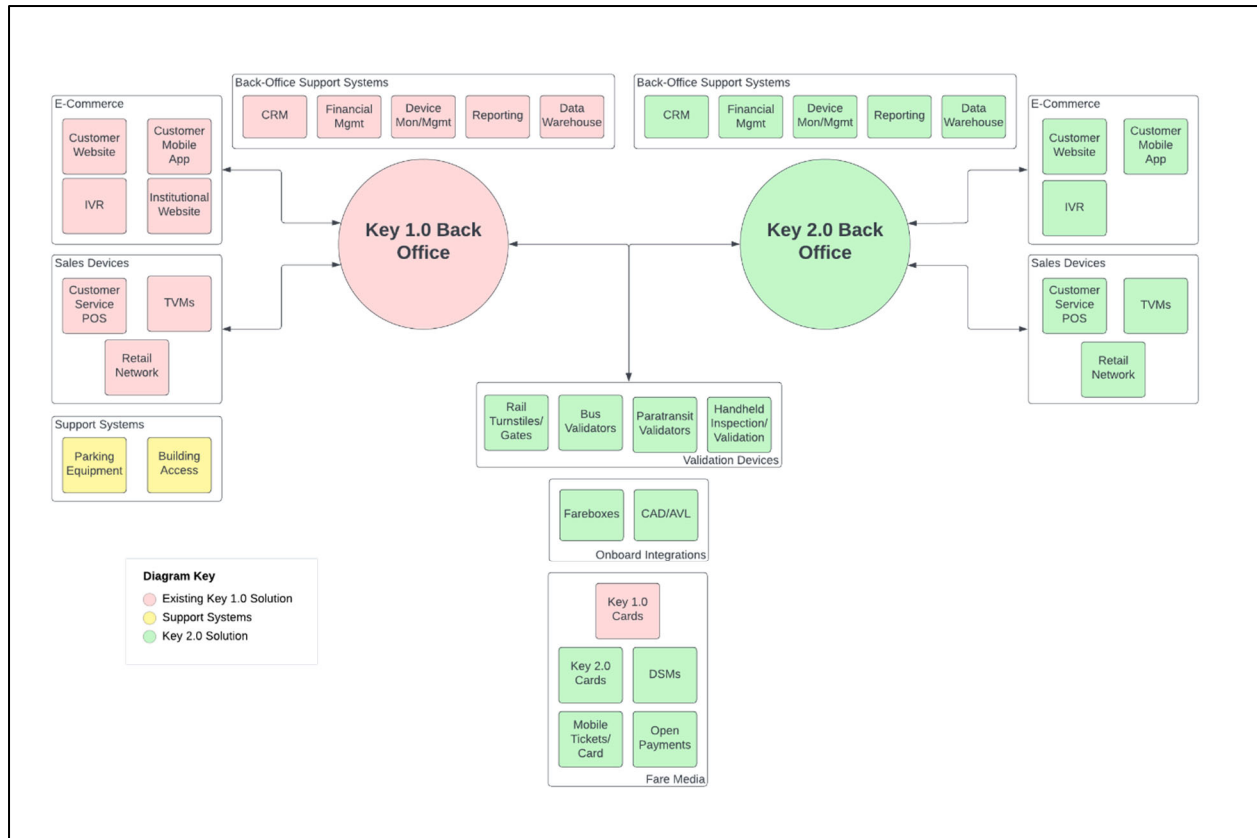
- Open payment processing transitioned to the Key 2.0 back-office
- Launch of the new customer website to support open payment transaction lookup

Future transition periods, introduce new Key 2.0 fare media (cards and Disposal Smart Media (DSM)) and new sales channels including:

- Customer Mobile Application
- Retail Network

- Customer Service Point-of-Sale (POS)
- Fare Vending Machines (FVM)

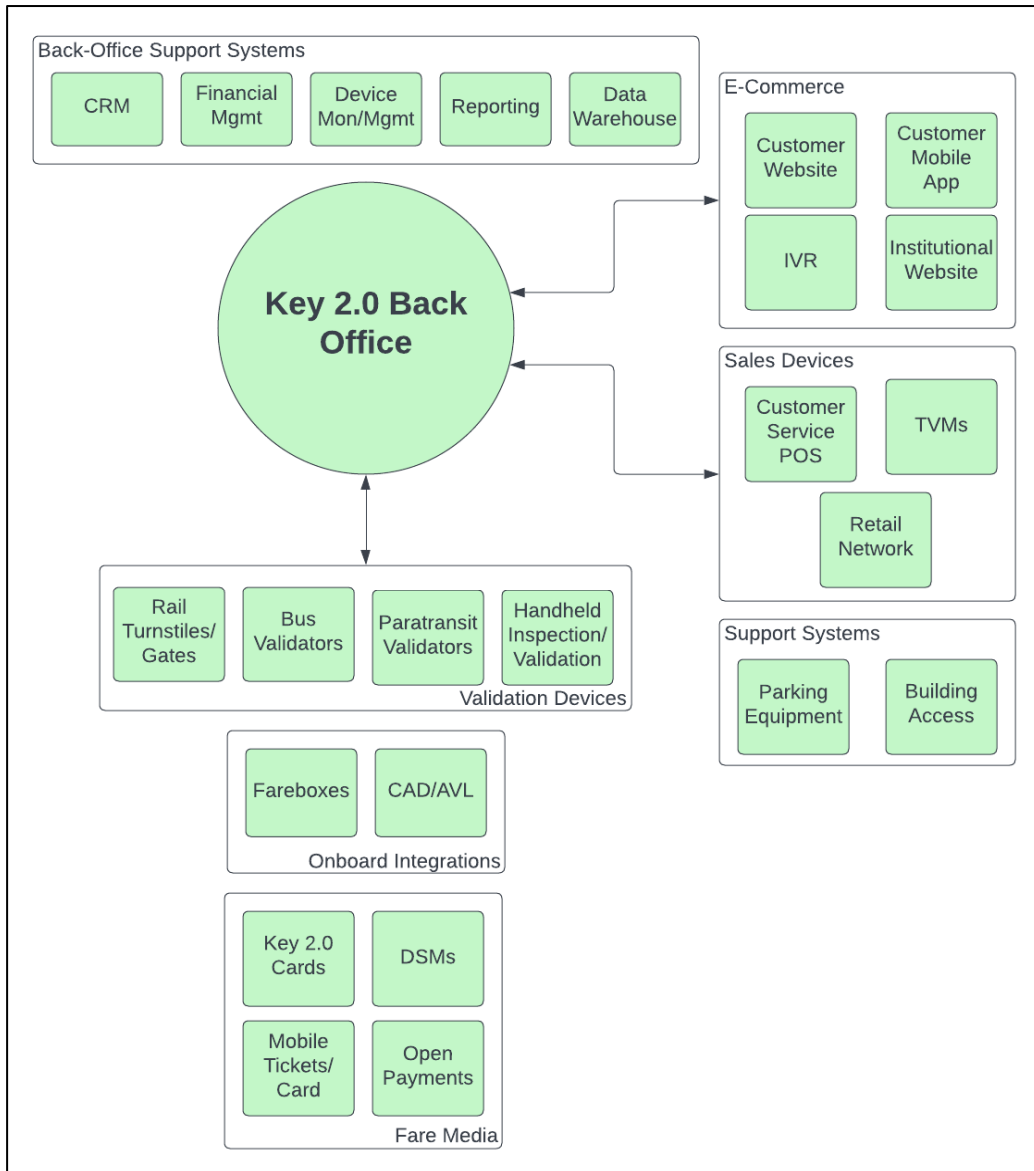
Figure 3: Transition Period



Once the Transition Period summarized in Figure 3 has been executed, SEPTA will initiate a period to discontinue Key 1.0 fare media sales and reloads. Customers will be allowed to use remaining value for a limited duration determined by SEPTA. After this period ends, customers will be required to perform a fare product (e.g., stored value and passes) exchange to new Key 2.0 fare media. Once this period is complete, Key 1.0 system decommissioning may commence.

The final period includes full implementation as illustrated by Figure 4. This period launches the institutional website to support program sales and administration. In addition, the parking equipment and building access integrations are completed during this period.

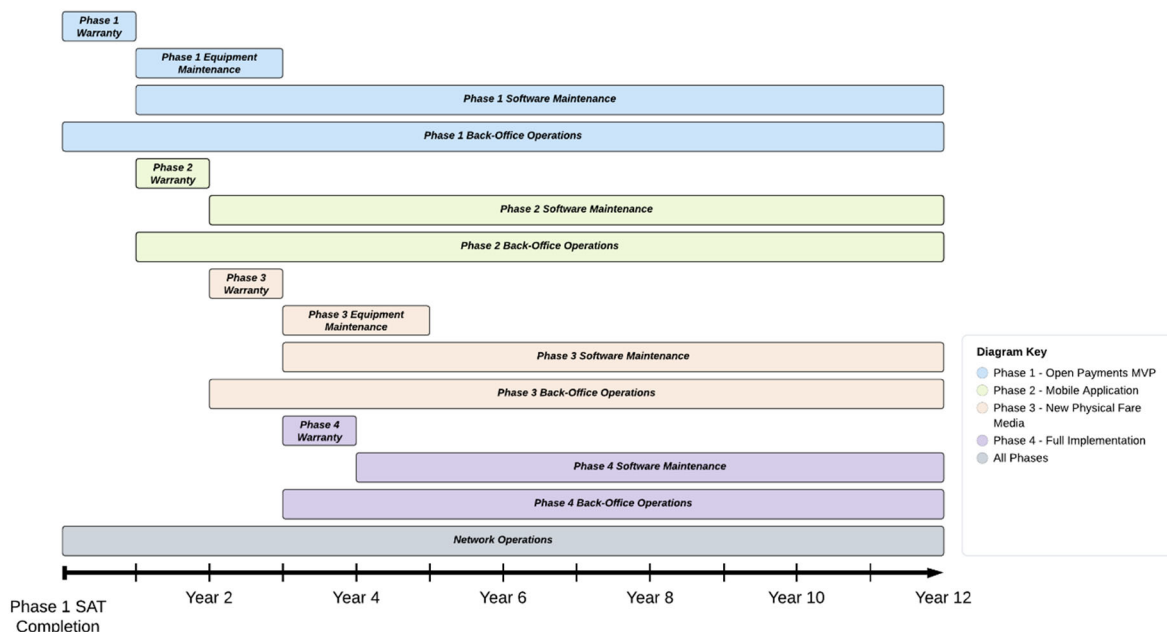
Figure 4 – Full Transition



2.3 Operations Approach

The Contractor shall provide a warranty that covers the components and modifications of the core system delivered at each applicable phase for a minimum of [one (1) year], to commence after the completion of system acceptance of each phase. A [12 year] Software Maintenance Agreement (SMA), Back-Office Operations Agreement (BOA), and Equipment Maintenance Agreement (EMA) will be provided for Phase 1, the core back-office systems and fare equipment, and will remain in effect for the duration of the Contract. Coverage at each phase will meet the requirements in the System Operations Requirements. Figure 5 represents a generic staggering of the implementation of the warranty, SMA, BOA, and EMA. The timeline shows the required minimum [one (1) year] warranty duration for illustration purposes.

Figure 5: Deployment Phase Timeline



Phase 2, Phase 3, and Phase 4 SMA and BOA will be added to the core (Phase 1) agreements and will only include the new components delivered with each phase. The EMA will be added to the core agreements as new hardware equipment is delivered. The durations for the phase's agreements will correlate to the remaining duration of the core Phase 1 SMA, BOA, and EMA. The incremental update for each phase to the core (e.g., Phase 1) SMA, BOA, and EMA is represented by the phased SMA, BOA, and EMA line items in the Financial Proposal Form. The Contractor will provide the Phase 2, Phase 3, and Phase 4 incremental increase that will be added to the Phase 1 SMA, BOA, and EMA in 2026 dollars.

Along with SMA, BOA, and EMA, the Contractor will also be responsible for wired and wireless communication for the system, under the Network Operations Agreement (NOA), which includes the configuration of the wired and wireless communication of the AFC System, and owning and managing any service contracts with communication service providers. More details are provided in the System Operations Requirements.

3. Technical Specification Format

The Contractor shall provide services described in the AFC System requirements and shall exercise independent and professional judgment in performing the services under this Contract. The requirements in all sections collectively represent a complete and cohesive AFC System solution regardless of the provider (e.g., Contractor or subcontractor). Many of the requirement sections are applicable across all system and application requirements. Services provided by the Contractor will comply with all applicable SEPTA manuals, procedures, and memorandums in effect at the time of execution of the Contract unless otherwise directed in writing by SEPTA. Such manuals, procedures, and memorandums will be provided by SEPTA. A reference to "shall" in connection with an action or obligation shall be interpreted as "required" or "must", and is not permissive.

The requirements in these specifications are functional and intended to describe the behavior or performance of the AFC System, with details specified, as necessary. The requirements are organized in a table format, and divided into the following Sections:

- *Section 1: Introduction*
 - *Project background and description of the current system*
- *Section 2: Future System Overview*
 - *Brief description of the new AFC System*
- *Section 3: Technical Specification Format*
 - *A guide on the overall structure of the system requirements*
- *Section 4: Project Management Requirements*
 - *Requirements for project management plan and processes*
- *Section 5: Common Design Requirements*
 - *General hardware and software requirements that apply to the entire system*
- *Section 6: System Architecture Requirements*
 - *Core system design principles and requirements*
- *Section 7: Payment Processing Requirements*
 - *Payment processing requirements for the acceptance of open payments*
- *Section 8: System Security Requirements*
 - *Requirements for cybersecurity, fraud controls and cryptographic key management*
- *Section 9: Fare Structure Requirements*
 - *Fare policies, pricing, products, and distribution that the system needs to support*
- *Section 10: Fare Equipment Requirements*
 - *Requirements for Contractor-provided fare distribution, payment, and inspection devices*
- *Section 11: Back-Office Components Requirements*
 - *Requirements for Contractor-provided central back-office system and support systems*
- *Section 12: Customer Applications Requirements*
 - *Requirements for Contractor-provided websites, mobile application, and Interactive Voice Response system*
- *Section 13: Retail Network (Option)*
 - *Requirements for the distribution of fare media and products through retail outlets*
- *Section 14: System Integration Requirements*
 - *Requirements for the integration of the new AFC System with existing SEPTA systems*
- *Section 15: Design Review Requirements*
 - *Requirements for the execution of the Design Phase of the Project*
- *Section 16: Testing Requirements*
 - *Requirements for detailed testing of the system, broken down into Phases*
- *Section 17: Training Requirements*
 - *Requirements for staff training and associated materials*
- *Section 18: Installation Requirements*
 - *Requirements for site preparation and system installation*
- *Section 19: System Transition Requirements*
 - *Requirements for supporting the transition from the current Key System as part of the new system implementation*
- *Section 20: System Operations Requirements*
 - *Requirements for all system operating responsibilities following Final Acceptance*
- *Section 21: System Performance Requirements*

- *Description of performance requirements to be measured during acceptance testing and throughout system operations*

Section narratives are included to provide a guide to the Contractor on the overall structure of the system requirements for each set of requirements in this SOS.

Each Section and/or subsections' Requirement Table includes the following (see Table 3 as an example):

- **Req #:** A unique requirement identification number that reflects an iterative sequential numbering beginning with the Section number.
- **Requirement:** A clear description of the requirement and/or specification.
- **Assigned CDRL:** Reference to a corresponding Contract Data Requirements List (CDRL) number that identifies which document delivered by the Contractor should contain the requested information or describe how the proposed solution shall meet the associated requirement. A single CDRL may encompass many requirements.

A CDRL table is included at the end of each major section under the required submittal header that summarizes the CDRLs to be provided, and the design phases in which they shall be delivered. A complete CDRL Table is in Section 22.

Table 3: Requirement Format Example

Req #	Requirement	Assigned CDRL
EX-01-001	A description of the requirement will be located here. Requirements are grouped into sections to describe features or functions relevant to the specific topic. Including overarching requirements specific to the complete solution.	XX-##
EX-01-002	This is an example of another requirement that when combined with all the requirements in the section, articulate the required capabilities of the solution.	XX-##

4. Project Management Requirements

System requirements that describe roles and responsibilities of the Contractor as it relates to the project management.

4.1 Project Manager and Technical Leads

Req #	Requirement	Assigned CDRL
PM-04-01-001	The Contractor shall designate responsible and experienced individuals to serve as the Project Manager (PM) and Technical Lead for the entire term of the Contract. Both the PM and Technical Lead shall maintain close collaboration throughout the project lifecycle. The Contractor shall also designate a responsible and experienced individual to serve as the Financial Systems Lead for the entire term of the Contract. The Financial Systems Lead shall provide subject matter expertise on project design, implementation, and operations on the back-office financial and accounting components. The Contractor shall also designate a Project Scheduler. The Project Scheduler must have at least [3 years] of experience using Microsoft Project or Oracle Primavera P6 in developing, managing, and maintaining large complex integrated project schedules.	PM-01
PM-04-01-002	The designated leads for PM, Technical, and Financial Systems shall be subject to SEPTA review and approval.	PM-01
PM-04-01-003	The designated PM, Technical Lead, and Financial Systems Lead must be three different individuals, and all shall be subject to SEPTA's review and approval.	PM-01
PM-04-01-004	The PM shall be fluent in English with strong verbal and written communication skills and possess at least [five (5) years] of demonstrable, recent, and extensive experience managing electronic payment system projects that includes multiple points of integration with third-party systems and devices. The PM shall have a project management certification, such as Project Management Professional or equivalent.	PM-01
PM-04-01-005	The Technical Lead shall be fluent in English with strong verbal and written communication skills and possess at least [five (5) years] demonstrable, recent, and extensive experience serving in a lead technical role on electronic payment system projects that include multiple points of integration with third-party systems and devices. The Technical Lead shall also have cybersecurity experience.	PM-01
PM-04-01-006	The Financial Systems Lead shall be fluent in English with strong verbal and written communication skills and possess at least [five (5) years] demonstrable, recent, and extensive experience serving in a lead financial role on electronic payment system projects that include multiple points of integration with third-party systems and devices.	PM-01

Req #	Requirement	Assigned CDRL
PM-04-01-007	The Technical Lead shall be [100%] allocated to the SEPTA Project, located in the Philadelphia area and be onsite no less than [75%] of the time to provide onsite support beginning no later than [30 calendar days] following Notice to Proceed (NTP) and continuing through Final Acceptance.	PM-01
PM-04-01-008	The Quality Engineer shall be onsite during software and hardware deployments, as well as all formal onsite testing.	PM-01
PM-04-01-009	The PM shall be [100%] allocated to the SEPTA Project, located in the Philadelphia area and be onsite no less than [50%] of the time to provide onsite management support beginning no later than [30 calendar days] following NTP and continuing through Final Acceptance.	PM-01
PM-04-01-010	Contractor staff consistency is important and key staff, including the PM, Technical, and Financial Systems Leads, shall be assigned to this Project throughout its duration unless contractually released.	PM-01
PM-04-01-011	Removal or replacement of the PM, Technical, Financial Systems Leads, or Quality Engineer by the Contractor shall require prior approval by SEPTA. The Contractor request to remove or replace the PM, Technical, Financial Systems Leads, or Quality Engineer shall be made in writing and include the reason for removal or replacement. When approved changes are made, the Contractor shall provide SEPTA with an updated project organization chart.	PM-01
PM-04-01-012	In the event that any key Contractor staff (PM, Technical Lead, Financial Systems Lead, or Quality Engineer) is found unacceptable by SEPTA, or needs to be replaced for any reason, the Contractor shall provide a replacement candidate within [90 calendar days]. Replacement candidates shall be subject to SEPTA's approval.	PM-01

4.1.1 Project Management Office (PMO)

Req #	Requirement	Assigned CDRL
PM-04-01-01-001	The Contractor shall stand up a full-time Project Management Office (PMO) facility within [10 miles] of SEPTA's Test Lab located at 1234 Market Street, Philadelphia, Pennsylvania, for Contractor staff to work and collaborate. The PMO facility shall be located within [1/2 mile] of a transit stop. SEPTA staff shall be approved as visitors to the PMO facility and have access to audit the QA/QC program and activities.	PM-01

Req #	Requirement	Assigned CDRL
PM-04-01-01-002	The PMO shall adopt and adhere to best practices, status reporting, templates, tools, safety and security requirements and training requested by SEPTA.	PM-01
PM-04-01-01-003	The PMO shall be staffed and provide daily onsite management support beginning [90 days] after NTP and continuing operations through Final Acceptance.	PM-01
PM-04-01-01-004	The PMO shall include the Contractor's PM, Technical Lead, Financial Systems Lead, Quality Engineer, and other resources as needed throughout the duration of the Project.	PM-01
PM-04-01-01-005	The PMO shall include all necessary equipment, environments, tools, applications, systems, network connectivity, and fare media to simulate test and production environments.	PM-01

4.2 Project Meetings

The Contractor shall participate in regular project coordination and status meetings throughout the life of the Project. Meeting topics may range from general project status updates to key discussions and decision-making. The Contractor shall facilitate project meetings and develop agendas based on input from both the Contractor's team, as well as SEPTA. The Contractor shall also take and disseminate meeting minutes, following up on actions and maintaining an action item list that includes actions for the Project.

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.

Req #	Requirement	Assigned CDRL
PM-04-02-01-001	No later than [21 calendar days] following NTP, the Contractor shall participate in a Project Kickoff Meeting to be held at SEPTA's office. A virtual meeting may be used in lieu of an in-person meeting at the discretion of SEPTA. Microsoft Teams is the preferred technology for any teleconference meetings held with SEPTA, although this technology preference may be changed at the request of SEPTA.	Continuous

Req #	Requirement	Assigned CDRL
PM-04-02-01-002	The Contractor shall work with SEPTA to assemble an agenda for the Project Kickoff Meeting that introduces key points of contact between SEPTA's project team and the Contractor, reviews project roles and responsibilities, reviews the Contractor's SOS, and provides a draft project baseline schedule. The Contractor shall be responsible for documenting minutes and submitting those minutes for SEPTA's review within [three (3) business days] following the meeting.	Continuous
PM-04-02-01-003	The Contractor shall support and attend (as requested) meetings for subsequent projects that provide SEPTA services and integrate with the AFC System back-office.	Continuous
PM-04-02-01-004	After the initial Project Kickoff Meeting, the Contractor shall hold additional project phase kickoff meetings for each subsequent project phase (Phase 2 and Phase 3) no later than [21 calendar days] following the NTP for each of the applicable project phases. These meetings are to be held at SEPTA's office. A virtual meeting may be used in lieu of an in-person meeting at the discretion of SEPTA.	Continuous

4.2.2 Progress Review Meetings

Req #	Requirement	Assigned CDRL
PM-04-02-02-001	The Contractor shall prepare and submit to SEPTA a Monthly Progress Report that addresses the following topics: (1) Review and status of actions from previous meetings; (2) Updated master program schedule showing progress against the approved baseline schedule; (3) Status of all current key activities, upcoming activities, issues, delayed activities and cause, and corrective actions; (4) Update of all identified project risks and the actions taken towards mitigating those risks, and an updated risk register; and (5) Updated CDRL indicating the current status of each document. The progress report may vary depending on project needs and priorities. SEPTA may request other items not listed here.	Continuous
PM-04-02-02-002	The Contractor shall facilitate monthly progress review meetings at SEPTA's facilities. Meetings shall be held monthly or more frequently as the Project requires. Live video or teleconference meetings may be used as allowed by SEPTA.	Continuous

Req #	Requirement	Assigned CDRL
PM-04-02-02-003	The Contractor shall prepare and submit an agenda for the monthly progress review meetings at least [five (5) business] days prior to the scheduled meeting for review and approval by SEPTA. The Contractor shall include required SEPTA and staff resources for each topic on the agenda.	Continuous
PM-04-02-02-004	Monthly project review meeting topics to be discussed and reviewed shall include both non-technical and technical agenda items. Non-technical topics shall include, and are not limited to: (1) Prior progress review meeting minutes; (2) Master program schedule updates; (3) Design Review progress; (4) Action item log updates; (5) Issues and risk list updates; and (6) A summary of progress made since the last meeting.	Continuous
PM-04-02-02-005	Monthly project review meeting technical agenda items shall include participation from the Contractor's technical resources as needed. Topics shall include all technical issues arising from proposed changes and other circumstances which affect the progress of the work, and a summary of engineering or development. A quality control summary and any needed corrective measures shall also be provided as necessary.	Continuous
PM-04-02-02-006	All key decisions needed by SEPTA shall be presented to SEPTA and include recommendations from the Contractor with pros and cons associated with the Contractor's recommendations.	Continuous
PM-04-02-02-007	The Contractor shall be responsible for documenting minutes for all monthly progress review meetings and submitting those minutes for SEPTA to review within [three (3) business days] following each meeting.	Continuous

4.2.3 Weekly Project Coordination Meetings

The purpose of weekly 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	Assigned CDRL
PM-04-02-03-001	The Contractor shall facilitate weekly project coordination meetings. At a minimum, the Contractor's PM and Technical Lead shall participate in all weekly project coordination meetings.	Continuous

Req #	Requirement	Assigned CDRL
PM-04-02-03-002	The Contractor shall prepare and submit an agenda and project status overview at least [two (2) business days] prior to all weekly project coordination meetings for review and approval by SEPTA. The weekly project coordination meeting shall include a timeline of activities, task updates since the last meeting, review of all open action, detailed discussion on any decisions needed by SEPTA's project team, and other topics as required.	Continuous
PM-04-02-03-003	The Contractor shall be responsible for documenting minutes for each weekly project coordination and ad-hoc meetings and submitting those minutes for SEPTA to review within [three (3) business days] following each meeting.	Continuous
PM-04-02-03-004	The Contractor's Technical Lead, PM, and other designated staff shall participate as required in other ad-hoc meetings to facilitate project coordination and decision making.	Continuous

4.3 Project Management Plan (PMP)

The Contractor shall submit a comprehensive Project Management Plan (PMP) that details project organization including schedule, risk, safety, quality and change management, and all other aspects of the Project specified in this section.

4.3.1 Project Management Plan (PMP) General Requirements

Req #	Requirement	Assigned CDRL
PM-04-03-01-001	A PMP shall be submitted no later than [21 calendar days] following NTP for SEPTA's review and approval. The PMP shall incorporate each project phase's unique requirements and shall be continuously updated throughout the Project.	PM-01

Req #	Requirement	Assigned CDRL
PM-04-03-01-002	The PMP shall include the following elements: (1) Organization chart identifying key project personnel and contact information; (2) Master program schedule, identifying key program milestones and activities; (3) Schedule for all project design and manufacturing elements that require SEPTA's approval; (4) Project meeting schedule; (5) Methodology to control program schedule, scope, cost, and risk; (6) Project risk management processes and risk register, including identified project risks and actions required to mitigate them; (7) Transition and change management processes and procedures; (8) Safety processes and procedures; (9) Quality assurance processes and procedures to ensure that the requirements of the Contract are being met; (10) Subcontractor management and communications; (11) Document and Master Issues List (MIL) control processes and procedures, including version and traceability controls; (12) Configuration management processes and procedures for all submittals and subsequent revisions; and (13) Document SEPTA's stakeholders and decision-makers. At a minimum, the PMP must be maintained and updated on monthly basis, to reflect changes in staffing, through Final System Acceptance. Additional elements of a PMP may be proposed or requested by SEPTA.	PM-01

4.3.2 Master Program Schedule

Req #	Requirement	Assigned CDRL
PM-04-03-02-001	The Master Program Schedule shall identify all program activities, deliverables, and key milestones (including those owned by SEPTA and third-party contractors), with expected and actual completion dates.	PM-01
PM-04-03-02-002	The Master Program Schedule shall be developed using Microsoft Project or Oracle Primavera P6.	PM-01
PM-04-03-02-003	Unless otherwise set forth in the requirements, the Contractor shall work with SEPTA to determine acceptable delivery and review timeframes for all SEPTA-owned deliverables and activities within the Master Program Schedule. All proposed times shall be subject to review and approval by SEPTA. Any impacts to cost, time and scope shall be communicated to SEPTA.	PM-01
PM-04-03-02-004	The listing of activities in the Master Program Schedule shall contain 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 AFC System.	PM-01

Req #	Requirement	Assigned CDRL
PM-04-03-02-005	The Master Program Schedule approved by SEPTA shall become the baseline schedule, against which subsequent schedule updates shall show performance. Baseline schedule shall not change except with written approval by SEPTA.	PM-01
PM-04-03-02-006	The Master Program Schedule shall designate intermediate program milestones and target dates to track ongoing performance.	PM-01
PM-04-03-02-007	The Contractor shall update the Master Program Schedule on a monthly or more frequent basis and submit the updated schedules for SEPTA's review and approval.	PM-01

4.3.3 Scope Management

Req #	Requirement	Assigned CDRL
PM-04-03-03-001	As part of the PMP, the Contractor shall provide a Scope Management Plan that shall guide how project scope shall be defined, documented, verified, managed, and controlled by the project management team. This plan shall include: (1) Scope definition: A process to prepare detailed project scope statements based on the preliminary project scope; (2) a Work Breakdown Structure (WBS): A process that establishes how the WBS shall be maintained and approved; (3) Scope Verification: How formal verification and acceptance of the completed project deliverables shall be obtained; and (4) Scope Control: A process to control changes to project scope directly linked to integrated change control.	PM-01

4.3.4 Cost Management

Req #	Requirement	Assigned CDRL
PM-04-03-04-001	As part of the PMP, the Contractor shall include a Cost Management Plan that clearly defines how the costs of the Project shall be managed throughout the project lifecycle. Earned Value (EV) shall be used to measure and monitor the level of work completed against the plan.	PM-01

Req #	Requirement	Assigned CDRL
PM-04-03-04-002	The Cost Management Plan shall set the format and standards by which the project costs are measured, reported, and controlled. It shall identify who is responsible for managing costs and who is authorized to ask SEPTA to approve changes to the Project or its budget.	PM-01
PM-04-03-04-003	The Cost Management Plan shall also specify how cost performance is quantitatively measured and detail cost report formats, frequency, and to whom they are presented.	PM-01

4.3.5 Risk Management

The PMP shall include a Risk Management Plan that describes the processes that the Contractor shall follow to identify and manage potential risks that threaten to increase project costs, lengthen the project schedule, or compromise project performance.

Req #	Requirement	Assigned CDRL
PM-04-03-05-001	As part of the PMP, the Contractor shall include a Risk Management Plan that shall address risk planning, risk identification, risk analysis, and risk control, and shall be reviewed and updated on a monthly basis, or as requested by SEPTA.	PM-01
PM-04-03-05-002	The processes that the Contractor shall follow for mitigating risk from the project shall be identified, along with the processes for identifying, evaluating, and reporting (i.e., to SEPTA) future risks.	PM-01
PM-04-03-05-003	The processes for developing and implementing corrective action plans to lessen the impact an unexpected event has on the Project shall be identified, as shall the process for returning the Project to steady-state.	PM-01
PM-04-03-05-004	The Contractor shall maintain a comprehensive Project Risk Register comprised of data fields including, and not limited to: Risk Title, Risk Statement, Risk Owner, Risk Status, Risk Consequence, Probability Score, Impact Score, Initial Risk Rating, Current Risk Rating, Mitigation Approach, Mitigation Status, and Due Date. Regular updates to the Project Risk Register shall occur as part of scheduled project meetings.	PM-01

4.3.6 Transition and Change Management

Pertaining to this SOS, Change Management refers to the systematic and structured approach in addition to supporting tools for leading SEPTA through internal and external changes.

Req #	Requirement	Assigned CDRL
PM-04-03-06-001	The Contractor shall include a Transition and Change Management Section as part of the PMP for review and approval by SEPTA.	PM-01
PM-04-03-06-002	The Contractor shall reference the detailed Transition and Change Management Section (as identified in the System Transition Requirements section) for all technical system design aspects related to the transition. The Transition and Change Management Section of the PMP shall focus on operations and stakeholder impacts. The section shall describe in detail the change from current operations to the new AFC System for SEPTA, as well as impacts for external stakeholders and the public.	PM-01
PM-04-03-06-003	The Transition and Change Management Section shall document critical changes to program stakeholders, as well as change management and risk mitigation procedures.	PM-01
PM-04-03-06-004	The Transition and Change Management Section shall document the transition process, including any additional, temporary, or special equipment and/or staffing requirements.	PM-01

4.3.7 Quality Assurance and Control (QA/QC)

As part of the PMP, the Contractor shall establish, implement, and maintain an effective QA Program Plan to manage, control, and document the work performed, and ensure that it complies with the requirements of the Contract.

Req #	Requirement	Assigned CDRL
PM-04-03-07-001	As part of the PMP, the Contractor shall establish, implement, and maintain a QA Program Plan governing the work performed by the Contractor, and any subcontractors.	PM-01
PM-04-03-07-002	The QA Program Plan shall describe the overall quality policies and responsibilities that shall ensure the quality of work performed for each phase of the project.	PM-01

Req #	Requirement	Assigned CDRL
PM-04-03-07-003	The QA Program Plan shall contain a collection of all forms to be used for the documentation of quality control activities, which ensure compliance of materials, processes, personnel, and products with the applicable specifications.	PM-01
PM-04-03-07-004	The QA Program Plan shall include written descriptions of QA and QC policies and procedures, including the procedures that the Contractor shall follow to ensure that controls and detailed documentation are maintained throughout software development and configuration changes.	PM-01
PM-04-03-07-005	The QA Program Plan shall at minimum include procedures for the following activities: (1) Surveillance overall work, including by subcontractors, to ensure compliance with all Contract requirements; (2) Verification of compliance, including audit, discrepancy identification, notification, and corrective action; (3) Evaluation and assessment of subcontractors' QA programs; (4) Provision of technical documentation, drawings, specifications, handbooks, manuals, data flow diagrams, and other technical publications for the new AFC System and supplied equipment (if applicable), including traceability back to requirements; (5) Design control and version management for changes to documents, drawings, data, and specifications; (6) System software development (consistent with IEEE Standard 730 or equivalent ISO 9001 standards for software QA); (7) Test plan, test cases, testing and certifications; (8) Equipment handling, inventory, storage, and delivery; (9) System configuration management; (10) Qualification and certification for all personnel performing work under the Contract; and (11) Data Protection Impact Assessments (DPIA), including traceability to any data that may be impacted by a system design change, including data extracts provided to SEPTA. As part of the QA Program Plan, the Contractor shall participate and assist with SEPTA audits. The QA Program Plan shall include QA activities throughout the lifecycle of the delivery, to be performed prior to proceeding to the next project phase. The Contractor shall ship all security related items to SEPTA-designated personnel. The Contractor shall provide identical copies of all shipping documents to Contractor and SEPTA-designated personnel.	PM-01
PM-04-03-07-006	The QA Program Plan shall define methods of designing for, achieving, and maintaining quality. If defects, errors, or inaccuracy are found in any work, SEPTA shall have the right to reject or require corrective action to bring the work into compliance with the Contract requirements. The Contractor shall bear all costs incurred in correcting rejected work.	PM-01

Req #	Requirement	Assigned CDRL
PM-04-03-07-007	The Contractor shall designate an experienced Quality Engineer responsible for quality assurance over the entire term of the Contract. The designated Quality Engineer shall be subject to SEPTA's approval.	PM-01
PM-04-03-07-008	The Contractor shall not commence the performance of any design or work until SEPTA has approved the QA Program Plan.	PM-01
PM-04-03-07-009	The Contractor shall use the defined QA procedures as an integral part of its design development and review process.	PM-01
PM-04-03-07-010	The Contractor shall identify design variances from Contract requirements and document and report variances to SEPTA before equipment procurement, fabrication, or installation.	PM-01

4.3.8 Subcontractor Management

Req #	Requirement	Assigned CDRL
PM-04-03-08-001	The PMP shall include a Subcontractor Management Section outlining all activities to be performed by subcontractors, and procedures for organizing and communicating with subcontractors.	PM-01
PM-04-03-08-002	The Contractor shall manage activities of subcontractors, including providing all necessary plans, specifications, and instructions to its subcontractors and suppliers to enable them to properly perform their work.	PM-01
PM-04-03-08-003	The Contractor shall ensure that subcontractors or suppliers are informed of all applicable requirements in this SOS and that appropriate engineering and project management tools are utilized for coordination and communication.	PM-01
PM-04-03-08-004	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, SEPTA shall have access to all subcontractors.	PM-01
PM-04-03-08-005	The Subcontractor Management Section of the PMP shall include procedures and processes to be followed for the replacement of any subcontractors throughout the duration of the Contract.	PM-01

Req #	Requirement	Assigned CDRL
PM-04-03-08-006	The Subcontractor Management Section shall include activities to be performed by Disadvantaged Business Enterprises (DBEs), and other recognized subcontractor categories, as defined by the United States (U.S.) Department of Transportation. It shall identify the Contract revenues to be allocated to such firms, and the means of encouraging, tracking, and controlling DBE participation throughout the Project.	PM-01

4.3.9 Communications Management and Document Control

Req #	Requirement	Assigned CDRL
PM-04-03-09-001	The PMP shall outline who is responsible to deliver and respond to various communications, who receives which communications, and how and when communications shall be delivered.	PM-01
PM-04-03-09-002	The Contractor shall ensure that stakeholder communication needs are understood. This includes determining what communication work products shall be exchanged throughout the Project (e.g., status updates, meeting minutes, reports, deliverables).	PM-01
PM-04-03-09-003	Throughout the duration of the Contract, in coordination with SEPTA and the primary relationship manager as the communications lead, the Contractor shall actively communicate with SEPTA and participating third-parties.	PM-01
PM-04-03-09-004	The Contractor shall store and maintain all program documents, manuals, meeting materials, submittals, and correspondence in an editable electronic form with a SEPTA-provided Document Control System to provide robust and secure document control, as per the terms of the Contract. The Document Control System shall be available within [30 days] of NTP and may include users from third-party entities providing services and solutions for SEPTA's program. Access to the Document Control System and specific documents (e.g., access permission) for SEPTA's partners and third-parties, shall be determined by SEPTA.	PM-01
PM-04-03-09-005	Project documents shall be categorized and numbered within the Document Control System according to an established document control scheme. The Document Control System shall include version control to provide access to prior versions of documents, while identifying current versions.	PM-01

4.3.10 Master Issues List (MIL)

Req #	Requirement	Assigned CDRL
PM-04-03-10-001	The Contractor shall maintain an electronic MIL, that SEPTA shall have access to, for the ongoing tracking and management of project issues and action items. The MIL shall also track Risks, Assumptions, Issues, and Dependencies (RAID). The MIL shall be maintained in a web-based application such as Azure, Modern Requirements, or as directed by SEPTA.	PM-01
PM-04-03-10-002	MIL items shall be identified and updated during Design Review, weekly project coordination meetings, monthly progress review meetings, and on an ad-hoc basis.	PM-01
PM-04-03-10-003	For each item entered into the MIL, the following attributes for each entry shall include: (1) Unique identifying number; (2) Date opened and closed; (3) Name and role of the person identified; (4) Description of the issue; (5) Action needed to resolve issue; (6) Assigned party; and (7) Status. Other attributes may be required by SEPTA. No action items shall be assigned to SEPTA resources without SEPTA's knowledge and consent.	PM-01

4.3.11 Safety Assurance

Req #	Requirement	Assigned CDRL
PM-04-03-11-001	The Contractor shall include a Safety Assurance Section as part of the PMP that identifies all safety processes and procedures for review and approval by SEPTA.	PM-01
PM-04-03-11-002	The Safety Assurance Section shall identify and document safety risks, owners, and mitigation plans throughout the Project, and shall be reviewed and updated on a monthly basis, or as requested by SEPTA.	PM-01
PM-04-03-11-003	The Contractor shall designate an experienced Safety Engineer to be responsible for Safety Assurance over the entire term of the Contract. The Safety Engineer shall not have other roles or responsibilities outside of safety and shall be onsite while the Contractor performs any civil work, equipment installation, equipment modification, equipment removal, safety inspections, or safety-related work on SEPTA property. The designated Safety Engineer shall be subject to SEPTA approval.	PM-01

Req #	Requirement	Assigned CDRL
PM-04-03-11-004	The Safety Engineer shall document, review, and approve all system safety analyses to ensure that all hazards are adequately identified, and their impact is eliminated or controlled.	PM-01
PM-04-03-11-005	The Safety Engineer shall verify that all Contractor staff is trained in SEPTA-required safety policies and procedures and that those procedures are followed to the satisfaction of SEPTA. Any Contractor and subcontractor personnel that perform work on SEPTA premises shall maintain SEPTA and Amtrak safety certifications.	PM-01

4.4 Equipment and Software Change Control

Throughout the Contract, and beginning on a mutually agreed upon design freeze, the Contractor shall implement and maintain a change control process that encompasses the entire AFC System, including all Contractor and subcontractor, supplied equipment, and software. The change control process shall begin at the point of the design freeze. However, this shall not relieve the Contractor from meeting submittal requirements identified in the Contract.

The date for the design freeze shall reflect a point during the Project when the development of the AFC System is substantially complete. The Contractor or SEPTA may desire multiple design freeze dates based on system components. For example, a design freeze to represent hardware that the agency allows to begin manufacturing may be provided before the software or other components of the AFC System development is considered substantially complete.

The change control process provides a process to communicate engineering change requests to address issues or efficiencies in meeting the established requirements. This process is not intended to replace the SEPTA Contract change process that modifies, adds, or removes Contractual obligations or established requirements.

4.4.1 Change Control Process

Req #	Requirement	Assigned CDRL
PM-04-04-01-001	The Contractor shall work with SEPTA during the Design Review to develop a Change Control Plan that includes change control processes and procedures for SEPTA's review and approval of all changes that shall be implemented following a mutually agreed upon design freeze.	PM-02

Req #	Requirement	Assigned CDRL
PM-04-04-01-002	Hardware and software changes, including updates to approved documents, drawings, and data, shall be managed by following the Change Control Plan.	PM-02
PM-04-04-01-003	Requested changes shall be documented in Engineering Change Requests (ECRs) and shall include documentation describing the reasons for and effects of the change and shall be submitted to SEPTA for review and approval.	PM-02
PM-04-04-01-004	Accompanying each ECR for proposed software changes shall be comprehensive software release notes containing the following information at a minimum: (1) A description of the change; (2) List of the software modules updated by the release; (3) List of all defects corrected, including references to SEPTA's correspondence where applicable; (4) List of all new features included; (5) List of all features to be tested; (6) Copies of all applicable test procedures; and (7) Back-out procedures if the software fails to update. Other software release note elements may be requested by SEPTA.	PM-02
PM-04-04-01-005	Upon approval of the ECR, the Contractor shall install the proposed software change in SEPTA's test facility to undergo verification of new features and fixes, as well as regression testing. Upon successful verification, SEPTA shall authorize the Contractor to deploy the software change according to an approved deployment plan.	PM-02
PM-04-04-01-006	The Contractor shall be responsible for maintaining an ECR Status Report that lists all changes, the submittal and approval status, implementation status, and expected and actual completion dates.	PM-02
PM-04-04-01-007	Following equipment installation, approved ECRs shall generate Field Modification Instructions (FMI) that describe the process to update installed equipment and systems. FMIs shall require SEPTA review and approval prior to implementation.	PM-02
PM-04-04-01-008	An FMI shall include the following at a minimum: (1) Cover sheet; (2) Unique FMI number; (3) Title of FMI; (4) Equipment/systems affected, including spare parts (quantity, model, serial number); (5) Implementation location; (6) Signoff provisions for implementation; (7) Procedure; (8) Step-by-step implementation process; (9) Inspection procedure; (10) Testing procedure; (11) Supporting documentation; (12) Underlying ECR(s); (13) Affected documents and drawings, including any change to manuals and catalogs; and (14) Date.	PM-02

Req #	Requirement	Assigned CDRL
PM-04-04-01-009	The Contractor shall be responsible for all FMIs, even if the FMI is not performed directly by the Contractor. The Contractor shall approve subcontractor FMIs before submitting them to SEPTA.	PM-02

4.4.2 Hardware and Software Versioning

Req #	Requirement	Assigned CDRL
PM-04-04-02-001	Throughout the performance of the Contract, the Contractor shall adhere to the software quality and version control procedures submitted and approved as part of the QA Program Plan. The version identifiers for all provided hardware and software versions shall be unique.	PM-02
PM-04-04-02-002	After completing an approved hardware update, the Contractor shall submit an updated listing of the serial numbers and versions of the affected hardware components in a SEPTA-approved format. This listing shall include the date the revision was applied to each item. The Contractor shall submit failure reports for all hardware updates and replacements down to the Lowest Level Replaceable Unit (LLRU).	PM-02
PM-04-04-02-003	Throughout the hardware warranty period, the Contractor shall maintain accurate records of the versions of all serialized components, including all spare parts in inventory and shall track all equipment taken from spares so that it can be replaced by Contractor.	PM-02

4.4.3 Component Identification

The Contractor shall develop and submit for agency review and approval an equipment identification and labeling plan that identifies how the deployed AFC System shall comply with the requirements in this section.

Req #	Requirement	Assigned CDRL
PM-04-04-03-001	All equipment shall be permanently identified with a manufacturer or supplier name, part number, and serial number.	PM-02

Req #	Requirement	Assigned CDRL
PM-04-04-03-002	The Contractor shall assign unique serial numbers to equipment and modules, enabling tracking of components for maintenance, repair, and warranty, and to provide sufficient identification to analyze failures.	PM-02
PM-04-04-03-003	The serial numbering scheme and format shall be submitted for SEPTA review and approval. Where possible, serial numbers for like components shall be sequential.	PM-02
PM-04-04-03-004	Serial numbers shall be engraved, with barcodes, on metal labels that are riveted in place or attached by another approved permanent method.	PM-02
PM-04-04-03-005	Labels shall be placed in areas where they are likely to avoid wear and fading and shall include barcode. The location of the serial number labels shall be chosen for readability without disassembly of equipment or components. Each fareline Turnstile/ADA Faregate shall be sequentially numbered. Remote control of farelines shall use this sequential number.	PM-02
PM-04-04-03-006	The visible serial number shall match the Electronic Serial Number (ESN) in all instances where an ESN is assigned to a device. For all customer-facing units, the serial numbers should be clearly visible and noted "For Customer Service inquiries involving this device, please use the following: [Serial Number]."	PM-02
PM-04-04-03-007	At a minimum, the following equipment shall have serial numbers applied: (1) Bus Validators; (2) Driver Displays; (3) Fare Vending Machine (FVM) (and all major internal components/modules) (if the option is exercised); (4) Turnstile Readers and ADA Faregates (including Readers) (and all major internal components/modules); (5) Station Terminal Equipment; (6) Platform Validators; (7) Customer Service Terminals (CSTs); (8) Mobile Fare Inspection Devices; (9) Back-Office Hardware; and (10) Test Environment Devices and Back-Office Hardware.	PM-02
PM-04-04-03-008	Within [30 calendar days] following each phase's Final Design Review (FDR) approval, the Contractor shall furnish a list of the items that shall be serialized for SEPTA review and approval.	PM-02
PM-04-04-03-009	Serial numbers of all components shall be presented to SEPTA in the form of a Microsoft Excel spreadsheet included with the shipment of all equipment and modules.	PM-02

4.5 Required Submittals

CDRL ID	Contractor Deliverable	Due
PM-01	Project Management Plan (PMP)	NTP+21 calendar days
PM-02	Equipment and Software Change Control Plan	Design Review
NA	Meeting Agendas and Minutes	Continuous

5. Common Design Requirements

Common design requirements are applicable to the complete AFC System solution, including all software, applications, equipment, and services. This includes all subcontractor work and COTS solutions used to meet the overall system requirements. The Contractor shall address the common design requirements, as appropriate throughout the Design Review, testing, installation and ongoing operations and maintenance.

The Contractor shall ensure compliance with, at a minimum, the following applicable codes, laws, ordinances, statutes, standards, rules, and regulations identified below unless otherwise stated. The latest revisions in effect at the time of Final Acceptance shall 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
- National Institute of Standards and Technology (NIST)
- NCITS 322-2002, American National Standard for Information Technology – Card Durability Test Methods
- 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
- Current Web Content Accessibility Guidelines (WCAG) at the time of deployment

5.1 Common Design General Requirements

Req #	Requirement	Assigned CDRL
COM-05-01-001	The Contractor shall provide an AFC System to replace SEPTA's existing Key fare collection system. The Contractor's solution shall comply with all applicable local, state, and federal codes and regulations. All software and hardware provided by the Contractor shall be designed to provide a minimum useful life of [12] years beginning at the start of Beneficial Use (BU) (i.e., following the successful completion of Systems Acceptance Testing (SAT)).	As required
COM-05-01-002	SEPTA prefers a service-proven AFC System design that meets all of the following criteria: (1) Has been deployed and met system acceptance requirements at a minimum of [one (1) transit agency] with a gated rail system, an open proof-of-payment system, and FVMs; (2) Has been deployed and met system acceptance at a minimum of [one (1) transit agency] with a bus vehicle fleet; (3) Has been deployed and successfully integrated frontend equipment with a back-office system at a minimum of [one (1) transit agency]; and (4) 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].	As required
COM-05-01-003	The Contractor may offer, for approval, a design that is largely unchanged from a service-proven design, and 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 shall not adversely affect operation or maintenance in the planned environment.	As required

Req #	Requirement	Assigned CDRL
COM-05-01-004	The Contractor's solution shall be compliant with relevant standards, laws, and regulations to ensure that the AFC System: (1) Presents no safety hazards for customers and agency employees; (2) Shall withstand the rigors of the environments in which the equipment will be installed and the public use to which it will be subjected; (3) Provides for the secure storage and transmittal of data; (4) Is designed using state-of-the-art methods to maximize quality; and (5) Satisfies federal, state, and other requirements for ergonomics and usability.	As required

5.2 Nonproprietary Technology

Req #	Requirement	Assigned CDRL
COM-05-02-001	At the time of delivery, equipment, and all associated components and software shall not contain non-standard, prototype, obsolete, or discontinued products. The Contractor shall provide and execute a replacement plan for any hardware or software components that have end-of-life within this project timeline at no cost to SEPTA.	As required
COM-05-02-002	Where possible, the Contractor shall use COTS components and software applications, with custom software and hardware modules used only if necessary.	As required
COM-05-02-003	Smartcard media shall be available for competitive purchase from multiple U.S. sources. Throughout Contract's life the Contractor shall provide the specifications and associated documentation necessary to support the future procurement of smartcard media from third-parties that allow for competition.	As required
COM-05-02-004	The AFC System shall have a modular design for all relevant components. These modules shall support field replacement to return a device to service in minimal time in the event of a failure. The AFC System shall also permit upgrades and configuration changes without requiring component replacement or redesign. Upgrades or configuration changes shall not disrupt service.	As required
COM-05-02-005	All devices, components, parts, modules, assemblies, and subassemblies provided shall be fully interchangeable among those of the same type without the need to make adjustments for proper compatibility.	As required

Req #	Requirement	Assigned CDRL
COM-05-02-006	The Contractor shall design the AFC System so that incorporating technology upgrades may be done with no or minimal redesign of components, modules, and software, or other work. Technology upgrades shall not disrupt service.	As required

5.3 Software Design Principles

Req #	Requirement	Assigned CDRL
COM-05-03-001	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 required for AFC System operation to successfully meet the operational and performance requirements in these specifications.	As required
COM-05-03-002	AFC System software shall incorporate the following design elements at a minimum: (1) Be developed using a non-proprietary, hardware architecture-independent programming language; (2) Be fully integrated with the Operating System (OS) to support all required functions of the applications in both a networked and a stand-alone environment; (3) Not utilize or employ hard coding of configuration parameter values, except where expressly permitted in writing by the SEPTA PM; (4) Be fully tested, documented, and include all approved revisions introduced up to the time of Final Acceptance; (5) Be portable to other software platforms or languages where possible; and (6) Utilize object-oriented programming or equivalent programming methodology that encourages software reuse and minimizes development time.	As required
COM-05-03-003	AFC System software shall incorporate the following controls at a minimum: (1) Allow for the distribution of software modifications to all system devices from the back-office without field intervention or component replacement; (2) Be fully version-controlled, with the ability to revert to a previous software version or fork; (3) Support audit of activity to show when and what changes were made from version to version; (4) Be designed using best practices that allow for OS and database patches and upgrades to be applied with minimal testing; and (5) Be designed in such a way that no single component of the system is a point of failure for the AFC System as a whole. The AFC System shall contain sufficient resiliency so that the failure of a single component or module does not create a system-wide outage.	As required

Req #	Requirement	Assigned CDRL
COM-05-03-004	AFC System software shall incorporate the following diagnostic capabilities at a minimum: (1) Sample all input conditions at rates sufficient to detect and remedy all unsafe or damaging conditions in the shortest possible time; (2) Perform self-diagnostic routines and respond promptly and predictably to detected faults; (3) Respond predictably when powering up or recovering from power interruptions; and (4) Permit thorough interrogation of all input, output, and internal conditions by external diagnostic equipment.	As required
COM-05-03-005	Software upgrades shall be centrally managed and fully tested prior to installation. The AFC System shall be able to roll-back to previous software versions without adversely impacting operations. All software upgrades shall be at the discretion and approval of SEPTA.	As required
COM-05-03-006	All third-party software shall be at the latest commercial release at the time of FDR approval for each phase of the project. If a release candidate is pending, SEPTA shall review and approve the version that shall be deployed.	As required
COM-05-03-007	Solution software provided as part of the AFC System shall include provisions for network time synchronization and verifying date and time, with automatic adjustments for leap year and daylight savings time changes.	As required
COM-05-03-008	The AFC System shall be designed to support all required functions in a networked, degraded, and offline environment and shall automatically recover back to normal operations after any degradation or outage.	As required
COM-05-03-009	The AFC System software shall provide error codes that contain easily understood explanatory text and include the manner in which the error can be corrected. Error codes and correction measures shall be provided to SEPTA during Design Review.	As required
COM-05-03-010	The Contractor shall provide an AFC System that is compliant with relevant standards and regulations, including SEPTA-specific Information Technology (IT), security, open-source, and general software development standards. Details on SEPTA's IT standards are available online upon request.	As required
COM-05-03-011	The AFC System shall provide secure storage and transmittal of data. Data shall be encrypted in transit and at rest. The Contractor shall follow SEPTA encryption requirements (available upon request).	As required

Req #	Requirement	Assigned CDRL
COM-05-03-012	The Contractor shall employ a User Experience (UX)/User Interface (UI) designer for all customer-facing software solutions to provide a coherent customer experience, with a similar look and user experience across all customer interfaces (e.g., FVM, Websites, mobile app, IVR). The Contractor shall use the UX/UI designer for all customer service applications (e.g., CST, CRM) to provide modern, streamlined solutions focused on providing efficient customer service.	As required
COM-05-03-013	The customer registration process and data required for registration shall be consistent across all platforms and user interfaces that are used to create individual and institutional customer accounts. However, the process and data required for individual accounts verses Institutional accounts shall be different.	As required
COM-05-03-014	For all customer, institutional, and transit accounts, the Contractor shall provide a primary user authentication that is secure and uses modern best practices as it relates to user accounts and account authentication (such as user verification or username/password with multi-factor authentication) which allows users to access or make modifications to their account. Secondary user authentication shall be used to support users that do not have access to their primary authentication information. The secondary user authentication provided by the Contractor shall allow users that may not have access to mobile devices (e.g., cell phone), e-mail, or data from the physical or digital fare media security to gain access to their account. Authorized users shall be able to view and modify primary and secondary user authentication through any application and interface using the Contractor-provided Customer Account Application Programming Interfaces (APIs).	As required

5.4 Licensing and Data Ownership

Req #	Requirement	Assigned CDRL
COM-05-04-001	SEPTA shall own all data generated by the equipment, systems, and software delivered under this Contract. SEPTA shall be able to freely access and distribute all data free of charge. SEPTA shall retain ownership of all data in perpetuity with no restrictions or additional cost. Contractor shall have no rights to use customer data for any purposes outside of the contract and in fulfillment of services to SEPTA.	SDD-01

Req #	Requirement	Assigned CDRL
COM-05-04-002	All Contractor-provided documentation described in this SOS shall become the property of SEPTA or provided under a perpetual license to enable internal use and distribution to third-parties at no additional cost.	SDD-01
COM-05-04-003	The Contractor shall provide SEPTA with a perpetual license for all defined and documented system and software interfaces for internal use and distribution to third-parties at no additional cost. All third-parties are to be constrained by a Non-Disclosure Agreement.	SDD-01
COM-05-04-004	The Contractor shall provide SEPTA with all APIs, open-source code, libraries, and Intellectual Property (IP), including data exchange formats and algorithms under a perpetual license to enable internal use and distribution to third-parties at no additional cost. All third parties are to be constrained by a Non-Disclosure Agreement.	SDD-01
COM-05-04-005	The Contractor shall submit a Licensing and Data Ownership Plan that details all API, software, and associated licenses of the Project. Details shall include the quantities, Licensor, Licensee, License Type, software/version, and end user. Any terms associated with software or subscriptions for usage shall be clearly documented for SEPTA review and approval.	SDD-01

5.5 ADA Compliance and Accessibility

Req #	Requirement	Assigned CDRL
COM-05-05-001	All equipment, software, and customer interfaces shall be in compliance with ADA standards to maximize ease of use. The system equipment shall comply with the most recent version of the ADAAG at the time of Final Acceptance.	SDD-02
COM-05-05-002	The Contractor shall develop, test, and maintain all applicable customer-facing interfaces (e.g., FVM user interface, mobile app, websites, etc.) to the upcoming WCAG 2.2, with a minimum Level AA conformance (see W3C working draft if not officially released by the time Contract is awarded).	SDD-02

Req #	Requirement	Assigned CDRL
COM-05-05-003	The Contractor shall submit an ADA Compliance and Accessibility Plan to document the Contractor's approach to Usability and Accessibility Testing (see Integration Testing requirements) and how each customer-facing device and system shall achieve ADA compliance for SEPTA review and approval. The Contractor shall review the proposed design with representatives from the local ADA community and incorporate feedback from SEPTA and the local ADA community representative for each piece of equipment and user interface.	SDD-02

5.6 Required Submittals

CDRL ID	Contractor Deliverable	Due
SDD-01	Licensing and Data Ownership Plan	Design Review
SDD-02	ADA Compliance and Accessibility Plan	Design Review
As required in SDD-01 through SDD-30	<i>The Contractor shall provide confirmation of all requirements in all applicable system design documentation</i>	Design Review

6. AFC System Architecture Requirements

The new SEPTA AFC System shall 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 SEPTA.

6.1 Account-Based System

Req #	Requirement	Assigned CDRL
SAR-06-01-001	The Contractor shall design, develop, implement, and operate an account-based AFC System, which maintains unique transit accounts associated with each issued and/or accepted fare payment (i.e., closed-loop and open payment) credential.	SDD-03

Req #	Requirement	Assigned CDRL
SAR-06-01-002	All issued and accepted fare payment credentials shall contain a token (i.e., transit account identifier), which shall be captured during any system interaction with the credential and used to identify the associated transit account within the AFC System.	SDD-03
SAR-06-01-003	The AFC System shall use data maintained within transit accounts (e.g., fare value loaded, transaction records, and fare payment credential attributes) to process all fare sales, validation, and inspection transactions, as associated fare payment credentials are used by customers to initiate such transactions within the AFC System.	SDD-03

6.2 Online Transaction Processing

Req #	Requirement	Assigned CDRL
SAR-06-02-001	The AFC System shall constitute a real-time transaction processing system, such that all transactions generated by system devices and components, which may impact transit account balance or status, are completely processed within the time thresholds specified by the System Performance Requirements including completion of all necessary updates to transit account status and transaction records, and the return of processing results back to the device or component that generated the transaction.	SDD-03
SAR-06-02-002	All equipment to support hardwired network connections shall be provided by SEPTA. The Contractor shall be responsible for the configuration, testing, and maintenance of the communications network required to enable the secure transmission of all data between the Contractor-provided devices and AFC System back-office.	SDD-03
SAR-06-02-003	All hardwired network connections, with the exception of those connecting equipment onboard vehicles, shall be provided by SEPTA, and supported by a fiber backbone. The Contractor shall be responsible for identifying all communication requirements for Contractor-provided devices, including a description of any networking equipment necessary to connect the devices to SEPTA network at installation sites.	SDD-03

Req #	Requirement	Assigned CDRL
SAR-06-02-004	All AFC System devices and components using cellular communications shall operate on a cellular data network, using SEPTA-provided equipment with sufficient speed, bandwidth, and latency characteristics to meet all specified transaction timing requirements. All communications over the cellular network shall use a private Access Point Name (APN), Virtual Private Network (VPN), or both, as necessary to secure transmitted data and meet all applicable Payment Card Industry (PCI) requirements. The Contractor shall contract directly with the cellular carriers for cellular data service.	SDD-03
SAR-06-02-005	Online communication interfaces shall support on-demand (i.e., real-time) loading of fare products through all fare sales channels, on-demand processing of fare validations onboard vehicles and at rail stations, and on-demand fare inspection using all fare inspection devices.	SDD-03
SAR-06-02-006	Default processing of fare validation and inspection transactions shall assume an online connection between the AFC System back-office and device or component generating the transaction; however, fare validation and inspection transactions shall be processed offline by devices in the event that an online response is unavailable or not received within a configured timeout period. Fare sales transactions shall require an online connection to the AFC System back-office, unless otherwise specified and configured for specific devices and/or fare products (e.g., single ride ticket purchased from a FVM with cash) on an exception basis.	SDD-03
SAR-06-02-007	All transactions processed by devices in offline mode shall be flagged as such within the AFC System. The AFC System back-office shall process these transactions immediately upon receipt and make any required updates to the transit account balance and status. Both the offline (i.e., device) and online (i.e., server) transaction results shall be recorded within the AFC System transaction records. SEPTA shall be able to configure a threshold, up to [one (1) year] following transaction generation, after which late-arriving transactions processed offline shall no longer result in the associated transit account being updated. These transactions shall still be recorded in the AFC System for reporting purposes.	SDD-03

6.3 Open Architecture

The AFC System shall be designed and implemented using an open architecture approach to provide flexibility as technology and agency needs change. The open architecture shall apply to all fare media,

system interfaces, and transaction formats used for the management, distribution, payment, and inspection of fares. There is a strong preference for the use of open source and cloud-based infrastructure and applications.

6.3.1 AFC System Interfaces and APIs

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

Req #	Requirement	Assigned CDRL
SAR-06-03-01-001	The Contractor shall deliver an AFC System based on an open architecture design that provides access to all core back-office functions via published APIs. The APIs shall be designed, deployed, and hosted by the Contractor, and shall be made available to all system devices and components requiring access to back-office functions. The full range of APIs to be provided by the Contractor shall be identified during Design Review.	SDD-04
SAR-06-03-01-002	The Contractor shall develop and deliver comprehensive and flexible APIs, which are structured and organized around the core sets of functions provided by the back-office. APIs shall not be designed to support only integrations of a specific device or component, and instead provide access to core functionality that can be used commonly across all planned integrations. As such, integrated system devices and components may make use of more than one API set to deliver required functionality.	SDD-04
SAR-06-03-01-003	Each API shall be developed based on modern standards. The use of modern and secure standards shall extend to the method of API access (e.g., HTTPS), the architecture used for API design (e.g., REST), and the format of commands and data exchanged when using the APIs (e.g., JSON). The specific API architecture and format to be used shall be identified and agreed upon during Design Review.	SDD-04
SAR-06-03-01-004	The Contractor shall implement embedded and strong security features in the design of the APIs, based on industry-accepted best practices, to prevent unauthorized, fraudulent, and unintended use.	SDD-04

Req #	Requirement	Assigned CDRL
SAR-06-03-01-005	The Contractor shall publish detailed API specifications that describe the intended use for each delivered API set, the supported functions performed by each API within a set, and the methods and options available for accessing each function. API Specifications shall include for each API: (1) Detailed descriptions of all API calls; (2) Defined structure for each call; (3) Description of all data elements (e.g., type, format, required/option) present in each API call and return; (4) Description of all exception/error states and appropriate handling; (5) Timing requirements; (6) Use of internal security protocols; (7) Applicable use cases; and (8) Example execution codes with input and output parameters. API specifications shall also include architecture details about the systems and components supporting the API workflows.	SDD-04
SAR-06-03-01-006	The Contractor shall make use of its own APIs for all internal integrations and the access of functions between the back-office components the Contractor is delivering (e.g., between Account-Based Transaction Processor (ATP) and CRM Systems). The Contractor shall demonstrate its use of the APIs as part of AFC System implementation and testing.	SDD-04
SAR-06-03-01-007	The Contractor shall update the API specifications as necessary throughout design, implementation, testing, deployment, and operations (i.e., warranty, SMA, and Back-Office Operations terms). An impact assessment shall be performed to ensure API updates do not negatively affect AFC System devices and components.	SDD-04
SAR-06-03-01-008	The full range of APIs provided by the Contractor shall support all interfaces within the AFC System and shall not be limited to the specific APIs described in this Section. Any additional APIs that are required shall be identified during Design Review. The Contractor shall provide Interface Control Documentation (ICD) for each system interface that describes the interface and APIs used to support it.	SDD-04
SAR-06-03-01-009	The Contractor shall deploy an API gateway to govern the usage of all APIs and system resources for third-party integrators and developers. The Contractor shall develop a process to onboard third-party integrators and provide comprehensive integration guides to enable integrators to use the API with minimal assistance from the Contractor. The onboarding process and integration guide shall be subject to review and approval by SEPTA during Design Review.	SDD-04
SAR-06-03-01-010	The Contractor shall work collaboratively with third-parties to use and adapt the APIs in order to integrate new system devices and components to support the AFC System as described in these specifications.	SDD-04

Req #	Requirement	Assigned CDRL
SAR-06-03-01-011	The APIs and ICDs shall be fully owned by or licensed to SEPTA with the right to use and distribute the specifications without further approval, license, or payment.	SDD-04
SAR-06-03-01-012	The Contractor shall monitor the performance of all delivered APIs to identify and deploy optimizations for the continuous improvement of API response times. The AFC System shall be continuously scaled to ensure performance stability is maintained as additional API consumers are introduced to the system.	SDD-04
SAR-06-03-01-013	The Contractor shall be responsible for providing APIs to support the following functions: (1) Fare Sales; (2) Fare Validation; (3) Fare Inspection; (4) Transit Account Management; (5) Customer Account Management; (6) Device Management; and (7) Fare Pricing. Alternative categorization of APIs may be permitted, as long as the functional requirements described in these API specifications are met.	SDD-04
SAR-06-03-01-014	The Fare Sales APIs shall enable the sale of available fare media and fare products. The Fare Sales APIs shall be utilized by all new fare distribution devices and components, including: (1) Fare Vending Machines (FVM); (2) Customer Service Terminals (CST); (3) Customer Relationship Management (CRM) Systems; (4) Customer and Institutional Websites; (5) Mobile Applications; (6) Interactive Voice Response (IVR) Systems; and (7) Retailers.	SDD-04
SAR-06-03-01-015	The Fare Sales APIs shall support all functions necessary to facilitate the sale and refund of all available fare media and fare products across all current and envisioned sales channels, using all supported payment methods. The specific functions to be supported shall be defined during Design Review.	SDD-04
SAR-06-03-01-016	The Fare Sales APIs shall support the capture and processing of electronic payment data used in the completion of sales transactions, as required. Supported functions shall include the capture of payment data records for payments processed externally (e.g., directly by integrated devices/interfaces and/or through a third-party payment processor), as well as the full capture of payment card data which can be used by the back-office to process payments as part of a sales request. If payment card data is captured via the API, it shall be performed in a PCI-compliant manner that does not increase the PCI scope of the devices, back-office, or communication networks.	SDD-04

Req #	Requirement	Assigned CDRL
SAR-06-03-01-017	The fare media and products available for sale, and the associated pricing, shall be configured and maintained in the back-office. The Fare Sales APIs shall return this information upon request. The results provided shall be configurable to be specific to the sales channel, location, or system device/component from which the API call is generated.	SDD-04
SAR-06-03-01-018	The Fare Sales APIs shall support the sale of multiple products (e.g., fare media and fare products) and the use of multiple payment methods in a single sales transaction.	SDD-04
SAR-06-03-01-019	The Fare Sales APIs shall return a confirmation of all actions taken by the back-office to complete a sale, including creation, activation, and/or modification of transit accounts. If the sale was unsuccessful, a denial and associated reason code shall be provided. All supported functions, response types, and error handling shall be described in detail within the Fare Sales API Specification.	SDD-04
SAR-06-03-01-020	For all sales performed using the Fare Sales APIs, a transaction record shall be created by the AFC System, which identifies the system device/component and user that initiated the request, and includes all details of the sale result. The transaction shall be stored in the associated transit account and accessible via queries of the account transaction history.	SDD-04
SAR-06-03-01-021	The Fare Validation APIs shall enable the processing of all closed-loop and open-loop fare validations across all supported agencies and modes of travel, and using all supported fare media and fare products.	SDD-04
SAR-06-03-01-022	The Fare Validation APIs shall support all functions necessary to initiate a fare validation transaction that results in a fare validation being performed by the back-office, and where necessary a fare calculation and processing of a payment against a closed-loop or open-loop transit account. The specific functions to be supported shall be defined during Design Review.	SDD-04
SAR-06-03-01-023	The Fare Validation APIs shall enable the secure capture of unique fare media and/or transit account identifiers from fare validation devices to reference associated accounts and perform fare validations. All fare validation processing shall be performed by the back-office in real-time.	SDD-04

Req #	Requirement	Assigned CDRL
SAR-06-03-01-024	The Fare Validation APIs shall support the manual override and reversal of a fare validation from system devices and components. The eligibility to perform an override and/or reversal shall be determined by rules defined by SEPTA, including time elapsed from tap and transit account attributes.	SDD-04
SAR-06-03-01-025	The Fare Validation APIs shall support integration where third-party devices and system components calculate the amount due and pass in a pre-calculated fare (e.g., bike share). The back-office shall process pre-calculated fare transactions against the identified transit account and may apply additional pricing policies based on configured rules for combined use/payment across modes or participants.	SDD-04
SAR-06-03-01-026	The Fare Validation APIs shall return a confirmation of the actions taken by the back-office to complete a validation and account status information, including at a minimum: (1) Validation status (e.g., success or failure); (2) Rider classification/fare type used in the fare calculation (if appropriate); (3) Fare product used for validation; (4) Fare charged (if appropriate); (5) Remaining balance (if appropriate); and (6) Transfer time remaining (if appropriate); and (7) Number of riders (or open trips). If the validation was unsuccessful, an associated reason code shall be provided. All supported functions, response types, and error handling shall be described in detail within the Fare Validation API Specification.	SDD-04
SAR-06-03-01-027	For all fare validations performed using the Fare Validation APIs, a transaction record shall be created by the back-office, which identifies the system device/component and user that initiated the request, and includes all details of the validation result. The transaction shall be stored in the associated transit account and accessible via queries of the account transaction history.	SDD-04
SAR-06-03-01-028	When an offline validation result is generated by a fare validation device, regardless of the result given (acceptance or denial), the Fare Validation APIs shall support sending a post-validation request to the back-office, indicating use of an offline result, and identifying the result provided to the customer.	SDD-04
SAR-06-03-01-029	The Fare Inspection APIs shall enable inspection of all supported fare media and querying of associated transit accounts for the purpose of confirming fare validation status across all supported agencies and modes of travel, and using all accepted forms of fare payment. The Fare Inspection API shall be utilized by all new fare inspection devices and interfaces, and shall accept both online and offline transactions.	SDD-04

Req #	Requirement	Assigned CDRL
SAR-06-03-01-030	The Fare Inspection APIs shall support all functions necessary for passing data between a fare inspection application and the back-office in order to initiate a fare inspection transaction, which shall result in confirmation or denial of a fare validation previously made using an identified transit account.	SDD-04
SAR-06-03-01-031	The Fare Inspection APIs shall return fare media usage information, including at a minimum: (1) Inspection status (e.g., valid, or invalid); (2) Rider classification/fare type assigned to the associated account; (3) Fare product used (if valid tap is found); (4) Fare charged (if valid tap is found and a fare was charged); (5) Transfer start and end date / time (if valid tap is found and transfer is applicable); (6) Transfer time remaining (if valid tap is found and transfer is applicable); (7) Number of riders (or open trips); (8) Account balance (if applicable); (9) Fare validation and payment transaction history; and (10) Inspection history. If the inspection is determined to be invalid, an associated reason code shall be provided (e.g., no tap, blocked card). All supported functions, response types, and error handling shall be described in detail within the Fare Inspection API Specification.	SDD-04
SAR-06-03-01-032	For all inspections performed using the Fare Inspection APIs, a transaction record shall be created by the back-office, which identifies the system device/component and user that initiated the request, and includes all details of the inspection result. The transaction shall be stored in the associated transit account and accessible via queries of the account transaction history.	SDD-04
SAR-06-03-01-033	The Transit Account Management APIs shall enable querying and management of transit accounts (and associated transit account data) maintained within the back-office. The Transit Account Management APIs shall be utilized by all system devices and components requiring access to these functions, including: (1) FVMs; (2) CSTs; (3) CRM Systems; (4) Customer and Institutional Websites; (5) Mobile Applications; (6) IVR Systems; and (7) Handheld Devices. Not all system devices/components shall require or be granted access to all Transit Account Management API functions.	SDD-04

Req #	Requirement	Assigned CDRL
SAR-06-03-01-034	The Transit Account Management APIs shall support all the necessary functions related to the querying and management of transit accounts, which are outside of the automated actions performed during fare sales, fare validation, and fare inspection. The Transit Account Management APIs shall support the following functions at a minimum: (1) Query/update transit account status (e.g., active/inactive, blocked/unblocked); (2) Query/update associated rider classification/fare type; (3) Query transaction history (i.e., sales, validations, inspections, adjustments); (4) Setup fare product autoloading (requires registered funding source); (5) Generate a fare validation reversal (e.g., cancellation); (6) Generate an account adjustment (e.g., credit or debit); (7) Transfer balance (between [two (2) accounts]); (8) Block/unblock token, account, or individual fare product; (9) Initiate replacement of lost, stolen, or damaged fare media (e.g., associate new token with existing account); and (10) Generate an opt-out refund (e.g., close account and issue refund).	SDD-04
SAR-06-03-01-035	The Transit Account Management APIs shall enable system devices and components to query the sales, fare validation, and adjustment transactions that were conducted over a specified timeframe or a specified number of past transactions.	SDD-04
SAR-06-03-01-036	For all actions performed using the Transit Account Management APIs, a transaction record shall be created by the back-office, which identifies the system device/component and user that initiated the request, and includes all details of the actions taken. The transaction shall be stored in the associated transit account and accessible via queries of the account transaction history.	SDD-04
SAR-06-03-01-037	The Transit Account Management APIs shall return a confirmation of the actions taken by the back-office. If any action was unsuccessful, a denial and associated reason code shall be provided. All supported functions, response types, and error handling shall be described in detail within the Transit Account Management API Specification.	SDD-04
SAR-06-03-01-038	The Customer Account Management APIs shall enable querying and management of customer accounts (and associated customer data) maintained within the Customer Database. The Customer Account Management APIs shall be utilized by all system devices and components requiring access to these functions, including: (1) CST; (2) CRM Systems; (3) Customer and Institutional Websites; (4) Mobile Applications; and (5) IVR Systems. Not all system devices/components shall require or be granted access to all Customer Account Management API functions.	SDD-04

Req #	Requirement	Assigned CDRL
SAR-06-03-01-039	The Customer Account Management APIs shall support all the necessary functions related to the querying and management of customer accounts. The Customer Account Management APIs shall support the following functionality at a minimum: (1) Create new individual customer account; (2) Create new institutional customer account; (3) Query customer account status and data; (4) Modify customer account data; (5) Register (e.g., link) a transit account to an individual or institutional customer account; (6) Unregister (e.g., unlink) a transit account from an individual or institutional customer account; (7) Add a funding source to an individual or institutional customer account; (8) Close an individual or institutional customer account; (9) Authenticate customer accounts with valid user credentials; and (10) Authenticate user identity with alternate information.	SDD-04
SAR-06-03-01-040	The Customer Account Management APIs shall 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, customer names, date of birth, and card personalization information, such as a customer photograph, to be stored in the Customer Database.	SDD-04
SAR-06-03-01-041	The Customer Account Management APIs shall return a confirmation of the actions taken by the back-office. If any action was unsuccessful, a denial and associated reason code shall be provided. All supported functions, response types, and error handling shall be described in detail within the Customer Account Management API specification.	SDD-04
SAR-06-03-01-042	For all actions performed using the Customer Account Management APIs, a transaction record shall be created by the back-office, which identifies the system device/component and user that initiated the request and includes all details of the actions taken. The transaction shall be stored in the associated customer account and accessible via queries of the account transaction history.	SDD-04
SAR-06-03-01-043	The Device Management APIs shall support the reporting of device events and alarms and shall be utilized by all devices deployed within the system, including and not limited to: (1) Bus Validators; (2) Platform Validators; (3) Driver Displays; (4) FVMs; (5) Turnstile Readers and ADA Faregates (including Readers); (6) Emergency Exit Gates; (7) CST; and (8) Mobile Fare Inspection Devices.	SDD-04

Req #	Requirement	Assigned CDRL
SAR-06-03-01-044	The Device Management APIs shall support distribution of all positive and negative lists (i.e., risk lists) maintained by the back-office. The Device Management APIs shall support the usage of timestamps/list versioning, such that that list updates are provided on an incremental basis so that only updates since that last timestamp/version received by an individual device are returned.	SDD-04
SAR-06-03-01-045	The Device Management APIs shall support the distribution of any centrally (i.e., back-office) managed software and configuration parameters used by system devices and components. The option to distribute parameter updates on an increment-basis shall be supported, such that only updates since that last timestamp/version received by an individual device are returned. Any such software and parameters shall be defined and agreed to during Design Review.	SDD-04
SAR-06-03-01-046	The Device Management APIs shall support the passing of data between system devices/components and the SMMA to enable the monitoring of system performance in real-time. The device events and alarms reported via the Device Management API shall provide enough detail to support proactive device maintenance at the module-level and support accurate reporting on all system performance requirements and service level agreements.	SDD-04
SAR-06-03-01-047	The Device Management APIs shall support the passing of data between system devices/components and the SMMA to enable remote control and issuance of all commands supported for each device type.	SDD-04
SAR-06-03-01-048	The Fare Pricing APIs shall enable the pricing of a sample transit journey (single- or multi-trip) and shall be utilized by trip planning services to provide customers with an accurate and individualized price for a future transit option that is being presented.	SDD-04
SAR-06-03-01-049	The Fare Pricing APIs shall accept all customer- and trip-related parameters necessary to price a sample journey, including: (1) customer concession type; (2) fare media to be used for validation; (3) fare product or products to be used for validation; (4) transit agency used for each trip; (5) service type/mode/route used for each trip; (6) start day/time of each trip; (7) origin of each trip; and (8) destination of each trip.	SDD-04
SAR-06-03-01-050	For valid journeys, the Fare Pricing APIs shall return a calculated price (based on configured business rules within the AFC System) for each trip specified, as well as a price for the overall journey.	SDD-04

Req #	Requirement	Assigned CDRL
SAR-06-03-01-051	The Fare Pricing APIs shall gracefully handle instances where a specified journey is determined to be invalid based on configured business rules. In these instances, the Fare Pricing API shall return an error indicating the trip or parameter that is generating the conflict.	SDD-04

6.3.2 System Data Formats

Req #	Requirement	Assigned CDRL
SAR-06-03-02-001	In support of the open architecture design, the Contractor shall publish detailed specifications for all standard and proprietary data formats used within the AFC System.	SDD-04
SAR-06-03-02-002	The Contractor shall publish detailed specifications for all transactions generated and stored by the back-office. The Transaction Data Format Specifications shall include detailed descriptions of each transaction type, including transaction structure, data elements, and data types and formats.	SDD-04
SAR-06-03-02-003	The Contractor shall publish detailed specifications for all types of closed-loop fare media accepted within the AFC System. The Fare Media Data Format Specifications shall include detailed descriptions of each closed-loop fare media type, including bit-level definition of all data structures, data elements, and data types and formats. The Fare Media Data Format Specifications shall specify the method or algorithm used for the generation of any dynamic or diversified (unique) data that is part of any fare media format.	SDD-04

6.4 Fare Payment Credential Design

6.4.1 General Requirements

Req #	Requirement	Assigned CDRL
SAR-06-04-01-001	The AFC System shall support a variety of closed-loop fare media, including: (1) EU contactless smartcards; (2) DSMs; (3) printed 2D barcode and Quick Response (QR) code paper tickets; (4) 2D barcode and QR code mobile tickets; and (5) mobile wallet-based (Near Field Communication (NFC)) virtual cards.	SDD-05
SAR-06-04-01-002	The AFC System shall support the option of third-party fare media acceptance. SEPTA shall propose potential third-party media integrations as needed, and may include employee IDs, school IDs, social service program cards, and media from partner transit agencies and systems.	SDD-05
SAR-06-04-01-003	All closed-loop fare media shall be designed for use in an account-based system and serve as a token for accessing transit accounts maintained within the ATP.	SDD-05
SAR-06-04-01-004	Fare media shall be produced based on branding developed by SEPTA and a card design developed jointly with the Contractor. Fare media shall also be produced with one or both sides left blank for custom printing following manufacture.	SDD-05
SAR-06-04-01-005	The Contractor shall design, develop, and ensure manufacture and delivery of all fare media required for successful deployment of the AFC System. The Contractor shall deliver all graphics files and related materials required for the manufacture of the fare media for SEPTA's review and approval no less than [120 days] prior to the start of fare media production. The Contractor shall maintain updated fare media specifications to be provided to SEPTA to enable SEPTA's procurement of all fare media following the initial fare media supply.	SDD-05

6.4.2 Physical Characteristics

Req #	Requirement	Assigned CDRL
SAR-06-04-02-001	All contactless smartcard fare media shall 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 shall be finalized during Design Review.	SDD-05

Req #	Requirement	Assigned CDRL
SAR-06-04-02-002	EU smartcards shall be constructed of appropriate durable materials for a minimum useful life of [10 years]. The media shall comply with the most recent versions of ISO/IEC 10373 and ANSI INCITS 322 for durability.	SDD-05
SAR-06-04-02-003	EU smartcards shall have read/write performance of not less than [500,000 read/write cycles].	SDD-05
SAR-06-04-02-004	DSMs shall be constructed of appropriate durable materials for a minimum useful life of [one (1) year]. The media shall comply with the most recent versions of ISO/IEC 10373 and ANSI INCITS 322 for durability.	SDD-05
SAR-06-04-02-005	DSMs shall have read/write performance of not less than [100,000 read/write cycles].	SDD-05
SAR-06-04-02-006	All contactless smartcard fare media shall include an etched, unique non-sequential serial number for the purposes of traceability that is separate from the encoded token and smartcard Unique Identification Number (UID).	SDD-05
SAR-06-04-02-007	The fare media shall be printed using a four-color process, front and back, and support edge to edge printing.	SDD-05
SAR-06-04-02-008	All pre-printed graphics shall be protected by a clear coat that covers the entire surface of the card.	SDD-05
SAR-06-04-02-009	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 SEPTA.	SDD-05

6.4.3 Fare Media Format

Req #	Requirement	Assigned CDRL
SAR-06-04-03-001	The fare media shall use a MIFARE format with an ATP application developed by the Contractor. An alternative fare media format, such as an open payment format, ISO/IEC 24747, or CIPURSE, may be proposed by the Contractor so long as it meets all of the requirements in these specifications.	SDD-05

Req #	Requirement	Assigned CDRL
SAR-06-04-03-002	In addition to the primary communication interface used by each type of closed-loop fare media, fare media may be produced with barcodes and/or magnetic stripes to allow interaction with third-party systems (e.g., retail network, Mobility as a Service (MaaS) providers). Secondary interfaces may also be designed for use on platforms such as mobile applications and mobile wallets. If required, the format and data content of any additional barcodes or magnetic stripes shall be defined during Design Review.	SDD-05
SAR-06-04-03-003	All closed-loop fare media shall include a unique identifier that may be visually printed/displayed, as well as stored electronically, and is separate from the transit account Token that is used to identify the associated transit account in the back-office. A security code shall also be printed/displayed on the media. The contactless smartcards and DSMs shall not represent the smartcard UID as the printed unique identifier.	SDD-05
SAR-06-04-03-004	The closed-loop fare media chip technology shall comply with ISO/IEC 14443, shall enable secure processing of fare payment credential data, and shall allow writing data back to the fare payment credential application. The closed-loop fare media chip technology shall be subject to SEPTA's review and approval.	SDD-05
SAR-06-04-03-005	If possible, the same fare media format shall be used for both the EU and LU media.	SDD-05

6.4.4 Transit Payment Application

Req #	Requirement	Assigned CDRL
SAR-06-04-04-001	The Contractor shall be responsible for designing and deploying the transit payment applications and/or data formats to be used for each type of fare payment credential. The design shall be subject to SEPTA's review and approval.	SDD-05
SAR-06-04-04-002	The transit payment application design shall support a multi-application architecture to enable interoperability with external building access control systems. The Contractor shall be responsible for working with SEPTA's building access control vendor to integrate fare payment credentials into the building access control system.	SDD-05

Req #	Requirement	Assigned CDRL
SAR-06-04-04-003	The technology and algorithm used for the generation of paper and mobile 2D barcodes and QR codes shall be based on modern design and security standards, resistance to fraud, and shall be proposed by the Contractor and approved during Design Review. The 2D barcode and QR code design shall be updated as technology improves.	SDD-05
SAR-06-04-04-004	The Contractor shall be responsible for the design, development, and publishing of Payment Credential Data Format Specifications for each closed-loop fare payment credential type.	SDD-05
SAR-06-04-04-005	All Payment Credential Data Format specifications shall support the storage of a unique transit account Token (used to access a transit account maintained within the back-office) in a consistent format used for all closed-loop payment credential types. The transit account Token shall not be the unique media identifier, the transit account number used within the back-office, the card number printed/visually displayed on the media, or otherwise accessible using a non-system device.	SDD-05
SAR-06-04-04-006	The Payment Credential Data Format specifications shall include bit-level definition of all data to be stored within each type of fare payment credential, including definition of all data structures, data elements, and data types and formats.	SDD-05
SAR-06-04-04-007	For applicable closed-loop payment credential types, the Payment Credential Data Format specifications shall include reserved space for the writing of data to the credentials by the system devices. This data space shall be used to support risk management techniques based on the writing of data to fare payment credentials at the time of fare sales, fare payment, and fare inspection. The specific risk management techniques to be supported by the AFC System shall be defined during Design Review.	SDD-05
SAR-06-04-04-008	The transit payment application shall be compatible with all modern MIFARE formats, including but not limited to: Ultralight C, MIFARE Plus, DESFire, and SmartMX. The specific platform to be used for SEPTA-issued fare media shall be proposed by the Contractor and approved during Design Review.	SDD-05
SAR-06-04-04-009	If possible, the same transit payment application shall be used for both the EU and LU media.	SDD-05
SAR-06-04-04-010	The Contractor-developed transit payment applications shall be fully owned by or licensed to SEPTA, 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.	SDD-05

6.4.5 Security

Req #	Requirement	Assigned CDRL
SAR-06-04-05-001	The Payment Credential Data Format specifications shall specify the method or algorithm used for the generation of any dynamic or diversified (unique) data that is part of any fare media format.	SDD-05
SAR-06-04-05-002	All fare payment credentials shall employ strong cryptography, as defined by the National Institute of Standards and Technology (NIST), to protect access to and modification of all data stored within each type of fare payment credential. The Payment Credential Data Format specifications shall include detailed specifications for securely reading and writing all fare payment credential data.	SDD-05

6.4.6 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 AFC System shall support risk mitigation techniques used to limit fraud, provide accurate and timely account information, and control risk, as necessary.

Req #	Requirement	Assigned CDRL
SAR-06-04-06-001	The AFC System and associated fare media formats shall support the limited writing of data to closed-loop fare media for the purposes of risk mitigation, including displaying accurate and timely account information to customers, and ensuring accurate fare payment and fare inspection results, irrespective of payment / inspection device status (i.e., online / offline).	SDD-05
SAR-06-04-06-002	Data shall be writable to the closed-loop fare media at time of manufacture, loading, use, and inspection. All data shall be secured for both reading and writing using strong cryptography, as defined by NIST.	SDD-05
SAR-06-04-06-003	Any data written to the closed-loop fare media during fare payment or fare inspection activities shall not rely on a response from the back-office (e.g., timestamp) and be written in a manner that does not impact overall transaction timing.	SDD-05

Req #	Requirement	Assigned CDRL
SAR-06-04-06-004	Examples of information which may be written to closed-loop fare media include: (1) Recent transaction information (e.g., transaction timestamps); (2) Transit account balance information (e.g., low balance / load indicators); (3) Transit account status information (e.g., rider classification, institutional program, or blocking indicators); and (4) Fare product status information (e.g., expiry timestamps).	SDD-05

6.4.7 Third-Party Media

Req #	Requirement	Assigned CDRL
SAR-06-04-07-001	The AFC System shall 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: (1) State and local government employee identification (IDs); (2) Transit employee and Contractor IDs; (3) Corporate employee IDs; (4) School and college IDs; and (5) Social service program cards.	SDD-05
SAR-06-04-07-002	If SEPTA chooses to utilize the transit payment application for third-party media, the media shall be supported without any additional development to the Contractor-supplied devices and systems.	SDD-05
SAR-06-04-07-003	All third-party media accepted within the AFC System shall 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 shall be defined during Design Review.	SDD-05

6.4.8 Initial Fare Media Supply

Req #	Requirement	Assigned CDRL
SAR-06-04-08-001	The Contractor shall provide the initial supply of fare media to support the first [six (6) months] of operation following AFC System launch.	SDD-05
SAR-06-04-08-002	Pricing for various fare media types shall be provided as part of the Contractor's proposal. Fare media pricing shall be updated prior to purchase of the initial supply to account for market adjustments.	SDD-05

Req #	Requirement	Assigned CDRL
SAR-06-04-08-003	The estimated quantity of EU smartcards to be provided is [200,000]. The estimated quantity of DSMs to be provided is [3,500,000]. The Contractor shall work with SEPTA 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.	SDD-05
SAR-06-04-08-004	Delivery of fare media may occur at once or in installments as deemed appropriate by SEPTA. All fare media inventory shall be tracked and updated by the Contractor within the MIMS.	SDD-05
SAR-06-04-08-005	All supplied fare media shall 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 shall be replaced by the Contractor at their own expense.	SDD-05

6.5 Risk List Design

Req #	Requirement	Assigned CDRL
SAR-06-05-001	The AFC System shall support the distribution of positive and negative lists (i.e., risk lists) to be maintained locally at system devices and used for offline transaction (e.g., fare validation and inspection) processing when necessary. Positive and negative lists shall be managed within the AFC System back-office and distributed to devices via the Device Management API.	SDD-03
SAR-06-05-002	Risk list updates shall be generated by the AFC System back-office at a frequency of no less than every thirty [30 seconds] and include version control to ensure timely and accurate synchronization with system devices.	SDD-03
SAR-06-05-003	For the purposes of denying fare payment credentials, the AFC System shall be capable of maintaining credentials in the Master Risk List indefinitely. Distributed risk lists shall be configurable, such that credentials may be added or removed based on parameters, including deny reason, balance threshold, and duration on the list, and able to be distributed to specific device types.	SDD-03

Req #	Requirement	Assigned CDRL
SAR-06-05-004	The AFC System shall be capable of designating a permanent block of closed-loop fare payment credentials on the risk list, based on business rules defined by SEPTA during Design Review. The AFC System shall provide a method for devices to initiate and confirm completion of a permanent block, which shall ensure rejection of the fare payment credential by all system devices and components, and remove the credential from the risk list.	SDD-03
SAR-06-05-005	Any and all processes governing the use of risk lists shall be fully documented in AFC System specifications and subject to SEPTA review and approval during Design Review.	SDD-03

6.6 Back-office Hosting and Architecture

6.6.1 Cloud-Hosted Environment

Req #	Requirement	Assigned CDRL
SAR-06-06-01-001	Hosting of the AFC System back-office shall be performed using a public cloud hosting service, which shall be provisioned, configured, and managed by the Contractor over the life of the Contract (i.e., under Software Maintenance and Back-Office Operations). The cloud hosting service shall include all physical hardware supporting the cloud-hosted environment at sites meeting the standard of a Tier 3 (or better) data center, as defined by the Uptime Institute.	SDD-06
SAR-06-06-01-002	The cloud-hosted environment as configured by the Contractor shall deliver a High Availability (HA) system architecture, with built-in redundancy at the physical, logical, and network layers.	SDD-06
SAR-06-06-01-003	The cloud-hosted environment as configured by the Contractor shall employ both static and dynamic resource allocation, with the ability to assign a base allocation of computing, memory, and storage resources to back-office components and services, and scale resources dynamically as the processing load of such components and services increase.	SDD-06

6.6.2 Production Back-Office

Req #	Requirement	Assigned CDRL
SAR-06-06-02-001	The Contractor shall provision [two (2) separate, identical, and fully functional instances] of the production back-office within the cloud-hosted environment to enable geographic redundancy and disaster prevention.	SDD-06
SAR-06-06-02-002	In addition to the redundancy built-into the cloud-hosted environment, the Contractor shall design the AFC System to have full redundancy of the provisioned servers, applications, and databases such that there is no single point of failure present in the hosting architecture.	SDD-06
SAR-06-06-02-003	Each production back-office instance shall include all operation-critical back-office components, including: Account-Based Transaction Processor (ATP), Customer Relationship Management (CRM) System, Financial Management System (FMS), and Reporting System.	SDD-06
SAR-06-06-02-004	Each production back-office instance shall include all applications, services, and databases necessary to independently support the functionality of each back-office component.	SDD-06
SAR-06-06-02-005	Each production back-office instance shall use different geographic zones across North America (i.e., U.S. East and U.S. West) for the location of the physical hardware supporting the cloud-hosted environment.	SDD-06
SAR-06-06-02-006	The [two (2) production back-office instances] shall process transactions in parallel in an active-active, load-balanced configuration to optimize system performance and ensure that if one instance fails, or goes into a degraded mode, the second instance shall automatically take over processing of all transactions with no downtime.	SDD-06
SAR-06-06-02-007	Each production back-office instance shall be configured to take advantage of dynamic resource allocation, with each having a base allocation of compute, memory and storage resources capable of handling [200%] of the anticipated peak processing load when all system participants and services are in full operation. Each production back-office instance shall be configured to dynamically scale to support up to [400%] of the anticipated peak processing load without reconfiguration.	SDD-06

Req #	Requirement	Assigned CDRL
SAR-06-06-02-008	The production back-office shall use all available and necessary techniques in order to sufficiently protect against the loss of any data. Each identical and independent production back-office instance shall be equipped with the means necessary to synchronize data across redundant database instances in real-time (i.e., simultaneous writes). Database redundancy may be handled differently from application and service redundancy, with both production back-office instances accessing the same database with failover to an active (i.e., hot) backup in the event of a failure.	SDD-06
SAR-06-06-02-009	The production back-office shall protect against data loss and cyber-attacks by performing periodic immutable backups of production databases. The frequency of back-ups and number of backups to maintain shall be configurable and defined by SEPTA.	SDD-06
SAR-06-06-02-010	Routine system and software patching shall cause no impact or outage to system processes or system availability and should utilize techniques including staggered deployment across load balanced hosts.	SDD-06
SAR-06-06-02-011	The Contractor shall propose a logical architecture that meets all production back-office requirements, subject to review and approval from SEPTA.	SDD-06
SAR-06-06-02-012	The automated failover between production back-office instances shall be exercised in multiple failover scenarios during the Field Integration Test to demonstrate no data loss or significant degradation in system performance prior to Final Acceptance.	SDD-06

6.6.3 Non-Production Back-Office Instances

Req #	Requirement	Assigned CDRL
SAR-06-06-03-001	In addition to the production back-office instances, the Contractor shall provide [four (4) additional back-office instances (development, test, training, and staging)] for use solely by SEPTA and their designated representatives. Any non-production back-office instances required by the Contractor for their development and support of the AFC System shall be separate from those provided for use by SEPTA.	SDD-06

Req #	Requirement	Assigned CDRL
SAR-06-06-03-002	The non-production back-office instances shall have all system components (applications, services, and databases) and configuration options necessary to mirror the production back-office instances without the required redundancy of the production back-office.	SDD-06
SAR-06-06-03-003	The non-production back-office instances shall leverage dynamic resource allocation with the ability to scale to the full resource allocation of the production back-office instances. The base resource allocation for each non-production back-office instance shall be agreed to during Design Review.	SDD-06
SAR-06-06-03-004	The Contractor shall be responsible for supporting and managing the configuration of all non-production back-office instances under the BOA.	SDD-06
SAR-06-06-03-005	The Contractor shall ensure that the staging back-office instance always mirrors the current software and configuration released to the production environment. The development and test back-office instances shall be updated to match the software and configuration in development, under test, or currently in the production environment at the direction of SEPTA.	SDD-06
SAR-06-06-03-006	All non-production system devices and components provided by the Contractor, including those in the SEPTA test facility shall be configurable, such that they can be connected to any of the non-production back-office instances at the direction of SEPTA.	SDD-06

6.6.4 Disaster Recovery

Req #	Requirement	Assigned CDRL
SAR-06-06-04-001	The Contractor shall provide a HA system that offers maximum protection against data loss and system failure. Means shall be provided in the AFC System design to ensure a complete recovery from the loss of any system components at any point during operation.	SDD-06
SAR-06-06-04-002	The Contractor shall develop and submit a Disaster Recovery Plan that describes data backup and recovery measures, and looks to minimize data loss in the event of a catastrophic event or outage that impacts the cloud-hosted environment. The Disaster Recovery Plan shall be aligned and integrated with existing disaster recovery procedures currently employed by SEPTA.	SDD-06

Req #	Requirement	Assigned CDRL
SAR-06-06-04-003	The Disaster Recovery Plan shall contain detailed procedures to be followed to restore the AFC System to full operation following a catastrophic or failover event, including the complete resynchronization of data across production system instances. The Disaster Recovery Plan shall be modular where possible to recover from failures that do not require a complete system cutover.	SDD-06
SAR-06-06-04-004	The Contractor shall provide and maintain an evaluation of the types of disasters that may impact system operations, detail the steps to be taken to recover from such events, and suggest procedures to recover from contained failures that do not require a complete system cutover.	SDD-06
SAR-06-06-04-005	The Contractor shall identify and actively maintain the resources (e.g., people, systems, communications, etc.) that must be committed to implement each recovery procedure.	SDD-06
SAR-06-06-04-006	The Contractor shall immediately inform SEPTA and all designated representatives, in the event of a disaster event or any service degradation event to ensure the AFC System shall be recovered as described in the Disaster Recovery Plan.	SDD-06

6.7 Required Submittals

CDRL ID	Contractor Deliverable	Due
SDD-03	System Architecture Design	Design Review
SDD-04	Open Architecture Design	Design Review
SDD-05	Fare Payment Credential Design	Design Review
SDD-06	Back-Office Hosting and Architecture Design	Design Review

7. Payment Processing Requirements

The following sections describe the requirements for the processing of electronic payments. These payments shall be processed through SEPTA's existing Payment Service Providers (PSPs) and include card-present and card-not-present (e.g., e-commerce) payment transaction processed through all fare sales channels, as well as transactions associated with the acceptance of open payments.

7.1 General Requirements

Req #	Requirement	Assigned CDRL
PPR-07-01-001	The Contractor shall be responsible for the processing of electronic payments associated with the acceptance of open payments, and sales performed through all sales channels, except for the retail partner network.	SDD-07
PPR-07-01-002	The AFC System shall accept card-present and card-not-present (e-commerce) bank card payments made using all Europay, MasterCard, Visa (EMV)-compliant credit and debit cards, including those associated with all major North American (e.g., Visa, MasterCard, American Express, and Discover) and international (e.g., China UnionPay and JCB) card brands.	SDD-07
PPR-07-01-003	The AFC System shall accept e-commerce payments from mobile- and web-based payment service providers, including Apple Pay, Google Pay, Samsung Pay, PayPal, Alipay, and WeChat Pay.	SDD-07
PPR-07-01-004	All AFC System devices and components accepting bank cards for payment shall be certified as compliant with the EMV standards in effect at the time of Final Acceptance, and capable of being certified to newer versions via software upgrades. All system devices and components shall default to EMV processing, including the use of offline data authentication (e.g., Combined Dynamic Data Authentication (CDA) and Dynamic Data Authentication (DDA)) when available, and fall back to non-EMV processing only when it is not supported by the card being used for payment or the method of acceptance.	SDD-07
PPR-07-01-005	All AFC System devices and components accepting electronic payments shall support the configuration of system-enforced minimum and maximum payment amounts. The minimum and maximum amounts shall be able to be independently set by sales channel/device type, device status (i.e. online vs. offline), and payment type (including by card brand).	SDD-07
PPR-07-01-006	All AFC System devices and components accepting electronic payments shall support split payments, with the use of up to [three (3) funding sources] to complete payment for a single sale, including the use of multiple credit/debit cards along with other forms of accepted payment.	SDD-07

Req #	Requirement	Assigned CDRL
PPR-07-01-007	All AFC System devices and components accepting debit cards for payment shall be able to identify pre-tax benefit cards issued by the government and pre-tax benefit providers, based on Issuer Identification Number (IIN). Stored value and passes loaded using these cards shall be identified as such and segregated within the associated transit accounts to ensure compliance with all applicable Internal Revenue Service (IRS) regulations.	SDD-07
PPR-07-01-008	The AFC System shall maintain detailed payment records of all electronic payments processed to support auditing, and payment dispute and chargeback resolution. All chargebacks and other forms of non-payment identified by the system shall result in the automated and immediate reversal of the value purchased, and the blocking of the associated transit account, should such reversal leave the associated account in bad standing.	SDD-07

7.2 Payment Service Provider (PSP) Interface

Req #	Requirement	Assigned CDRL
PPR-07-02-001	The AFC System, including all system devices and components that process electronic payments, shall interface with SEPTA's existing PSPs for the processing of those payments, which may include unique PSPs for the processing of open payments and for the processing of all other sales. SEPTA may establish unique Merchant IDs (MIDs) to support the processing of electronic payment through any of the provided sales channels.	SDD-07
PPR-07-02-002	The interface to the PSP may be built using a central Contractor-provided payment application, through which all system devices and components processes payments, or using a combination of individual PSP connections at the device- and/or component-level.	SDD-07
PPR-07-02-003	Regardless of the approach to PSP integration, the Contractor shall provide a Payment Processing API, which shall allow any third-party device or component to process an electronic payment through the AFC System via the Contractor-provided PSP interface.	SDD-07
PPR-07-02-004	The AFC System shall be capable of issuing refunds back to the original method of payment for all electronic payments processed via the PSP interface.	SDD-07

Req #	Requirement	Assigned CDRL
PPR-07-02-005	The Contractor shall be fully responsible for acquiring all required PSP and bank certifications (e.g., EMV certification) required to support the PSP interface and the delivered AFC System as a whole.	SDD-07

7.3 Open Payment Acceptance

7.3.1 General Requirements

Req #	Requirement	Assigned CDRL
PPR-07-03-01-001	The AFC System shall be designed to accept contactless open payments (i.e., contactless EMV bank cards and equivalents in mobile wallets) for the payment of fares at all points where fare payment is accepted, including at validators installed onboard vehicles and on station platforms, at contactless readers installed in subway faregates, and using handheld fare validation devices.	SDD-07
PPR-07-03-01-002	The AFC System shall support all contactless open payment methods that comply with EMV standards, including those from all other major North American (e.g., MasterCard, Visa, American Express, and Discover) and international (e.g., China UnionPay and JCB) card brands, and those initiated using contactless-enabled bankcards and NFC-based mobile wallet applications (e.g., Apple Pay, Google Pay, Samsung Pay, and LG Pay). The AFC System shall support Apple Pay Express Mode and similar functionality offered by other mobile wallet providers. Acceptance of legacy (non-EMV compliant) contactless open payments is not required.	SDD-07
PPR-07-03-01-003	The Contractor shall be responsible for ensuring compliance with all EMV payment acceptance requirements in the U.S., including the use of all forms of Offline Data Authentication (e.g., Dynamic Data Authentication and Combined Data Authentication), for the acceptance of open payments.	SDD-07
PPR-07-03-01-004	The AFC System shall be fully compliant with the latest version of the Visa Mobility and Transport Transaction (MTT) model for the acceptance of open payments published at the time of system launch, including all rules related to transaction processing, aggregation, and debt recovery. The solution shall also be fully compliant with the latest version of any similar specifications issued by other card brands at the time of Final Acceptance.	SDD-07

Req #	Requirement	Assigned CDRL
PPR-07-03-01-005	The Contractor shall be responsible for processing of open payments transactions, including: (1) Risk management – maintaining and distributing a risk list of invalid open payment credentials; (2) Payment validation – payment token management, transit account maintenance, fare calculation, and issuance of a validation (i.e., acceptance or denial) response; (3) Payment authorization – bank authorization using an interface to the PSP; and (4) Settlement reconciliation – automated transaction-level reconciliation of settled bank card transactions, including automated clearing of settled transactions and write-off of non-settled transactions, per SEPTA-defined rules.	SDD-07

7.3.2 Open Payment Validation

Req #	Requirement	Assigned CDRL
PPR-07-03-02-001	As with closed-loop payments, the ATP shall serve as the system of record (i.e., primary source) for determining acceptance or denial of open payments presented to fare validation devices, which shall send real-time fare validation requests to the ATP using the Contractor-provided Fare Validation API. If accepted, the ATP shall also make a determination whether to submit an open payment transaction to the PSP for payment authorization.	SDD-07
PPR-07-03-02-002	Each open payment credential used within the AFC System shall have an associated transit account maintained within the ATP. The transit account shall provide a means to calculate the fare due, and record any bad debt associated with the open payment credential in the event of a payment decline. When processing an open payment fare validation request, the ATP shall use the status of the transit account (e.g., in good standing) in determining the validation result to be provided.	SDD-07
PPR-07-03-02-003	If the ATP cannot find a transit account associated with the open payment credential being used for payment (e.g., first use), a new transit account shall be created and the payment shall be accepted, subject to the passing of local validity checks, and each card brand's processing model and other liability sharing (e.g., first-ride risk) requirements.	SDD-07

Req #	Requirement	Assigned CDRL
PPR-07-03-02-004	ATP fare validation responses for open payments shall mirror those for closed-loop payments in the information provided regarding acceptance or denial. Responses indicating acceptance shall include at a minimum: (1) Indication of acceptance; (2) Fare amount charged; (3) Transfer status; and (4) Transfer time remaining. In the event that fare capping is enabled for open payment media, a fare cap (once earned) that is used for payment shall also be returned in the validation response.	SDD-07
PPR-07-03-02-005	In parallel with, or immediately upon, sending a fare validation request to the ATP, fare validation devices shall perform a series of local validation checks on the open payment credential being presented for payment. These checks shall include at a minimum: (1) EMV card authentication (including Offline Data Authentication (ODA)); (2) Card expiry check; and (3) Presence on a locally maintained hotlist. Any failure of the local validation checks related to card validity, including card authentication and expiration, shall result in immediate denial of the payment by the fare validation device. Otherwise, fare validation devices shall wait until the ATP fare validation response timeout is reached before making an offline validation decision.	SDD-07
PPR-07-03-02-006	When an offline fare validation result is given for an open payment (regardless of payment acceptance or denial), the fare validation device shall send a new request to the ATP, indicating that an offline result was used, and the result given. Fare validation devices shall continue to send this request until it is acknowledged by the ATP. Reconciliation of online and offline results by the ATP shall be handled in the same manner as for closed-loop payments.	SDD-07

7.3.3 Open Payment Authorization

Req #	Requirement	Assigned CDRL
PPR-07-03-03-001	The ATP shall request payment authorization for open payment transactions from the PSP per card association (e.g., MTT specifications) and internal risk management rules, to be defined during Design Review. Payment authorization shall be performed in parallel with internal fare validation processing as required.	SDD-07
PPR-07-03-03-002	A declined payment authorization, or determination that payment authorization is not possible, shall result in any unpaid fares being recorded as a negative balance within the associated transit account.	SDD-07

Req #	Requirement	Assigned CDRL
PPR-07-03-03-003	Recording of a negative balance in a transit account associated with an open payment credential shall result in the credential tied to the account being added to a risk list maintained by the ATP, and distributed to all fare validation devices within the time requirements of the MTT specifications for use in offline fare validation.	SDD-07
PPR-07-03-03-004	While the PSP payment authorization result is not required nor anticipated to be provided as part of the ATP fare validation response, the AFC System shall be designed such that if, in the future, a payment authorization result is received within the validation response timeout period, the associated transit account status shall be updated in real-time, and reflected in the validation response provided by the ATP.	SDD-07

7.3.4 Open Payment Tokenization and Payment Account Reference (PAR)

Req #	Requirement	Assigned CDRL
PPR-07-03-04-001	All open payment card data captured and used by the AFC System shall be tokenized in a secure manner, which removes the tokenized data, and the applications, components, and networks that handle only the tokenized data, from PCI scope.	SDD-07
PPR-07-03-04-002	Tokenization of open payment card data may be performed by the Contractor within the AFC System or using PSP-provided tokenization services. Separate tokens may be used for internal fare validation processing and for payment authorization with the PSP.	SDD-07
PPR-07-03-04-003	In addition to any tokens used for fare validation processing and payment authorization, the AFC System shall capture Payment Account Reference (PAR) values for accepted open payment credentials whenever available. PAR values shall be associated with the transit account maintained for each open payment credential accepted by the AFC System.	SDD-07
PPR-07-03-04-004	If a new transit account created for an open payment credential is found to have an associated PAR value or payment token (upon retrieval) matching that of an existing transit account, the ATP shall support the option of merging of the new and existing transit accounts, including any recalculation of fares and revision to the risk status associated with the open payment credential. Instances in which the AFC System shall automatically merge transit accounts shall be determined at Design Review.	SDD-07

7.3.5 Processing Cost Control and Liability Sharing

Req #	Requirement	Assigned CDRL
PPR-07-03-05-001	The AFC System shall support all cost reduction (e.g., transaction aggregation), debt recovery, and liability sharing features described in the Visa MTT processing model specifications, as well as similar specifications issued by other card brands. The Contractor shall process open payments in a manner that is fully compliant with these specifications, and use other available mechanisms, including first-ride risk liability sharing rules provided by the PSP, card brands, and card issuers, to minimize processing costs and liability.	SDD-07
PPR-07-03-05-002	The AFC System shall support the aggregation of fare payments initiated using the same open payment credential over a configurable period of time and up to a configurable spending threshold, enabling a single PSP payment authorization request to be submitted for multiple fare payment transactions.	SDD-07
PPR-07-03-05-003	The AFC System shall 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.	SDD-07
PPR-07-03-05-004	All key values used to define the payment aggregation and debt recovery processes shall be designed as configurable parameters that can be set universally and individually for each recognized card brand. These values shall be applied in a consistent manner across the brands unless there is/are requirement(s) from the brands that conflict. These configurable parameters shall include: (1) Payment aggregation on/off; (2) Payment aggregation value threshold; (3) Payment aggregation time threshold; (4) Payment pre-authorization on/off; (5) Payment pre-authorization amount; (6) Automated debt recovery on/off; (7) Automated debt recovery period; (8) Automated debt recovery frequency; and (9) Tap-driven debt recovery on/off.	SDD-07
PPR-07-03-05-005	The AFC System shall accommodate scenarios where the aggregation and debt recovery rules vary by card brand or issuer by using the IIN to determine the card type.	SDD-07

7.4 Payment Security

Req #	Requirement	Assigned CDRL
PPR-07-04-001	All system devices and components developed or delivered by the Contractor that capture, store, transmit, or process credit/debit card data, as well as the AFC System as a whole, shall be certified, by the Original Equipment Manufacturers (OEMs) and/or Contractor, as compliant with all applicable PCI standards (e.g., PA-DSS and PCI DSS) through all phases of system deployment and at the time of Final Acceptance. PCI compliance shall be maintained throughout the life of the AFC System, as PCI standards are updated in the future.	SDD-07
PPR-07-04-002	The general approach to PCI compliance for all AFC System components shall be to: (1) Avoid the handling and storage PCI sensitive data whenever possible; (2) Use security measures, such as encryption and tokenization, to protect PCI sensitive data when required; and (3) Keep components out of PCI scope entirely when practical.	SDD-07
PPR-07-04-003	The AFC System shall make use of a Point-to-Point Encryption (P2PE) or End-to-End (E2E) encryption solution for the transmittal of all payment data, which prevents access to any decryption keys, is PCI-compliant, and effectively removes any networks used to transit the encrypted data from PCI scope. The Contractor shall be responsible for the PCI certification of any provided encryption solution, whether used PCI-certified P2PE or a proposed alternative.	SDD-07
PPR-07-04-004	The AFC System shall use tokenization for all funding sources stored within the system, which shall remove the tokenized data, and the applications, components, and networks that handle only the tokenized data, from PCI scope.	SDD-07
PPR-07-04-005	The Contractor shall be responsible for providing a PCI Compliance Plan during Design Review, and for obtaining certification for the entire AFC System.	SDD-07

Req #	Requirement	Assigned CDRL
PPR-07-04-006	The Contractor shall employ a Qualified Security Assessor (QSA), who has been certified by the PCI Security Standards Council, to certify the provided AFC System and its components are fully PCI-compliant as soon as deployed in the production environment prior to Final Acceptance. Certification shall include a Report On Compliance (RoC) and Attestation of Compliance (AoC), both provided to SEPTA. Any deficiencies identified during a PCI audit shall be rectified in no less than [90 days]. SEPTA may additionally choose to have its own PCI QSA evaluate and certify the AFC System as well. Should SEPTA choose to employ their own QSA, the Contractor shall provide all documentation necessary to support the assessment by the QSA.	SDD-07

7.5 Required Submittals

CDRL ID	Contractor Deliverable	Due
SDD-07	Payment Processing and Open Payment Design	Design Review

8. System Security Requirements

The Contractor shall deliver a security-focused solution where each system component and interface employs common security techniques and best practices to ensure every layer and capability of the AFC System is robust and protected. Proven security strategies and policies shall inform the overall design and implementation of system security features including: access control, encryption, privacy, threat management, network protection, auditability, monitoring, data integrity, fraud management, and incident reporting. The Contractor shall maintain compliance with all relevant security standards, regulations, and certifications, and continuously assess and mitigate security risks and vulnerabilities for the term of the Contract.

8.1 General Requirements

Req #	Requirement	Assigned CDRL
SSR-08-01-001	The general approach to system security shall include avoiding the storage of bank card data and customer Personally Identifiable Information (PII) wherever possible, and only storing and transmitting such data in a tokenized or encrypted form.	SDD-08

Req #	Requirement	Assigned CDRL
SSR-08-01-002	The AFC System shall adopt zero (0) trust architecture best practices, such that all deployed systems are access restricted and segmented, require authentication and authorization to access system resources, monitor for potential security issues and fraudulent activity, and protect against data loss throughout the system.	SDD-08
SSR-08-01-003	All frontend devices shall connect with the AFC System back-office via an IP network. The connections shall be secured using strong encryption, as defined by NIST. All data transmission protocols shall be, at minimum, TLS-1.2 encrypted with zero (0) weak cipher suites enabled, and shall be kept up to date with the latest protocol version.	SDD-08
SSR-08-01-004	Network/web application firewalls and intrusion detection/prevention systems shall be used along with other network traffic filtering security measures to protect the back-office components and the network by detecting and preventing intrusion attempts.	SDD-08
SSR-08-01-005	Physical and logical access to back-office components that contain PII and/or financial data shall be restricted using a privileged access management solution. Data Loss Prevention (DLP) techniques shall be employed to detect, limit, and prevent unauthorized data egress. Physical and logical security shall be sufficient to achieve compliance with the PCI standards in effect at the time of Final Acceptance.	SDD-08
SSR-08-01-006	The AFC System shall include a Security Incident and Event Management (SIEM) Tool to monitor for security incidents, capture security-related events, and identify potential threats. The Contractor shall configure the SIEM Tool to monitor the communications network, cloud resources, and application infrastructure for all types of security issues, including system vulnerabilities, malware and viruses, unauthorized access, and violation of security policies and standards. The Contractor shall provide SEPTA with real-time access to the system SIEM Tool.	SDD-08
SSR-08-01-007	The AFC System shall provide full logging capabilities in sufficient detail to diagnose technical and security issues for all system components of the back-office, including routers, firewalls, operating systems, and software applications. All log files shall be capable of central retrieval and storage and shall include attributes to enable querying by time and type. The Contractor shall provide any log file captured by the AFC System to SEPTA upon request.	SDD-08

Req #	Requirement	Assigned CDRL
SSR-08-01-008	Logical access to all supplied systems shall require multi-factor authentication and be centrally managed using SEPTA's Microsoft Azure Active Directory platform or an alternate, SEPTA-approved user authentication and access control platform.	SDD-08
SSR-08-01-009	AFC System security features shall be maintained, and security vulnerabilities addressed during Software Maintenance and Back-Office Operations. OS updates, software patches, bug fixes, and system enhancements to address identified security vulnerabilities shall be provided in accordance with the triaged severity, where system critical vulnerabilities shall be handled in real-time.	SDD-08
SSR-08-01-010	The AFC System shall restrict access to each function available in all user-accessible components to enable role-based access controls, such that appropriate permissions are required to perform any operation and access any system resource in the AFC System. The Contractor shall review SEPTA's current roles and user groups and propose an equivalent mapping for the AFC System. The Contractor shall track the role-based access controls for all internal users and review the configuration with SEPTA no later than quarterly to ensure currency.	SDD-08
SSR-08-01-011	Security-sensitive information shared with SEPTA, including Design Review, shall be submitted separately, in accordance with procedures to be jointly developed between the Contractor and SEPTA. Security-sensitive information shall include: (1) Information that would allow an individual to create, duplicate, skim or counterfeit fare media; (2) Information that would allow an individual to overcome security features or interlocks intended to prevent access to sensitive information; and (3) Information that would allow an individual to divert revenue, whether electronic or cash revenue, from the AFC System.	SDD-08
SSR-08-01-012	The Contractor shall provide all data, evidence, and services necessary to support internal and external financial and regulatory compliance audits conducted by SEPTA, their representatives, and external auditors. Compliance with external regulatory requirements shall be demonstrated as frequently as required by the applicable regulatory organization, no less than annually. The Contractor shall successfully complete a SOC 2 audit no less than annually, and compliance reports shall be provided to SEPTA for review and approval. Any findings resulting from audits shall be remedied in the recommended timeframe provided by the auditor.	SDD-08

Req #	Requirement	Assigned CDRL
SSR-08-01-013	The Contractor shall ensure external audits are conducted to provide annual assurance over the AFC System control environment, including financial reporting controls, cybersecurity controls, information security controls, and fraud management controls. A SSAE 18 audit, or SEPTA-approved equivalent, shall be successfully completed no less than annually. A copy of the results, an attestation, or an industry standard report (or equivalent) shall be provided to SEPTA for review and approval.	SDD-08

8.2 Cybersecurity

Req #	Requirement	Assigned CDRL
SSR-08-02-001	Before any Contractor-supplied software is activated to interface with any SEPTA data system or network, the Contractor shall demonstrate compliance with all relevant sections of NIST 800-171, or SEPTA-approved equivalent cybersecurity standard.	SDD-09
SSR-08-02-002	For the duration of the Contract and any subsequent Operations and Maintenance services Contract, at least [once (1) per year], the Contractor shall conduct a cybersecurity audit in compliance with NIST 800-171 or SEPTA-approved equivalent. For each cybersecurity audit, the Contractor shall supply a report summarizing the results of the audit.	SDD-09

Req #	Requirement	Assigned CDRL
SSR-08-02-003	Within [30 days] after NTP, the Contractor shall submit a draft Cybersecurity Management Plan (CMP) for review and approval during Design Review. At minimum, the CMP outline shall cover: (1) The Contractor's procedures to assess compliance with cybersecurity standards, including the frequency of these assessments (2) A description of the Contractor's internal System Security Plan (SSP), and the procedures to assess, maintain, and update that plan. The Contractor's SSP shall describe system boundaries, environments of operation, how security requirements are implemented, the relationships with or connections to other systems, and accurately reflect actual implementation of security controls. (3) The procedures to identify and develop any needed Plans of Action and Milestones (POAMs) to correct deficiencies and reduce or eliminate vulnerabilities in the Contractor's systems. (4) The plans and procedures to execute POAMs and achieve requisite compliance with NIST 800-171 or SEPTA approved equal. (5) The plans, procedures, and frequency of audits to confirm ongoing compliance with cybersecurity standards. (6) Operational procedures including: detection, response, and reporting of cybersecurity incidents; management of subcontractors to ensure compliance; and SSP and POAM updates as needed.	SDD-09
SSR-08-02-004	For the duration of the Contract and any subsequent Operations and Maintenance services Contract, at least [once (1) per year], the Contractor shall submit an updated CMP for SEPTA review and approval. The updated CMP shall incorporate any updates necessary as identified during cybersecurity audits.	SDD-09
SSR-08-02-005	For the duration of the Contract and any subsequent Operations and Maintenance services Contract, the Contractor shall stay informed of the latest security threats and vulnerabilities relevant to the AFC System by tracking updates from the Cybersecurity & Infrastructure Security Agency (CISA) and other accredited security organizations. The Contractor shall develop a plan to address any threat or vulnerability and submit it to SEPTA for approval.	SDD-09

8.3 Fraud Controls

Req #	Requirement	Assigned CDRL
SSR-08-03-001	The AFC System shall provide the capability to leverage analytics for identifying potential fraudulent transactions based on usage patterns, including load method (e.g., history of chargebacks), purchases with stolen payment methods, refund / transfer history, usage in alignment with concession settings, and sales and ridership data. All alerts generated from the fraud monitoring rules shall be generated in real-time and aggregated in a dashboard and report.	SDD-08
SSR-08-03-002	The AFC System shall support configurable velocity checks, and other fraud prevention measures, that identify excessive or potentially fraudulent use of stolen or compromised fare payment credentials.	SDD-08
SSR-08-03-003	The AFC System shall support the setting of a configurable upper limit of rides for unlimited ride passes (e.g., [50 rides] for a one-day pass) that shall generate an automated alert within the AFC System, and optionally block the fare media credential or product, when the limit is reached.	SDD-08
SSR-08-03-004	The AFC System shall 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], or at an unusually fast rate (e.g., set by velocity thresholds), within a configurable period of time.	SDD-08
SSR-08-03-005	For transit accounts with stored value, the AFC System shall 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 validation is online). The floor limit value shall be configurable (e.g., zero, positive, or negative number), and shall be configurable per rider classification, device, service, and location. Transit accounts with balances at or below the floor limit shall be automatically blocked for use (i.e., temporarily) at the corresponding service. A report shall be shared with SEPTA identifying instances where the floor limit is reached.	SDD-08
SSR-08-03-006	For transit accounts with stored value, the AFC System shall support the configuration of monitored value thresholds (e.g., minimums and maximums) for which an automated alert is generated in the event that the balance thresholds are reached or exceeded. Further alerts shall be generated in the event that balances continue to exceed the thresholds.	SDD-08

Req #	Requirement	Assigned CDRL
SSR-08-03-007	The AFC System shall support configurable rules to prevent the sharing of fare payment credentials and accidental validation through “passback protection,” or a configurable time period in which a card shall not be accepted for validation at a device after an initial tap. Passback protection shall be configurable by fare media type, fare product, rider classification, and transit mode, and enforceable at the bus, rail station, and individual device level. Passback protection shall be capable of being overridden where multi-rider functionality is deployed.	SDD-08
SSR-08-03-008	The AFC System shall support the manual placement of fare payment credentials and transit accounts into “observation mode”, which shall generate an automated alert when the credential or account is used. This may be used by fare enforcement staff to monitor known stolen or compromised credentials or transit accounts.	SDD-08
SSR-08-03-009	The AFC System shall provide the capability to block and unblock fare payment credentials, transit accounts, customer accounts, and individual fare products based on configurable fraud rules. The blocking and unblocking capability shall include: (1) automatic and manual configurations; (2) individual and bulk blocking / unblocking mechanisms (e.g., if a known batch of cards was lost, the entire batch may be blocked); and (3) capturing the reason for each block/unblock and the user or workflow performing the action. The capability to block credentials in bulk using both sequential and non-sequential ranges shall be supported.	SDD-08
SSR-08-03-010	The AFC System shall monitor the usage of blocked fare payment credentials and fare products, and generate automated alerts in the event that a credential or fare product is used despite the blocked status.	SDD-08
SSR-08-03-011	The AFC System shall track all instances that result in a denied transaction from the system (e.g., card blocked, insufficient funds, etc.) with sufficient detail to research and track the fare payment credential, associated transit account, and associated customer account.	SDD-08
SSR-08-03-012	The AFC System shall monitor for fraudulent activity from internal users and staff members. All financial-related actions shall be monitored against configurable thresholds to generate automated fraud alerts, and shall capture all available user information including but not limited to, user, date and timestamp for auditing purposes. Fraud monitoring shall include the reconciliation of cash funds for all cash handling devices.	SDD-08

Req #	Requirement	Assigned CDRL
SSR-08-03-013	The AFC System shall monitor for potential instances of money laundering. Alerts shall be automatically generated for activities, including transit accounts with multiple large cash purchases and transit accounts with multiple large balance transfers and refund requests. The frequency and magnitude thresholds at which these values are monitored shall be configurable. The maximum stored value balance threshold per transit account shall be configurable.	SDD-08
SSR-08-03-014	All fraud rules intended to identify fraudulent usage of fare payment credentials, transit accounts, fare products, and customer accounts shall be capable of sending notifications to customers based on contact information and notification settings stored in the customer account and shall include e-mail, text message, and push notifications. Any fraud-related notification issued to customers shall be delivered in no less than [15 minutes] of the identified fraudulent activity.	SDD-08
SSR-08-03-015	The AFC System shall maintain logs of all data and field changes to transit accounts and customer accounts for the life of the system to support fraud investigation and auditing purposes. Logs shall capture the user or system component performing the change and the timestamp of the change.	SDD-08
SSR-08-03-016	The AFC System shall ensure all fraud controls and fraud-related data shall be available to authorized users only. All fraud control actions performed by authorized users shall be logged with all user information for auditing purposes, and require a message indicating the reason for the operation.	SDD-08
SSR-08-03-017	The Contractor shall collaborate with SEPTA to define all fraud controls for the AFC System during Design Review, including the threshold and measurement values for each rule. The Contractor shall update any fraud control setting upon request from SEPTA for the duration of the Contract.	SDD-08

8.4 Cryptographic Key Management

Req #	Requirement	Assigned CDRL
SSR-08-04-001	The Contractor shall be responsible for the management of all cryptographic keys (and similar data security elements) used to protect data within the AFC System, including: (1) Cryptographic keys used to protect data read from and written to closed-loop fare media; (2) EMV cryptographic keys used by fare validation and sales devices to generate encrypted EMV payloads; (3) Secret salt value(s) used by fare validation devices to create internal open payment (i.e., hashed PAN) tokens; and (4) Any other encryption keys and/or hashing values / salts used to protect sensitive data (e.g., customer PII) stored in production and non-production AFC System databases.	SDD-08
SSR-08-04-002	The Contractor shall provide cryptographic key management services and tools. Key management in this context includes: (1) Key generation: unique and derived key generation; (2) Key storage: secure storage and retention of key sets; (3) Key updates: ability to update, or roll, all cryptographic keys used within system; (4) Key sharing: secure sharing of key sets with third-parties; and (5) Key revocation: ability to remove keys used within system.	SDD-08
SSR-08-04-003	The Contractor shall use the highest possible security in generating, storing deploying, and transmitting cryptographic keys, and shall provide an offline key management environment leveraging Hardware Security Modules (HSMs) to support these activities. The Contractor shall submit a cryptographic key management plan for SEPTA's review and approval during Design Review.	SDD-08
SSR-08-04-004	The Contractor shall provide detailed specifications for the generation and management of all cryptographic keys used within the AFC System. The key generation algorithms shall be fully owned by or licensed to SEPTA, 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.	SDD-08

8.5 Required Submittals

CDRL ID	Contractor Deliverable	Due
SDD-08	System Security Design	Design Review
SDD-09	Cybersecurity Management Plan (CMP)	Design Review

9. Fare Structure Requirements

The fare structure requirements provide all the different configurations that the AFC System shall need to support to accommodate SEPTA's business rules. This includes the use of stored value and pass products. To accommodate a vast array of different fare programs, the AFC System must provide many different options to establish pricing, fare capping, complex fare products, and transfer rules based on several different criteria. The requirements in this section describe a highly customizable solution that can accommodate a variety of complex fare products with different usage rules, pricing, and transfer permissions. Fare products must be dynamic and the Contractor-provided configuration tools must provide SEPTA with the ability to make tariff changes as needed at anytime. The fare structure shall be designed to enable interoperability across current and future transit modes and future agency partners without additional development required by the Contractor.

SEPTA's fares vary based on the service mode, method of payment (e.g., cash, mobile, Keycard, etc.), trip destination/distance, time-of-day/day-of-week, and rider category. Free and reduced fares are available for eligible customers. In addition, SEPTA offers special fare programs for institutions (i.e., schools, colleges, social service agencies and employers) that purchase fares in bulk.

9.1 General Requirements

Req #	Requirement	Assigned CDRL
FARE-09-01-001	The AFC System shall support agency-configurable fare sets, business rules, and transaction processing necessary to support the current fare structure and all of the fare structure configuration requirements. At any time during the life of the Contract, SEPTA shall be able to make changes to the business rules at no additional cost. All changes shall be available immediately, or per a scheduled "go live" time defined in the fare structure update that is automatically implemented. Once the business rule changes are configured, they shall be made available across the system and all sales channels shall receive the updated fare structure and immediately (e.g., updated to be the new fare structure, or updated on devices for a scheduled activation).	SDD-10
FARE-09-01-002	The Contractor shall work with SEPTA during the design phase to develop a business rules document that describes the capabilities of the fare structure, the initial configuration to be deployed at launch, and the configuration tools available to support ongoing operations and management. The final fare structure configuration for the initial implementation shall be defined, documented, and approved by SEPTA no later than [180 calendar days] before the start of integration testing for the applicable part of the AFC System. The Contractor shall update and maintain the fare structure documented in the business rules document throughout the life of the Contract.	SDD-10

Req #	Requirement	Assigned CDRL
FARE-09-01-003	The Contractor shall ensure a consistent data format is used on all fare sets and topologies for updates and configuration changes.	SDD-10
FARE-09-01-004	The AFC System shall support the ability for the transit account's stored value to be negative as a fully configurable parameter (including the value allowed to be negative) based on rider classification, mode, fare media type (e.g., LU, mobile e- ticketing, etc.), service type, line, and location.	SDD-10
FARE-09-01-005	The AFC System shall support the ability to dynamically set the validity of fare products at the point of sale. Such that a pass product valid only on a specific day(s) (or time) can be issued without a tariff update. For example, SEPTA shall have the ability to sell a rolling [three (3)-day pass product] valid only between March 3 rd and March 5 th for a convention, without requiring a tariff update.	SDD-10

9.2 Fare Pricing

Req #	Requirement	Assigned CDRL
FARE-09-02-001	The AFC System shall support single-tap (or “flat”), distance-based (miles-based, point-to-point and set destination), and zone-based, and time-based fare pricing that is fully configurable based on rider classification, mode, fare media type (e.g., LU, mobile e-ticketing, etc.), service type, line, location, day and time of day, allowable transfers, discounts, and loyalty programs at a minimum. Parameters and combinations of various parameters may be different across the system under varying circumstances (e.g., flat fares offered on weekends and distance-based fares offered on weekdays). The Contractor shall support all other parameters defined during the design phase as the business rules are defined.	SDD-10
FARE-09-02-002	The fare pricing parameters listed in the Fare Structure requirements shall also govern the acceptance or denial of fare products being used for payment and the granting of transfers.	SDD-10

Req #	Requirement	Assigned CDRL
FARE-09-02-003	Fare sets associated with transit accounts shall be based on the rider classification. All rider classifications shall be configurable by SEPTA and associated with unique fare sets, including but not limited to Senior Citizen, Reduced Fare (e.g. disabled or other eligibility criteria), Student, Children, Post-Secondary Student, Low Income, ADA Attendant, ADA Senior, ADA Paratransit, Local, and Visitor. Rider classifications shall be designed to manually (e.g., through CRM, CST or other customer service applications) or automatically transition based on supplied customer data. The AFC System shall support the ability of SEPTA to grant temporary classification with a configurable end date. For all age-based concessions, the AFC System shall support the ability to automatically transition the transit account into the next age-appropriate concession category (e.g., child to youth) rather than defaulting to full fare.	SDD-10
FARE-09-02-004	The AFC System shall support premium pricing for certain types of service (e.g., express bus or rail service). Service-based fare pricing shall be able to be configured for a single route or group of routes.	SDD-10
FARE-09-02-005	Fare pricing shall be configurable based on the mode being traveled. The AFC System shall allow the addition of new modes, transit agencies, and system participants (e.g., parking, bike share, ride-hailing, car-share, ferry) with unique fare pricing as needed.	SDD-10
FARE-09-02-006	The AFC System shall support fare pricing based on the distance traveled, for fixed route service and paratransit service. (E.g., An ADA/CCT trip that drops off or picks up [three (3) miles] outside the SEPTA service area or exceeds more than [10 miles] with a pick-up or drop-off in a suburban county incurs a per/mile fee based on the origin and destination of the trip.)	SDD-10
FARE-09-02-007	The AFC System shall support fare pricing based on the time of day and day of the week. 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).	SDD-10
FARE-09-02-008	The AFC System shall support location-based fares, or the ability to price fares based on the location of payment (e.g., boarding rail at the airport or bus at specific stop locations). Location-based fare pricing shall be configurable based on the station location programmed into the rail devices, or the geo-location information captured from the onboard validation equipment (e.g., Computer-Aided Dispatch (CAD)/Automatic Vehicle Location) AVL System).	SDD-10

Req #	Requirement	Assigned CDRL
FARE-09-02-009	For distance and zone-based fares, the AFC System shall allow SEPTA to configure the initial fare amount of either the base fare or the default maximum fare, which shall be calculated and secured in the stored value at tap-on based on the location.	SDD-10
FARE-09-02-010	For distance and zone-based fares, the final fare shall be calculated upon tap-off and the transit account shall be charged the appropriate fare. If no tap-off is received within a configurable amount of time, AFC System shall automatically close the trip based on the configured tap-on maximum fare parameters. Upon receipt of a late-arriving transaction, the fare system shall process an adjustment to the corresponding transit account.	SDD-10
FARE-09-02-011	For distance and zone-based fares, the AFC System shall allow riders to correct an automatic trip closure via the customer-facing applications, websites, and customer service channels (e.g., CRM, CST). The AFC System shall limit the number of manual overrides per transit account. The maximum number of allowed overrides shall be configurable, and SEPTA shall have the ability to limit overrides to registered customers only if desired.	SDD-10
FARE-09-02-012	The AFC System shall 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, routes, payment method (e.g., autoload), day of the week, and time of day (to any minute of any given day). The discounts shall be put into effect indefinitely, for a future date, or a defined period (e.g., from June 5 th to June 7 th and New Year's Eve).	SDD-10
FARE-09-02-013	The AFC System shall support discounted fares, limited-time special offers, and promotions. At a minimum, special offers shall be configurable based on agencies, service types, the number of rides (e.g., ride [five (5) times, the sixth (6 th) ride] is free, buy [three (3) passes get four (4) passes] at a discount, transaction history (e.g., previous trips), periods of time (e.g., holidays), and geographic area (e.g., discount for rides in a specific area).	SDD-10

Req #	Requirement	Assigned CDRL
FARE-09-02-014	The AFC System shall support the ability to pay for multiple riders within the same rider classification using a single fare media instrument (including open payment credentials), while still providing the risk mitigations associated with single riders. If the transit account has a valid pass product, the pass product shall be applied (as applicable) to the initial ride and use stored value for all subsequent riders. If the first rider is in a reduced rider classification, the stored value for all subsequent riders shall be at the adult (e.g., full) fare pricing.	SDD-10

9.3 Fare Products

Req #	Requirement	Assigned CDRL
FARE-09-03-001	The AFC System shall support account-based stored value, which shall serve as an electronic cash-equivalent, and shall be accepted for payment across all modes and services. When stored value is used for payment, the AFC System shall transmit to the fare engine the correct fare at each boarding or entry in real-time and maintain the balance paid accordingly, based on the fare pricing configuration described in the technical requirements.	SDD-10
FARE-09-03-002	The AFC System shall support calendar passes that are valid for unlimited and limited rides during a pre-defined calendar period. Calendar passes shall be configurable to be valid for any calendar period from [one (1) day to two (2) years], including periods that are bounded by specific dates (e.g., valid from August 16 th through May 14 th) and time bands. All passes shall be valid through the end of the service period. End of the service period shall be configurable for each fare product. For all passes, the number of allowed rides shall be configurable by SEPTA.	SDD-10
FARE-09-03-003	The AFC System shall support rolling passes that are valid for unlimited or limited rides for a pre-defined period (including time bands) starting at pass activation, which may occur upon sale or first use. Rolling passes shall be configurable to be valid for a continuous duration from [30 minutes to two (2) years] (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). For limited ride period passes, the number of allowed rides shall be configurable by SEPTA.	SDD-10

Req #	Requirement	Assigned CDRL
FARE-09-03-004	The acceptance or denial of pass products for use on a particular mode or service shall be able to be configured based on the Fare Pricing parameters. Pass products shall be able to be configured as mode-specific (e.g., valid for bus only) or joint passes (e.g., valid for bus and rail).	SDD-10
FARE-09-03-005	The AFC System shall support passes that are only valid during specific times of the day and on specific days including sequential and non-sequential days (e.g., school hours on weekdays). This may include a pass product that is only good on select days at specific times for a limited amount of taps during a given date range (e.g., an "Eagles Pass" valid for season ticket holders for home gamedays only between 10 A.M. and 4 P.M.). Such passes shall be configurable without the need for a tariff update.	SDD-10
FARE-09-03-006	The AFC System shall support trip-based passes that are valid for a pre-defined number of trips. Trip-based passes shall be configurable to be valid for any number of trips (e.g., [one (1) to 100 trips]), and include the option to have transfer privileges or not.	SDD-10
FARE-09-03-007	The AFC System shall support dynamic, multiple rider passes with the same, or different rider classifications (e.g., [four (4) adults] and [10 students]). Multiple rider passes available to the general public may be limited in the number of riders, however multiple rider passes available to institutions may include unlimited number of riders.	SDD-10
FARE-09-03-008	All pass products shall be configurable as mode-specific (e.g., valid for bus only) or multiple modes (e.g., valid for bus, subway, and rail) or system-wide.	SDD-10
FARE-09-03-009	Transit accounts shall be able to contain multiple fare products simultaneously (e.g., stored value and a pass product). One transit account shall be able to support up to any number of unique fare products, including active and multiple inactive instances of the same product. Order of precedent rules (defined during the design phase) shall determine which fare products are used first and under which scenarios.	SDD-10

Req #	Requirement	Assigned CDRL
FARE-09-03-010	The AFC System shall support fare incentives based on purchase bonuses. Purchase bonuses shall be able to be configured to grant a free product after a certain number of products have been purchased (e.g., buy [10 passes, get one (1) free]). SEPTA shall be able to add, modify or remove fare incentives and bonuses at any time with no restrictions. Changes shall go into effect and all applicable sales channels shall be updated immediately, or as scheduled depending on the activation parameters set by SEPTA.	SDD-10
FARE-09-03-011	The AFC System shall support the assessment of a configurable dormancy fee against stored value balances following a period of transit account inactivity. The assessment of dormancy fees shall be defined during Design Review and shall comply with all applicable state and federal regulations.	SDD-10
FARE-09-03-012	Pass products shall be configurable to grant a partial credit towards a fare for a premium service (e.g., the remainder of the fare, or “upgrade fare,” shall be deducted from stored value). If the customer does not have enough value in their account to cover the upgraded fare, the ride shall be denied.	SDD-10
FARE-09-03-013	Pass products shall include distance-based products. (e.g., point-to-point locations or zones.)	SDD-10
FARE-09-03-014	The maximum number of unused passes associated with a transit account shall be configurable by pass type, transit agency, value, and rider classification. Unused pass products shall automatically expire after a configurable set of time. Each pass product may include a different configurable expiration based on pass type, service, transit agency, value, rider classification as determined in the business rules.	SDD-10

9.4 Transfers

Req #	Requirement	Assigned CDRL
FARE-09-04-001	Transfers shall be supported for both single and multiple riders that pay fares using stored value and pass products for all supported fare media per the SEPTA business rules.	SDD-10

Req #	Requirement	Assigned CDRL
FARE-09-04-002	The AFC System shall support the granting of a transfer fare credit for a boarding (e.g., fare payment) that occurs within a defined time period of another. The transfer period (e.g., the time during which a boarding is eligible for a transfer) and the number of allowable transfers (e.g., transfer limit per product) and price charged for each transfer shall be configurable.	SDD-10
FARE-09-04-003	The transfer fare credit shall be configurable based on the fare product used as defined in the business rules. For example, if stored value is used, the first transfer is free on the same mode of service, and all other transfers within a specific window are at a discounted rate.	SDD-10
FARE-09-04-004	The granting of a transfer fare credit, the credit amount, and transfer validity shall be configurable based on all of the fare pricing parameters described in the Fare Structure requirements. Transfers shall be configured as route-specific, mode-specific (e.g., valid for bus-to-bus only) or intermodal. Transfers shall be designed to prevent round-tripping based on the mode, fare type, line, trip direction, and other parameters described in the requirements.	SDD-10
FARE-09-04-005	Transfers shall be configurable to grant a partial credit towards a fare for a premium service or transfers to another transit agency. In this scenario, the remainder of the fare, or “upgrade fare,” shall be deducted from stored value. If the transit rider does not have enough value in their account to cover the upgraded fare, the ride shall be denied.	SDD-10
FARE-09-04-006	The AFC System shall support transfers by using third-party issued barcodes (e.g., Amtrak tickets, NJT tickets, etc.). The approach shall be defined, reviewed, and approved during Design Review.	SDD-10

9.5 Fare Capping

Req #	Requirement	Assigned CDRL
FARE-09-05-001	The AFC System shall support fare capping based on configurable calendar periods (i.e., “capping periods”) per geographic region, service type, or system-wide in any combination. When a spending threshold (i.e., “fare cap”) is reached, the rider shall be entitled to free or discounted rides on configured services for the remainder of the capping period. There shall be no limit to the number of active fare capping accumulations that can be associated with a single transit account.	SDD-10

Req #	Requirement	Assigned CDRL
FARE-09-05-002	For each combination of a rider classification, calendar period (e.g., day, week, month, etc.), time period (e.g., morning, evening, etc.), zones and service type for which fare capping shall be used to confer a benefit (i.e., each calendar-based pass being replaced), a unique fare cap shall be configured and a unique record of spending (i.e., “fare accumulator”) shall be maintained for each customer. There shall be no limit on the number of concurrent fare caps supported by the AFC System.	SDD-10
FARE-09-05-003	In a multiple rider scenario, the AFC System shall support fare capping for the primary transit account holder however, subsequent riders shall not count towards fare capping accumulations.	SDD-10
FARE-09-05-004	For any fare paid on a service, SEPTA shall be able to configure unique accumulation rules associated with each of the fare caps providing a benefit on that service. These rules shall support the accumulation of either the full or a partial amount of the fare paid by the customer, independent of whether the amount paid is the full fare for the service or discounted due to transfer, upgrade, or the reaching of a fare cap.	SDD-10
FARE-09-05-005	For each fare capping accumulator, SEPTA shall be able to configure the services provided, including providing free or discounted rides for the remainder of the capping period. When a discount is provided for rides during the capping period, the customer shall be required to pay an “upgrade fare” based on the configured rules. In some circumstances, the upgraded fare shall accumulate towards a higher tier (e.g., free ride or longer duration) fare cap for the same service.	SDD-10
FARE-09-05-006	At the end of a capping period, fare accumulators for any fare cap associated with that period shall be reset for all customers.	SDD-10
FARE-09-05-007	The AFC System shall support limiting the maximum number of rides that can be taken per fare cap. The maximum number of rides per fare cap shall be a configurable parameter within the fare engine tool provided by the Contractor.	SDD-10

9.6 Special Fare Programs

Req #	Requirement	Assigned CDRL
FARE-09-06-001	The AFC System shall support special fare programs, or institutional programs, with a unique fare distribution channel, fare products, and business rules.	SDD-10

Req #	Requirement	Assigned CDRL
FARE-09-06-002	The AFC System shall support the current range of special fare programs offered by SEPTA, and future programs, including but not limited to: (1) Paratransit (e.g., CCT) program; (2) Regional Transit Service partners (e.g., PATCO, NJT); (3) University and other post-secondary school programs; (4) Department of Education (DOE) and other schools' (K-12) programs; (5) Corporate and employer programs; (6) Government and military programs; (7) Social service SEPTA programs; (8) Local attraction and tourist programs; (9) Partner programs supporting transit-related services, including parking, bike share, and tourist transportation (e.g., Rail from airport); and (10) Amtrak and partner transit agencies.	SDD-10
FARE-09-06-003	Special fare programs and their associated fare media, fare products, and business rules shall be defined during the design phase. The AFC System shall allow SEPTA to configure and enroll new programs throughout the duration of the Contract.	SDD-10
FARE-09-06-004	Special fare programs shall include the ability to provide fare sales using pre-tax transit benefits funds. Stored value and passes loaded through transit benefit programs shall be identified as such and segregated within the transit account to ensure compliance with all applicable IRS regulations.	SDD-10
FARE-09-06-005	The AFC System shall provide the capability to request printing of personalized special fare program media including media issued by third-parties, including: reduced fare cards (e.g., youth, senior, disabled, etc.), paratransit cards, employee IDs, post-secondary school, and school IDs, military IDs, and temporary tourist cards. Rider classification associated with unique fare pricing shall be supported for special fare programs and media.	SDD-10
FARE-09-06-006	Fare products offered through designated special fare programs shall not be available to the general public (with the exception of stored value). Only users enrolled in the fare program shall see applicable fare products available via the sales channels specified by the transit agency and SEPTA. Some special fare programs may be part of an Institutional account.	SDD-10
FARE-09-06-007	At a minimum, the following configuration parameters shall be supported to govern an institution's participation in special fare programs: program type (e.g., direct load, post-bill, or media order-only), available fare media, available fare products, fare media and product pricing, fare media and product ordering windows, payment type (e.g., prepay or invoice), and payment terms.	SDD-10

Req #	Requirement	Assigned CDRL
FARE-09-06-008	The special fare program configuration parameters shall be set by SEPTA during the registration of an institutional customer and shall be stored in the institutional customer account.	SDD-10
FARE-09-06-009	Special fare programs shall 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 shall have the option to load an unlimited-ride pass, or a post bill ride pass with the trip limit. The AFC System shall calculate the amount due on a monthly basis using pass ridership data and a SEPTA-defined formula.	SDD-10
FARE-09-06-010	Special fare programs shall include the bulk sale of fare media. Bulk sales shall include LU media where the associated transit accounts are pre-loaded.	SDD-10

9.7 Configuration Management

Req #	Requirement	Assigned CDRL
FARE-09-07-001	The Contractor shall provide fare configuration management user interface that supports the configuration of all fare rules used by the back-office in the processing of fare sales, validation, and inspection transactions by SEPTA or the Contractor.	SDD-10
FARE-09-07-002	The Contractor-provided tools shall enable the ability for SEPTA or the Contractor to add, edit or remove fare configurations including all fare tables, fare rules, and other parameters necessary to support the fare structure configuration described in the requirements. The Contractor-provided tools shall be accessible, modifiable and log all changes, and provide a historical record of changes and updates.	SDD-10
FARE-09-07-003	The AFC System shall be able to manage, store, and deploy an active fare set and multiple pending fare sets. An active fare set is effective immediately upon publication. Pending fare sets shall be able to be activated manually or automatically based on a future activation date configured within the tools. There shall be no limit to the number of changes and deployments of fare sets allowed.	SDD-10

Req #	Requirement	Assigned CDRL
FARE-09-07-004	The AFC System shall publish fare media positive and negative lists generated and used by the ATP, and distributed to devices, to support the risk mitigation techniques discussed in the Risk Mitigation requirements. Positive and negative list updates shall be published no less than every [three (3) minutes] and include version control to ensure timely and accurate synchronization.	SDD-10
FARE-09-07-005	All configuration parameters distributed to the devices, including positive and negative list updates, shall be distributed using the Contractor-provided Device Management API.	SDD-10
FARE-09-07-006	The configuration of the fare products available for sale and fare product pricing shall be accessible and modifiable by SEPTA using the tools provided by the Contractor. Fare structure configurations shall be able to be performed by SEPTA and the Contractor during implementation and throughout the warranty and software maintenance agreement terms.	SDD-10
FARE-09-07-007	Sales of available fare products and pricing shall be configurable by sales channel, location, mode, date, time, and individual device. To the extent that any fare product availability and pricing information is maintained locally at the devices, the AFC System shall publish this information for distribution. Devices that are not in communication at the time of distribution shall receive updates as soon as communications are re-established.	SDD-10

9.8 Required Submittals

CDRL ID	Contractor Deliverable	Due
SDD-10	Business Rules Design	Design Review

10. Fare Equipment Requirements

The fare equipment requirements describe the various equipment and associated features and functions required by SEPTA. All equipment shall be integrated with the fare collection back-office via APIs and meet all local, state, and federal regulations and certifications as necessary. It is the Contractor's responsibility to ensure that all provided equipment meet the applicable standards identified in the Common Design requirement section. As part of this project, the Contractor shall provide the following:

- Fare Payment Validators (FPV)

- ADA Faregates
- Station Agent Console (SAC)
- Fare Vending Machines (FVM)
- Customer Service Terminals (CST)
- Handheld Validation, Inspection, and Sales Applications Solution

All customer facing equipment and user interfaces shall provide a cohesive customer experience. Devices that include interactions with the customer (e.g., FVM user interfaces) shall provide a similar user interface of other customer facing applications and leverage the experience from the Contractor's UX/UI team. All Common Equipment Requirements shall be applied to all applicable equipment provided to meet the requirements of the overall AFC System.

10.1 Common Equipment Requirements

10.1.1 General Requirements

Req #	Requirement	Assigned CDRL
FEQ-10-01-01-001	All customer-facing equipment shall be designed to adhere to the aesthetic standards of SEPTA, with consistent cross-platform branding. The Contractor shall submit designs for review and approval during Design Review. Final equipment design, including interface display, lettering, lights, colors, color contrast to aid visually impaired, tactile feedback, brightness, graphics, animation, screen savers, surface texture, component size and height, and hardware shall be subject to SEPTA approval.	As required
FEQ-10-01-01-002	The Contractor shall provide a coherent customer experience, with a similar look and user experience across Contractor-provided hardware, especially customer-facing equipment and devices. Equipment design shall include careful consideration for equipment installed in unsheltered (e.g., uncovered) locations where sun glare may impact the customer experience. If necessary, the Contractor shall provide coverings that protect or shade the equipment to reduce glare and heat buildup, or the solar impact of being in direct sun. SEPTA and designated representatives shall participate in an industrial Design Review with the Contractor to define the customer experience for both hardware and software.	As required
FEQ-10-01-01-003	AFC System equipment displays (including the entire surface of the display for the FVM), graphics, signage, and all other instructions, labels, and information contained on the equipment shall include raised letterings and be visually readable within all common positions from a customer point of view, including devices exposed to and in direct sunlight.	As required

Req #	Requirement	Assigned CDRL
FEQ-10-01-01-004	AFC System equipment shall provide customers with displays, graphics, signage, controls, and mechanisms that are simple to use, easy to understand, and conveniently located. By following instructions given on and by the equipment, an inexperienced user shall be able to understand all transaction processes and results. All such user interfaces shall be user-friendly; that is, safe, predictable, simple to use, and in accordance with other applicable human engineering principles.	As required
FEQ-10-01-01-005	AFC System equipment shall accommodate the broad range of customers that use public transportation. The range of customers paying fares shall include commuters, infrequent riders (including tourists), children, the elderly, customers with impaired vision, customers in wheelchairs, customers with limited communications skills, including the illiterate, and customers who are hearing impaired.	As required
FEQ-10-01-01-006	All equipment shall meet the applicable Federal, State, and local hardware and software security requirements.	As required
FEQ-10-01-01-007	The Contractor shall provide equipment that is tamper and vandal resistant. Applicable equipment (e.g., PCI-compliant devices) shall automatically detect intrusion attempts and provide an alert or alarm to the device monitoring application.	As required
FEQ-10-01-01-008	The design of the AFC System shall provide a mechanism to recover transactions or other data stored on faulty equipment that has not been transmitted to the back-office.	As required
FEQ-10-01-01-009	Devices used for fare validation shall support multi-rider payment using a single credential. This may include functions to manually override passback for multi-rider payment such as automatically “resetting” passback when the ADA Faregates close, Turnstiles rotate, and when a bus operator selects an option from the operator display to override passback for multiple taps. The Contractor is welcome to propose alternative proven solutions.	As required
FEQ-10-01-01-010	All devices used for fare validation (including the conductor handheld unit) shall include the ability to securely read and write to closed-loop contactless media. Information written to the card upon tap may include the date/time stamp at the time the card is presented to the validation device to support inspection of media that tapped on offline validation devices. Details shall be determined during Design Review.	As required

10.1.2 PCI and EMV Compliance

Req #	Requirement	Assigned CDRL
FEQ-10-01-02-001	The AFC System and all applicable equipment shall be PCI, Data Security Standard (DSS), and EMV L3 certified for the acceptance of bank-issued contact and contactless credit and debit cards using all common formats based on the current published version of the standard at the time of Final Acceptance. The Contractor shall maintain and keep current PCI, DSS, and EMV certifications for the life of the Contract.	As required
FEQ-10-01-02-002	The AFC System and all applicable equipment shall be re-certified to the current published PCI, DSS, and EMV standards via software upgrades within a mutually agreed upon time between the Contractor and SEPTA after the published versions are released. Updates to the FPDs to maintain PCI, DSS, and EMV certification during the Contract period shall not require the replacement of hardware.	As required

10.1.3 Hardware

Req #	Requirement	Assigned CDRL
FEQ-10-01-03-001	Fare equipment shall satisfy all applicable common hardware design requirements including: (1) Service-proven design; (2) Nonproprietary technology; (3) Supply and availability; (4) Materials and workmanship; (5) Maintainability and serviceability; (6) Operating environment; (7) ADA compliance; and (8) Code and regulation compliance.	As required
FEQ-10-01-03-002	Equipment components shall be designed, built, and installed for the harshest operating environment in the Philadelphia region.	As required
FEQ-10-01-03-003	All equipment design, including dimensions, mounting options, and installation placement shall be subject to review and approval by SEPTA.	As required
FEQ-10-01-03-004	All customer-facing equipment shall include full-color displays that support adjustable brightness, contrast, and refresh rate that can be easily read under any combination of ambient lighting, including direct sunlight and night-time operation. A luminescence of [750nt] is recommended for devices deployed on unsheltered platforms or may be placed in direct sunlight.	As required

Req #	Requirement	Assigned CDRL
FEQ-10-01-03-005	All equipment that reads fare media for the purpose of fare distribution or validation shall include a contactless reader that supports all common ISO-14443 (Type A and B), ISO-18092 (NFC), and closed-loop (e.g., the entire MIFARE product line and Sony FeliCa) media formats, in addition to all open payment contactless standards, including but not limited to: (1) Visa payWave; (2) MasterCard® PayPass™; (3) American Express® ExpressPay; (4) Discover® D-PAS; and (5) Contactless EMV (e.g., Google Pay, Apple Pay).	As required
FEQ-10-01-03-006	A tamper-proof, durable identification label inscribed with the equipment serial number shall be permanently attached to the outside of each piece of equipment. Barcode readers housed within equipment (e.g., FPMs, FVMs, ADA Faregates, etc.) shall also include separate serial numbers attached to the barcode reader module.	As required
FEQ-10-01-03-007	Component and LLRU numbering, part numbers and names shall utilize existing OEM names and numbering. No generic names shall be used. Names shall indicate distinguishable components (or metrics) associated with that part.	As required

10.1.4 Supply and Availability

Req #	Requirement	Assigned CDRL
FEQ-10-01-04-001	SEPTA understands that supply chain issues continue to impact all industries, and that equipment or materials may need to be substituted during the Project. The Contractor shall provide written notice to SEPTA of any proposed substitution within [seven (7) days] of identifying the equipment or materials substitutions. SEPTA shall have [21 days] to review and approve substitution requests.	As required
FEQ-10-01-04-002	If SEPTA finds that approved equipment or materials do not furnish a uniform product, or the product is unable to meet the requirements in these specifications through Final Acceptance, the Contractor shall take all steps necessary to furnish acceptable materials at no additional cost to SEPTA.	As required

Req #	Requirement	Assigned CDRL
FEQ-10-01-04-003	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 OEM support commensurate with the required useful life of the AFC System.	As required
FEQ-10-01-04-004	The Contractor shall provide SEPTA with a list and pricing for all devices, components, parts, modules, assemblies, and subassemblies for purchase at SEPTA's discretion.	As required
FEQ-10-01-04-005	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 SEPTA a minimum of [180 calendar days] prior to the last available date of purchase or support.	As required
FEQ-10-01-04-006	The Contractor shall work with SEPTA 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 shall be borne by the Contractor.	As required

10.1.5 Materials and Workmanship

Req #	Requirement	Assigned CDRL
FEQ-10-01-05-001	All components of the AFC System shall be constructed of the highest quality materials suitable for production-level use in the intended environment over the required useful life of the AFC System. The Contractor shall use only new components conforming to the requirements of these specifications and approved by SEPTA. This does not preclude the use of recycled materials in the manufacture of new components.	As required

Req #	Requirement	Assigned CDRL
FEQ-10-01-05-002	The Contractor shall be responsible for all materials and workmanship. It is the Contractor's responsibility to design, select, and apply all materials necessary to meet the requirements of these specifications. If alternate materials are offered following selection, it is the responsibility of the Contractor to demonstrate that the alternate materials are equivalent to the proposed materials, and to obtain SEPTA approval for the substitution prior to any implementation.	As required
FEQ-10-01-05-003	All Contractor-provided equipment shall be free from safety hazards and must be Underwriter's Laboratory (UL) certified. All interior and exterior surfaces shall be free from sharp edges, protrusions, exposed wires, or other hazards. If SEPTA determines that the equipment is unsafe or poses a hazard to staff or the public, the Contractor shall correct the issue at no additional cost.	As required

10.1.6 Shock and Vibration

Req #	Requirement	Assigned CDRL
FEQ-10-01-06-001	The Contractor shall design, build, and install all onboard equipment (including bus validators and driver displays) for the harsh, high shock, and vibration operating environment in which the system components shall be installed. Operation of the fare collection equipment in this environment shall not in any way impair equipment performance throughout the required useful life of the AFC System.	As required
FEQ-10-01-06-002	All Contractor-provided components shall withstand structure-borne stresses and vibrations caused by the motion of buses and trains, daily customer use, the passing of trains or other vehicles, and emergency braking of fully loaded trains.	As required
FEQ-10-01-06-003	All AFC System components and mounts shall be sufficiently constructed to comply with local codes regarding stability of structures and contents in earthquakes, high velocity wind (up to [60 miles per hour]), and other natural phenomenon.	As required
FEQ-10-01-06-004	The Contractor shall provide certification for onboard equipment including bus validators, driver displays, and mobile fare validation and payment devices that show equipment passes the following shock and vibration tests: (1) IEC 60068-2-27; (2) IEC 60068-2-64; or (3) The latest revision.	As required

Req #	Requirement	Assigned CDRL
FEQ-10-01-06-005	The Contractor shall provide certification for rail equipment including platform validators, FVMs, and faregates that show equipment passes the shock and vibration tests specified in the ERTMS/ETCS Environmental Requirements (e.g., EEIG 97s0655).	As required

10.1.7 Climate Conditions

Req #	Requirement	Assigned CDRL
FEQ-10-01-07-001	Onboard equipment and mobile fare validation and payment devices provided by the Contractor shall be protected to prevent degradation in performance from exposure to moisture or dust raised by inclement weather or interior cleaning. Operation of the fare collection equipment in this environment shall not in any way impair equipment performance throughout the required useful life of the AFC System.	As required
FEQ-10-01-07-002	The onboard equipment provided by the Contractor shall be able to operate and not suffer any degradation in performance under the following environmental conditions: (1) Storage temperature: [-22°F to +150°F] (including direct sunlight); (2) Operating temperature: [-15°F to 120°F] (ambient air temperature); (3) Thermal shock: Up to [50°F in one (1) hour], non-condensing; (4) Relative humidity: [5% to 95%], non-condensing; (5) Airborne dust: [up to 180 micrograms per cubic meter], with iron and salt particles; (6) Sunlight: direct sunlight, radiation loading of up to [789J/sec/m2]; (7) Inclination: [0° to 20° off vertical]; (8) Water/solvents: IEC529 to level IP54 or equivalent; and (9) Other operational conditions: water spray, industrial cleaning solvents, and mud on system components from cleaning vehicle floors and walls.	As required
FEQ-10-01-07-003	The onboard equipment shall be designed to be resistant to liquid ingress caused by atomization cleaning, rain, snow, or by splashed water or cleaning chemicals, such as would occur during routine equipment and vehicle cleaning.	As required
FEQ-10-01-07-004	The onboard equipment shall be tested and certified to operate under the environmental conditions specified in the Society of Automotive Engineers (SAE) J1455 or approved equivalent.	As required
FEQ-10-01-07-005	The onboard equipment shall meet the following flammability requirements: (1) UL 94 V-O; and (2) UL HB.	As required

Req #	Requirement	Assigned CDRL
FEQ-10-01-07-006	The onboard equipment shall be either immune to or protected from the damaging effects of visible spectrum and ultraviolet radiation. Internal components that may be either damaged or affected operationally when exposed to direct sunlight shall be protected from exposure during maintenance activities without requiring specific action by maintenance personnel.	As required
FEQ-10-01-07-007	The rail station and platform equipment provided by the Contractor (including the rail station operator console) shall be designed to be installed in an open-air station environment with steel dust, direct sunlight, and extreme environmental conditions for the Philadelphia region. Operation of the fare collection equipment in this environment shall not in any way impair equipment performance throughout the required useful life of the AFC System.	As required
FEQ-10-01-07-008	The rail and platform equipment (except the Faregates) provided by the Contractor shall tolerate the environment in which it is installed and stored. The equipment shall be able to operate and not suffer any degradation in performance under the following environmental conditions: (1) Storage temperature: [-22°F to +150°F]; (2) Operating temperature: [-22°F to 120°F] (ambient air temperature); (3) Thermal shock: Up to [30°F in one (1) hour], non-condensing; (4) Relative humidity: [5% to 95%], non-condensing; (5) Airborne dust: [up to 180 micrograms per cubic meter], with iron and salt particles; (6) Sunlight: direct sunlight, radiation loading of up to [789J/sec/m ²]; (7) Platform Inclination: [0° to 4° off level]; (8) Rainfall: [10 inches] over [12 hours]; (9) Water/solvents: IEC529 to level IP54 or equivalent; and (10) Other operational conditions: water spray, industrial cleaning solvents, and mud on system components from cleaning station floors and walls.	As required
FEQ-10-01-07-009	The rail and platform equipment shall be designed to be resistant to liquid ingress caused by wind-driven rain, atomization cleaning, rain, snow, or by splashed water or cleaning chemicals during routine equipment and platform cleaning. The Contractor shall design the solution to account for liquid egress due to condensation and groundwater infiltration via conduits. Where weep holes are used, the design shall prevent rodent/insect infiltration. Plans for expelling water from devices are subject to SEPTA approval.	As required

Req #	Requirement	Assigned CDRL
FEQ-10-01-07-010	FVMs shall be subject to (1) Incidental moisture from customers and cleaning through coin, bill, and ticket slots, and other openings and enclosure joints; and (2) Inclement weather conditions (e.g., some FVMs are not covered or sheltered and directly exposed to the weather). The Contractor shall provide FVMs that are designed for proper operation under such conditions. All exposed surfaces, including push buttons, the display screen, and coin and bill components shall be unaffected, and means shall be provided to expel moisture from the devices to ensure continued reliable operation.	As required
FEQ-10-01-07-011	The rail and platform equipment shall be either immune to or protected from the damaging effects of visible spectrum and ultraviolet radiation. Internal components that may be either damaged or affected operationally when exposed to direct sunlight shall be protected from exposure during maintenance activities without requiring specific action by maintenance personnel.	As required
FEQ-10-01-07-012	CSTs shall be designed to be installed in SEPTA facilities at rail station locations (e.g., temperature moderated, with dust levels higher than a typical office setting). Operation of the equipment in this environment shall not in any way impair equipment performance throughout the required useful life of the AFC System.	As required

10.1.8 Electrical

Req #	Requirement	Assigned CDRL
FEQ-10-01-08-001	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.	As required
FEQ-10-01-08-002	Adequate protection against transient power surges on all vehicles, stations and platforms shall be incorporated to the extent necessary by the Contractor to prevent damage to the electronic components of the onboard equipment.	As required
FEQ-10-01-08-003	Power sensing shall be incorporated into onboard equipment power supplies to cause the devices to switch off automatically if the supply voltage increases or decreases to levels beyond the voltage tolerance defined by SEPTA.	As required

Req #	Requirement	Assigned CDRL
FEQ-10-01-08-004	All system components shall retain any information stored in non-volatile memory under any conditions of the supplied power.	As required
FEQ-10-01-08-005	Electrical power shall be obtained from existing power sources and shall be filtered, transformed, converted, battery-stored, and distributed by the Contractor as required, including all necessary connections and terminations.	As required
FEQ-10-01-08-006	Primary power shall be provided by SEPTA at equipment installation locations and may not be clean or isolated at the voltage levels required by the Contractor-supplied equipment. Any necessary conditioning of the primary power, or addition of line interface filters or power supplies, shall be the responsibility of the Contractor, and to the greatest extent possible, shall be performed within the equipment enclosures.	As required
FEQ-10-01-08-007	All system components operating off of line voltage shall be designed to operate with a [+/- 10%] fluctuation in voltage without any damage or interruption.	As required
FEQ-10-01-08-008	Rail and platform equipment provided by the Contractor shall be capable of normal operation under the following conditions: (1) Source power of [120 VAC (+/-10%)], single phase, 3-wire, [60 Hz (+/-1%)]; (2) Micro cuts in the power supply of up to [15 ms], with a recurrence of [100 ms]; and (3) The following voltage excursions: a) Sag: [-15%]; b) Surge: [15%]; c) Transient Impulse: [75 volts]; d) Common Mode Noise: [5 volts].	As required
FEQ-10-01-08-009	In the event of a loss of electrical power, the impacted rail equipment (including FVMs, ADA Faregates, and platform FPVs) shall complete any transaction in process, retain all data, and shut down in an orderly manner. The equipment shall return to full operational status after a power failure without manual intervention or adversely affecting the integrity of stored data.	As required
FEQ-10-01-08-010	Onboard equipment, including bus validators and driver displays shall be designed to operate reliably from a vehicle's direct current power source, which shall be either [12 VDC] or [24 VDC].	As required
FEQ-10-01-08-011	The onboard equipment shall be protected against damage or data loss under the following conditions: (1) Voltage fluctuations; (2) Reverse polarity of the input voltage; (3) Temporary voltage variations [0 to 50 V]; (4) Over-current draw; and (5) Stray currents.	As required

Req #	Requirement	Assigned CDRL
FEQ-10-01-08-012	The onboard equipment power supply shall include adequate filters and components to regulate the bus or trolley-supplied voltage and render it devoid of power spikes and noise. Provisions shall include the elimination of power fluctuations caused by fluorescent lights, coach alternators, air conditioning units, radio communication units, and other systems characteristic of a bus or trolley environment.	As required
FEQ-10-01-08-013	The Contractor shall ensure system equipment will operate without being affected by or causing Electromagnetic Interference (EMI).	As required
FEQ-10-01-08-014	All system components shall include protection against external EMI and Radio Frequency Interference (RFI) emissions, as well as internal conductive or inductive emissions.	As required
FEQ-10-01-08-015	The Contractor shall provide onboard equipment that conform to the following standards: (1) FCC Part 15, Subpart B Class A (Conducted emissions), pertaining to conducted susceptibility; and (2) FCC Part 15, Subpart B Class A (Radiated emissions), pertaining to radiated susceptibility.	As required
FEQ-10-01-08-016	The Contractor shall provide equipment that conforms to the following standards: (1) FCC Part 15; Subpart B Class A (Conducted emissions), pertaining to conducted susceptibility; (2) FCC Part 15, Subpart B Class A (Radiated emissions), pertaining to radiated susceptibility; (3) IEC 1000-4-6 (EN61000-4-6); (4) IEC 6100-4-3 (EN61000-4-3); and (5) IEC 6100-4-2 (EN 6100-4-2).	As required
FEQ-10-01-08-017	Equipment shall not emit measurable EMI or RFI that produces harmful interference with any other onboard or station devices or systems, including Global Positioning System (GPS) and magnetic compass reading.	As required
FEQ-10-01-08-018	Rail equipment shall not emit measurable EMI or RFI that produces harmful interference with any other onboard or station devices or systems, including GPS and magnetic compass readings, and shall comply with the following standards: (1) IEC 1000-4-6 (EN61000-4-6) pertaining to conducted susceptibility; (2) IEC 6100-4-3 (EN61000-4-3) pertaining to radiated susceptibility; and (3) IEC 6100-4-2 (EN 6100-4-2) pertaining to electrostatic discharge.	As required
FEQ-10-01-08-019	Operation of the equipment shall not be affected by the electromagnetic fields generated by traction power (overhead catenary or third rail) at distances as close as [20 feet], or by local high voltage power distribution lines at distances as close as [50 feet].	As required

Req #	Requirement	Assigned CDRL
FEQ-10-01-08-020	Operation of the rail and platform equipment, including the rail station operator console shall not be adversely affected by the operation of other station equipment, such as lighting and communications equipment, within close proximity.	As required
FEQ-10-01-08-021	Onboard equipment, including bus validators and driver displays, shall be unaffected by interference from fluorescent lights, coach alternators, air conditioning units, radio communication units, and other systems characteristic of a bus environment.	As required
FEQ-10-01-08-022	Equipment communications shall not interfere or be impacted by the use of established frequencies, including but not limited to: (1) Audio frequencies for overlay track circuits, highway crossing approach and island circuits, and electrical lock circuits; (2) Audio frequency code overlay for Automatic Train Control (ATC) Systems; (3) Signal power; and (4) Cab signals.	As required
FEQ-10-01-08-023	The Contractor shall certify the electromagnetic compatibility of system components to be furnished. The Contractor shall provide the results of interaction analysis and testing of each system component with regard to frequency distribution, amplitude, and harmonic content for review and approval during Design Review.	As required
FEQ-10-01-08-024	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.	As required
FEQ-10-01-08-025	All rail and station equipment enclosures, chassis, assemblies, panels, switch boxes, and terminal boxes shall be grounded. Where applicable, protective grounding shall be provided to ensure that exposed metal on all system components is connected to a common ground point.	As required
FEQ-10-01-08-026	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 shall be provided for review and approval during Design Review.	As required
FEQ-10-01-08-027	The Contractor shall provide Ground Fault Circuit Interrupter (GFCI) circuit breakers for all applicable equipment. Circuit breakers shall include a "push to test" button, visible indication of a tripped condition, and the ability to detect an earth leakage current of approximately [five (5) milliamperes] in accordance with UL 1053.	As required

10.1.9 Software

Req #	Requirement	Assigned CDRL
FEQ-10-01-09-001	Equipment software shall employ software that satisfies the Common Design Requirements including: (1) Nonproprietary technology; (2) Software design principle; (3) Licensing and ownership; (4) ADA compliance; and (5) Code and regulation compliance.	As required
FEQ-10-01-09-002	All equipment shall employ a current or recent version of a COTS operating system. The operating system shall 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.	As required
FEQ-10-01-09-003	All equipment shall maintain local transaction records in non-volatile memory in the event that communications to the back-office are unavailable. Local records shall not be deleted until they have been confirmed as received and recorded by the back-office.	As required
FEQ-10-01-09-004	All customer-facing system equipment shall incorporate a test mode. In this mode, the equipment shall have full functionality and process only test media. Test transactions shall be segregated in reporting from revenue service transactions.	As required
FEQ-10-01-09-005	Equipment shall receive configuration and software updates when available from the back-office. The equipment shall not commence updating software until it has received and verified the complete update. If any updates require a reboot, they shall occur during non-operating hours decided by SEPTA, unless specifically approved by authorized service staff.	As required

10.1.10 Configuration

Req #	Requirement	Assigned CDRL
FEQ-10-01-10-001	All equipment shall be remotely monitored, configured, and managed through the SMMA using the device management API. Equipment software and configuration updates, including all positive and negative lists, shall be managed through this system.	As required

Req #	Requirement	Assigned CDRL
FEQ-10-01-10-002	All equipment shall receive date/time, fare table, configuration, and list updates from the back-office at startup and as necessary. Additionally, equipment shall automatically synchronize with the back-office throughout the day using Network Time Protocol and other means to update configuration and list data.	As required
FEQ-10-01-10-003	All equipment shall be able to receive multiple account lists from the back-office including, and not limited to, positive and negative lists. These lists shall help improve passenger dwell time and mitigate risks from offline operation. All local lists shall be updated based on changes since the last update at a configurable interval.	As required
FEQ-10-01-10-004	All equipment shall include the flexibility to ensure that future fare policy shall be satisfied without software modifications. All fare policy modifications shall be through fare table and other configuration changes, downloadable from the back-office.	As required
FEQ-10-01-10-005	Each update shall have a unique version number and include an activation date and time if applicable. Updates shall be able to be downloaded and applied at that activation time or activated immediately after download and verification are confirmed.	As required
FEQ-10-01-10-006	The download process shall not interrupt normal equipment operations, or cause data or file corruption if communication is lost. The process shall recover from such loss and complete the download without issue.	As required

10.1.11 Maintainability and Serviceability

Req #	Requirement	Assigned CDRL
FEQ-10-01-11-001	AFC System equipment shall provide reliable operation over its design life and shall be designed to require minimal scheduled and unscheduled maintenance. To the extent possible, the Contractor shall design equipment to support "finger-tip" maintenance.	As required

Req #	Requirement	Assigned CDRL
FEQ-10-01-11-002	The time for entry into a device, removal, and replacement of the device or a device module, and restoration of the device to an operating condition shall take a minimum amount of time to facilitate efficient repair and replacement of devices. The Contractor shall provide documentation that clearly defines remedial maintenance tasks for all Contractor-provided devices and the time parameters required to enter, remove, and replace the devices.	As required
FEQ-10-01-11-003	The Contractor shall design equipment interiors to enable authorized users safe access. Adequate space shall be available to insert keys; grasp, lift, and turn internal components; and remove and replace components, connections, and consumables. The Contractor shall provide guides, rails, tracks, handles, and captive fasteners as needed to facilitate module installation and removal of equipment.	As required
FEQ-10-01-11-004	Any component or module that must be lifted (except for cash containers when full) shall not weigh more than [20 pounds]. Any exceptions to this weight limitation shall be subject to SEPTA approval.	As required
FEQ-10-01-11-005	The Contractor shall provide clear labels and symbols on all devices that at a minimum indicate safety warnings, servicing steps, and wiring connections. All connectors shall be properly tagged, labeled, and documented.	As required
FEQ-10-01-11-006	For ease of service and replacement, all electrical connections between components and subassemblies shall be established by means of connectors that allow rapid removal of a component or subassembly. Plug-in connectors shall be equipped with strain relief to prevent damage to cables and connectors.	As required
FEQ-10-01-11-007	Components requiring frequent adjustment or maintenance shall be conveniently located and designed to facilitate access and adjustment utilizing tool-free techniques wherever possible. The replacement of field devices or components shall be quick and secure.	As required
FEQ-10-01-11-008	Automatic diagnostic test routines (and equipment if necessary) shall be included to aid in troubleshooting malfunctions. These test routines shall provide the ability to isolate defects down to the LLRU.	As required
FEQ-10-01-11-009	No more than [one (1) person] shall be required to perform corrective maintenance on an individual piece of equipment.	As required

Req #	Requirement	Assigned CDRL
FEQ-10-01-11-010	The Contractor shall provide documentation during Preliminary Design Review (PDR) that defines: (1) Preventative Maintenance frequency for all system devices based upon time and transactions; (2) A list of all Preventative Maintenance tasks to be performed, including a brief description of the work, and any parts, materials or other components required; (3) Time required to complete each defined Preventative Maintenance task; and (4) Which Preventative Maintenance tasks require tools to complete, and which can be performed as “fingertip maintenance”.	As required
FEQ-10-01-11-011	All Contractor-provided devices shall detect the failure of any active cooling device and provide a controlled shutdown of the system components, and the generation of an alarm and maintenance event.	As required

10.2 Fare Payment Validator (FPV)

10.2.1 FPV General Requirements

Req #	Requirement	Assigned CDRL
FEQ-10-02-01-001	The Contractor shall provide the latest generation FPVs for bus and rail (e.g., rail platforms) that are PCI and EMV certified. The FPV readers shall be able to be updated via firmware to support future card formats and PCI standards.	SDD-11
FEQ-10-02-01-002	FPVs shall accept all the fare media specified in the requirements including the following fare media at a minimum:(1) SEPTA-issued EU media; (2) SEPTA-issued LU media; (3) Contactless bank cards/mobile wallets and other third-party-issued media; (4) Mobile wallet virtual ticket; (5) SEPTA-issued barcodes; and (6) Third-party issued barcoded media.	SDD-11
FEQ-10-02-01-003	FPVs shall include sufficient embedded storage to hold at least [30 days] of fare payment transactions, risk mitigation lists, and all data records as determined during Design Review.	SDD-11
FEQ-10-02-01-004	An alternate or manual means of downloading data from the FPV shall be provided for instances where there is a failure of the wired or wireless communication.	SDD-11

10.2.2 FPV Hardware

Req #	Requirement	Assigned CDRL
FEQ-10-02-02-001	The Contractor shall deliver the latest generation FPV device manufactured by the OEM that is as simple and compact as possible while providing the required functionality in these requirements. If a newer generation device is released following Design Review, and prior to device procurement, SEPTA shall have the option to upgrade to the newer device.	SDD-11
FEQ-10-02-02-002	The Contractor shall utilize the existing SEPTA stainless steel masts, cabinets, modems, and antennas at rail platforms. Contractors shall provide new harnesses and mounting brackets as necessary to secure the FPV to the SEPTA-provided equipment. Details regarding the existing equipment are available upon request. If the Contractor is not able to reuse the existing equipment, the Contractor shall provide high-grade stainless steel masts, cabinets, and associated equipment for all FPVs. All equipment is subject to review and approval by SEPTA.	SDD-11
FEQ-10-02-02-003	FPVs shall support a minimum of [two (2) Secure Access Modules (SAMs)] to facilitate acceptance of multiple fare media formats and the replacement of security keys, should a compromise occur.	SDD-11
FEQ-10-02-02-004	FPVs shall have at least [three (3) spare Universal Serial Bus (USB) ports] to support removable memory, SAMs, or future connection of ancillary devices.	SDD-11
FEQ-10-02-02-005	FPVs shall support expandable storage in a common, commercially available format (e.g., USB drive, compact flash, secure digital, etc.) that can be quickly and easily swapped or expanded without modification to the rest of the device components.	SDD-11
FEQ-10-02-02-006	In addition to the previously specified general environmental requirements, the FPVs shall be rugged and function under extended severe environmental conditions including: direct sunlight, moisture, dust/grit/sand, humidity, electrical storms, exposure to an urban environment, and the range of elevations and altitudes in the operating region.	SDD-11
FEQ-10-02-02-007	The FPV housing shall be resistant to corrosion, abrasion, scratching, impacts, and vandalism, and withstand standard bus cleaning and disinfectant materials. Validator housing color and finish shall be such that it minimizes reflection and is highly resistant to fading, cracking, and peeling.	SDD-11

Req #	Requirement	Assigned CDRL
FEQ-10-02-02-008	All FPV corners shall be rounded, and there shall be no exposed bolt heads, nuts, sharp edges, or cracks on outside surfaces. The FPV display shall be flush mounted in the housing.	SDD-11
FEQ-10-02-02-009	Covers on the validator housing for accessing modules and subassemblies shall be secured with mechanical locks and keys that are not readily duplicated nor readily available to the public, and uniquely serialized and stamped "Do Not Duplicate."	SDD-11

10.2.3 FPV Power and Communications

Req #	Requirement	Assigned CDRL
FEQ-10-02-03-001	For bus installation, the FPV shall receive [12 VDC] or [24 VDC] power through a circuit breaker assigned specifically to the FPV. External converters or power conditioners may be used with SEPTA approval.	SDD-11
FEQ-10-02-03-002	When bus power is turned off, the FPV shall remain powered for a configurable time to allow completion of transmission of any and all data files, and transaction records before powering down. Devices shall remain powered during data transmission.	SDD-11
FEQ-10-02-03-003	The onboard FPV shall communicate with the back-office and other onboard devices (as necessary) through the existing SEPTA-provided mobile data router via an ethernet port.	SDD-11
FEQ-10-02-03-004	The rail FPV shall communicate with the back-office through a hardwired connection at stations and platforms for power and data communications. On platforms where hardwired communications are not feasible, the FPV shall connect to a SEPTA-provided cellular modem and antenna that supports communication over 4G/5G data.	SDD-11
FEQ-10-02-03-005	The Contractor shall be responsible for providing conduit and cabling as necessary for the power and communications to the FPV per the Installation Requirements.	SDD-11

10.2.4 FPV Customer Interface

Req #	Requirement	Assigned CDRL
FEQ-10-02-04-001	A customer-facing contactless smartcard reader shall be installed in the FPV to read, write to, and validate contactless media presented by customers.	SDD-11
FEQ-10-02-04-002	The FPV shall include a color display that may be separate from, or integrated with the contactless reader. In either case, the tap area shall be easily identified and reachable by customers.	SDD-11
FEQ-10-02-04-003	The display shall be clearly visible in all forms of ambient light on the bus and at stations and viewable at a minimum angle of [45 degrees] from the display. See the Common Equipment Requirements for luminescence.	SDD-11
FEQ-10-02-04-004	The FPV display shall be capable of partial or full video or animation. The animations may be used to indicate fare feedback, relevant customer action, or other general information. Video or animation files shall be able to be updated remotely and installed via removable memory by maintenance staff. Supported video types shall be agreed upon during Design Review (e.g., JPG, GIF, PNG, MP4, etc.).	SDD-11
FEQ-10-02-04-005	FPVs shall include at least [three (3) multicolor light-emitting diode (LED) indicator lights] that can be configured to provide feedback on payment and device status.	SDD-11
FEQ-10-02-04-006	The FPV shall have ADA-compliant visual and audible feedback that provides distinctive messages for approval or denial of all fare media validations. FPVs shall include an audio interface and speakers for customizable audio feedback, including varying tones. All validator visual and audio feedback shall be fully configurable, able to be updated remotely, and subject to SEPTA review and approval during Design Review.	SDD-11
FEQ-10-02-04-007	FPVs shall support customizable visual feedback for different rider classes, transactions, fares charged, and general account information and statuses. Customizations shall be finalized during Design Review.	SDD-11
FEQ-10-02-04-008	The decibel levels of the tones shall be programmable locally and remotely, and the emitted tones shall be capable of being distinguished up to [eight (8) feet] away.	SDD-11

10.2.5 FPV Barcode Reader

Req #	Requirement	Assigned CDRL
FEQ-10-02-05-001	The Contractor shall provide a barcode reader to enable the validation of barcoded media (e.g., QuickTickets, Amtrak tickets, NJT tickets).	SDD-11
FEQ-10-02-05-002	The barcode reader shall be optimized for scanning barcodes from both printed and mobile screens and shall accommodate a wide range of mobile device screen sizes and barcode sizes, environmental factors (e.g., sun glare, phone screen protectors, and usability factors (e.g., scanning the barcode at angles ranging from [zero (0) to 45 degrees], and on mobile devices as well as printed on paper).	SDD-11
FEQ-10-02-05-003	The barcode reader shall be able to accommodate real-world environmental factors such as different scanning angles at varying distances from the reader and shall be designed to maximize usability without customer education.	SDD-11
FEQ-10-02-05-004	The barcode reader shall have a LED aimer and a minimum [752 x 480 pixel sensor].	SDD-11

10.2.6 FPV Software

Req #	Requirement	Assigned CDRL
FEQ-10-02-06-001	FPVs shall generate, store, and transmit a discrete data record for each transaction and/or validation performed. Errors with transactions and validations for card reads and barcode scans shall create a data record.	SDD-11
FEQ-10-02-06-002	Each transaction record shall be unique and shall include the following information, at a minimum: (1) Date and time; (2) Device ID; (3) Vehicle ID; (4) Operator ID; (5) Bus/Station Stop ID; (6) Geo-location information (GPS data); (7) Route number; (8) Run number; (9) Block number; (10) Media type; (11) Card/ticket number; (12) Fare category (e.g., full fare, reduced fare); (13) Action performed; (14) Fare instrument or product used (where applicable); (15) Transaction value (where applicable); (16) Transaction result (e.g., success, failure); and (17) Transaction ID. Transaction records details shall be finalized during Design Review.	SDD-11

Req #	Requirement	Assigned CDRL
FEQ-10-02-06-003	FPV software design shall allow for accepted media formats, including user-defined formats, to be enabled and disabled via configurable parameters.	SDD-11
FEQ-10-02-06-004	FPVs shall maintain local encrypted data records in non-volatile memory in the event that communications to the back-office systems are unavailable. The local records shall only be removed when verification of database storage of each record is received from the back-office.	SDD-11
FEQ-10-02-06-005	Any offline payment validation shall be recorded as such as part of the transaction data so that offline transactions can be easily identified and tracked.	SDD-11
FEQ-10-02-06-006	All FPVs shall provide audit register counts for purposes of data tracking and analysis. The audit registers shall store counts of specific events in non-volatile memory and shall not be able to be modified or erased.	SDD-11
FEQ-10-02-06-007	The FPV shall create a data record for the following events: (1) all sensed alarms; (2) all events and alarms that are cleared (including details on how the alarm was cleared); (3) status changes of the device or module; (4) configuration changes; (5) all communication failures (including missed "heartbeats" to the SMMA); (6) commands issued by maintenance, or other authorized personnel; and (7) all data necessary for a complete audit trail for PCI, revenue and fare media.	SDD-11
FEQ-10-02-06-008	The audit registers shall maintain counts of the following events as applicable: (1) Total validation counts; (2) Rider class counts; (3) Count of approved transactions; (4) Count of denied transactions; (5) Count of read failures; (6) Fare products validated (where applicable); and (7) Fare value deducted (where applicable). Final audit register events shall be determined during Design Review.	SDD-11
FEQ-10-02-06-009	Audit register records shall be transmitted to the back-office at the end of service day for reconciliation or based on a configurable time period.	SDD-11
FEQ-10-02-06-010	FPVs shall provide real-time status of device events and alerts reported through the SMMA. The FPV shall also maintain local event and alert logs in the event that communications to the back-office are unavailable.	SDD-11

Req #	Requirement	Assigned CDRL
FEQ-10-02-06-011	In addition to transmitting real-time events and alerts, the FPV shall transmit periodic “heartbeat” messages that confirm communication with the back-office and basic status. The “heartbeat” frequency shall be adjustable.	SDD-11
FEQ-10-02-06-012	At a minimum, the FPV shall generate, store, and forward to the back-office an event record for each of the following events with their corresponding date/time: (1) Power on; (2) Power off; (3) Operator login and logout; (4) Route changed; (5) Fare set or service level changed; (6) Back-office communications failed/restored; (7) Maintenance parameter changed; (8) New fare table received/activated; (9) New software received/activated; (10) New configuration data received/activated; (11) New list received/activated; (12) Anti-virus definitions and security updates downloaded; (13) Internal clock reset; (14) FPV clock error; (15) Data memory near full/full; and (16) FPV “heartbeat” check. Final event records shall be determined during Design Review.	SDD-11
FEQ-10-02-06-013	The FPV shall have the capacity to store a minimum of [three (3) months] of local event and alert data.	SDD-11

10.2.7 FPV Operations

Req #	Requirement	Assigned CDRL
FEQ-10-02-07-001	Upon power-up, the FPV shall be operational and ready for revenue service within [one (1) minute]. It shall remain operational until a configurable time after power off, subject to normal operating conditions.	SDD-11
FEQ-10-02-07-002	The FPV shall require a valid login to function. For FPVs installed onboard the bus, login information shall be automatically pulled from the CAD/AVL System by default. The bus operator shall be able to present an employee ID card to the reader to initiate a default login. For FPVs installed at rail stations, login information shall be automatically provided at boot up. After successful login, the FPV shall automatically and continuously poll for all supported media formats.	SDD-11
FEQ-10-02-07-003	The FPV shall support an anti-collision algorithm to ensure that payment is only accepted from a single piece of media or not accepted when multiple valid pieces of media are presented.	SDD-11

Req #	Requirement	Assigned CDRL
FEQ-10-02-07-004	The FPV shall be equipped with real-time communication to the ATP for processing fare payments using the Contractor-provided fare payment API.	SDD-11
FEQ-10-02-07-005	Prior to transmitting a fare payment transaction to the ATP, the FPV shall perform local fare media validity checks, including checks against any locally maintained positive and negative lists, passback checks, and other local checks as deemed necessary for security and the efficient processing of transactions. The FPV shall send the transaction record and result to the back-office for any local fare media validity check.	SDD-11
FEQ-10-02-07-006	The transaction result from the ATP shall include:(1) Validation result; (2) Fare product used; (3) Fare amount charged; (4) Balance remaining; (5) Fare product expiration date; (6) Fare product remaining rides or days; (7) Rider class; (8) Transfer time remaining; (9) Low balance warning (threshold to be configurable); and (10) Time-based pass expiration warning (threshold to be configurable). Results shall be configurable, set by downloadable configuration parameters from the back-office. Displayed results shall be determined during Design Review.	SDD-11
FEQ-10-02-07-007	The FPV shall display transaction results. The information displayed and screens shown to the customer shall be determined during Design Review. The screens and information shown to the customer shall be configurable, set by downloadable configuration parameters from the back-office.	SDD-11
FEQ-10-02-07-008	The FPV shall integrate with the Farebox operator display to show transaction results in real-time. The operator may be shown additional fare payment details that are not shown to the customer as determined during Design Review.	SDD-11
FEQ-10-02-07-009	FPVs shall provide a payment result within [500 milliseconds] of valid fare media being presented for all fare payment types regardless of network connectivity.	SDD-11
FEQ-10-02-07-010	FPVs shall be able to accept fare payments in an offline mode and accommodate scenarios where a full authorization cannot be received within the required timeframe. In these scenarios, risk mitigation strategies shall be employed to limit exposure for declined payments.	SDD-11
FEQ-10-02-07-011	All transactions generated in an offline mode shall be sent to the ATP immediately upon the restoration of communications.	SDD-11

Req #	Requirement	Assigned CDRL
FEQ-10-02-07-012	FPVs shall include a maintenance mode to display maintenance screens for troubleshooting and configuration purposes by authorized staff. The method and operator interface used to perform maintenance functions shall be determined during Design Review.	SDD-11
FEQ-10-02-07-013	If a failure is detected that causes the FPV to cease functioning or cause transactions to fail, the FPV shall go out of service and provide visual indication of the device status. The detected failure shall be recorded as an event record.	SDD-11
FEQ-10-02-07-014	Prior to powering down, FPVs shall transmit all recorded event records and perform all necessary steps to retain the integrity of all stored data. If network connectivity is unavailable, the FPV shall store the data and transmit when connectivity is available.	SDD-11

10.3 ADA Faregates

ADA Faregates are expected to be used by people with disabilities, with oversized luggage and strollers, and who cannot otherwise use a turnstile-type gate. New ADA Faregates shall replace existing SEPTA ADA Faregates and shall be installed in Subway and Regional Rail stations.

10.3.1 ADA Faregates General Requirements

Req #	Requirement	Assigned CDRL
FEQ-10-03-01-001	The Contractor shall deliver ADA Faregates. ADA Faregates shall be bi-directional and shall enable customers to traverse the gate from either the paid or unpaid side. ADA Faregates shall be configurable for single-directional or bi-directional (e.g., reversible) use. ADA Faregate direction shall be capable of automatic configuration based on day and time or manually adjusted via remote command. All configuration settings shall be adjustable per ADA Faregate, array, or station.	SDD-12
FEQ-10-03-01-002	ADA Faregates shall include contactless smartcard readers and 2D barcode readers installed on both the entry (unpaid) and exit (paid) sides. ADA Faregate readers shall be installed to the right of the ADA Faregate aisle to enable right-handed use and shall be positioned to induce correct entry behavior for customers and clearly indicate all interaction points. ADA Faregate readers shall validate all entry and exit attempts into the system and generate a fare transaction for each validation.	SDD-12

Req #	Requirement	Assigned CDRL
FEQ-10-03-01-003	ADA Faregates shall include a customer display and audio output for both the entry (unpaid) and exit (paid) sides. When a valid fare payment credential is presented, the ADA Faregate barriers shall open, sound an acceptance tone, and display a visual indication. If the credential does not have valid fare, the barriers shall remain closed, sound a rejection tone, and display the rejection reason.	SDD-12
FEQ-10-03-01-004	ADA Faregate barriers shall consist of the paddle design, or a SEPTA-accepted equivalent, which provides a fully unobstructed path upon opening and does not hinder bicycles, strollers, wheelchairs, luggage, or other large objects. ADA Faregate barriers shall limit fare evasion and shall produce no gaps of [two (2) inches] or greater between each barrier and between any barrier and cabinet.	SDD-12
FEQ-10-03-01-005	ADA Faregates shall include indicator lamps, LEDs, and other visual indicators that can be configured to signal when payments are accepted for specific fare products and rider classes.	SDD-12
FEQ-10-03-01-006	ADA Faregates shall communicate with the back-office through a secure communication interface using Contractor-provided APIs to send and receive data including: (1) Transaction information; (2) Event status and alerts; (3) Time synchronization information; (4) Positive/negative lists; (5) Configuration parameters; and (6) Remote commands or status inquiries. The list of exchanged information shall be finalized during Design Review.	SDD-12
FEQ-10-03-01-007	ADA Faregates shall be capable of being remotely controlled to enable the override of operational settings for each ADA Faregate or array, including direction, operational mode, customer display, and software configuration. Override control events shall be logged and transmitted to the back-office.	SDD-12
FEQ-10-03-01-008	ADA Faregates shall provide a throughput of [five (5) to 30 customers per minute], adjustable through configurable parameters, including fare payment credential validation, updating the display, and opening the barrier.	SDD-12
FEQ-10-03-01-009	ADA Faregates shall support reliable operation in the Philadelphia environment, including, direct sunlight, high humidity, rain, and snow, as well as withstand standard station cleaning materials.	SDD-12

10.3.2 ADA Faregates Hardware

Req #	Requirement	Assigned CDRL
FEQ-10-03-02-001	Customer-facing contactless smartcard readers shall be installed in ADA Faregates to read and validate contactless media. ADA Faregates shall support two configurations: (1) reader installed on entry side only; and (2) readers installed on both entry and exit sides.	SDD-12
FEQ-10-03-02-002	ADA Faregate smartcard readers shall be PCI- and EMV-certified for the acceptance of bank-issued contactless credit and debit cards using all common formats based on the latest version of the standard at the time of Final Acceptance. Smartcard readers shall be capable of re-certification with newer versions of the PCI and EMV standards via software upgrades, as necessary.	SDD-12
FEQ-10-03-02-003	ADA Faregate smartcard readers shall support a minimum of [two (2) SAMs] to facilitate acceptance of multiple fare media formats and the replacement of security keys, should a compromise occur.	SDD-12
FEQ-10-03-02-004	Customer-facing 2D barcode readers shall be installed in ADA Faregates to enable the validation of common 2D barcode formats, including QR and Aztec. ADA Faregates shall support two configurations: (1) Reader installed on entry side only; and (2) Readers installed on both entry and exit sides.	SDD-12
FEQ-10-03-02-005	ADA Faregate barcode readers shall be optimized for scanning QR codes from both mobile screens and printed paper media shall be capable of accommodating a wide range of mobile device screen sizes and QR code sizes.	SDD-12
FEQ-10-03-02-006	ADA Faregate barcode readers shall be capable of accommodating real-world environmental factors such as variable scanning angles at varying distances from the scanner in both natural and artificial lighting conditions.	SDD-12
FEQ-10-03-02-007	ADA Faregate barcode readers shall be designed to maximize usability without customer education.	SDD-12
FEQ-10-03-02-008	ADA Faregate barcode readers shall include a LED aimer and a minimum [752 x 480 pixel sensor].	SDD-12
FEQ-10-03-02-009	ADA Faregate barcode readers shall support a scan range between [zero (0) inches (flush) and six (6) inches] from the reader. A forward or upward facing, mirrored scanning configuration is preferred.	SDD-12

Req #	Requirement	Assigned CDRL
FEQ-10-03-02-010	ADA Faregate cabinets shall be self-standing, sturdy enclosures that contain the contactless reader, customer display, and electromechanical components that deploy the sliding panel (or accepted equivalent) system.	SDD-12
FEQ-10-03-02-011	ADA Faregate cabinets shall be installed in an array to form customer aisles. Cabinet positioning shall accommodate ADA-width of at least [36 inches].	SDD-12
FEQ-10-03-02-012	All ADA Faregate components, including the smartcard reader, display, indicator lamps, fare barrier position, and aisle width, shall meet all applicable ADA requirements.	SDD-12
FEQ-10-03-02-013	ADA Faregate cabinets shall be constructed from 316 grade stainless steel, or a SEPTA-approved equivalent, without any visible fasteners. The cabinet finish and corners shall be rounded to avoid sharp edges, corners, or protrusions that may cause injury to customers.	SDD-12
FEQ-10-03-02-014	ADA Faregate cabinets shall be rugged and function under harsh environmental conditions including: direct sunlight, moisture, dust/grit/sand, humidity, snow and ice, electrical storms, exposure to an urban environment, and the range of elevations and altitudes in the operating region.	SDD-12
FEQ-10-03-02-015	ADA Faregate cabinets shall be resistant to corrosion, abrasion, scratching, impacts, and vandalism, and withstand industry standard cleaning materials. Cabinet color and finish shall be such that it minimizes reflection and is highly resistant to fading, cracking, and peeling.	SDD-12
FEQ-10-03-02-016	Covers, doors, and panels on the cabinet housing that are used for accessing modules and subassemblies shall be secured with mechanical locks and keys that cannot be duplicated nor produced by the public, and are uniquely serialized and stamped "Do Not Duplicate."	SDD-12
FEQ-10-03-02-017	SEPTA prefers an ADA Faregate design that provides an unobstructed aisle, and minimizes the possibility of gate jumping and customer confusion. Paddle faregates are the current preference. Acceptable equivalents may include a bi-parting leaf design.	SDD-12

Req #	Requirement	Assigned CDRL
FEQ-10-03-02-018	The ADA Faregate paddle design (or SEPTA approved equivalent) shall include [two (2) paddle barriers] that protrude from the console on either side of the aisle and retract into the console upon opening. The paddle barriers shall obstruct most of the aisle when closed and shall be made from a transparent or translucent material to allow customers to see oncoming traffic. The paddle barrier design shall include padded edges to reduce impact force to customers and shall be subject to SEPTA review and approval.	SDD-12
FEQ-10-03-02-019	When in the open position, the ADA Faregate barriers shall provide an unobstructed aisle and adequate clearance for customers with bicycles, strollers, wheelchairs, luggage, or other large objects.	SDD-12
FEQ-10-03-02-020	Upon acceptance of a valid payment credential, the ADA Faregate barriers shall remain in the open position for a configurable minimum time. Sensors in the aisle shall detect the traversal of the customer, and the barriers shall only close when the customer has completely exited the aisle.	SDD-12
FEQ-10-03-02-021	ADA Faregate barriers shall be capable of closing immediately after all paid customers have traversed the area of the aisle subject to the barrier closing radius to limit fare evasion.	SDD-12
FEQ-10-03-02-022	Both the opening and closing speed of the ADA Faregate barriers shall be independently configurable per ADA Faregate aisle and array, and the barriers shall immediately retreat upon a configurable amount of opening and closing force.	SDD-12
FEQ-10-03-02-023	ADA Faregate barrier materials shall be flame retardant and comply with all applicable fire, life, and safety regulations.	SDD-12
FEQ-10-03-02-024	ADA Faregates shall detect if an ADA Faregate barrier is being forced open. If the barrier is forced open beyond [one (1) inch], an alarm shall sound until the barrier returns to the fully closed position. A unique alarm event shall be reported to the back-office in real-time.	SDD-12
FEQ-10-03-02-025	ADA Faregate aisle sensors shall employ the latest technology to detect and prevent fare evasion, such as 3D object tracking to fully identify and monitor all customers and objects traversing the ADA Faregate.	SDD-12
FEQ-10-03-02-026	ADA Faregate aisle sensors shall be positioned to fully detect the movement and positioning of customers and objects traversing the aisle. Sensors shall also detect obstructions in the path of the barrier as a condition for opening the barrier to allow passage.	SDD-12

Req #	Requirement	Assigned CDRL
FEQ-10-03-02-027	ADA Faregate aisle sensors shall not be obviously noticeable and employ infrared or equivalent technology that does not emit visible light.	SDD-12
FEQ-10-03-02-028	ADA Faregate aisle sensors shall operate in a pulse-width modulation mode or other technique that effectively filters out ambient light sources.	SDD-12
FEQ-10-03-02-029	ADA Faregate aisle sensors shall be positioned and programmed to prevent potential fraud from customers intentionally blocking sensors to open barriers for other customers.	SDD-12
FEQ-10-03-02-030	ADA Faregate aisle sensors shall detect the traversal of customers and objects from the opposite direction of an opened barrier. Upon detection, an alarm shall sound and a unique event shall be reported to the back-office.	SDD-12
FEQ-10-03-02-031	ADA Faregate aisle sensors shall detect the traversal of unpaid customers attempting to tailgate or piggyback behind a paid customer. Upon detection, the ADA Faregate shall be capable of sounding an alarm, reporting a unique event to the back-office, and safely closing the barriers to prevent the unpaid customer from traversing the aisle.	SDD-12
FEQ-10-03-02-032	ADA Faregates shall include full-color customer displays that provide visual feedback on payment acceptance and denial, and display relevant account information.	SDD-12
FEQ-10-03-02-033	ADA Faregate displays shall be installed on both entry and exit sides. Each display shall be independently programmable, such that messages and graphics on the entry side can operate independently from the exit side.	SDD-12
FEQ-10-03-02-034	ADA Faregate displays shall be color, trans-reflective backlit flat panel displays with a high-intensity backlight [>1000 nits], and at least [750:1 contrast ratio].	SDD-12
FEQ-10-03-02-035	ADA Faregate display screens shall provide a resolution of no less than [600 x 800 pixels], and at least [65,000 colors (RGB 16 bit) per pixel].	SDD-12
FEQ-10-03-02-036	ADA Faregate displays shall support adjustable brightness, contrast, and refresh rate that can be read under any combination of ambient lighting, including direct sunlight and night-time operation.	SDD-12

Req #	Requirement	Assigned CDRL
FEQ-10-03-02-037	ADA Faregate displays shall be capable of partial or full video or animation. Animations may be used to indicate fare feedback, relevant customer action, or other general information. Video or animation files shall be capable of being updated remotely or installed via removable memory by maintenance staff. Supported video types shall be agreed upon during Design Review (e.g., JPG, GIF, PNG, MP4, etc.)	SDD-12
FEQ-10-03-02-038	ADA Faregate displays shall be readable from a seated eye height of [40 inches] from the floor.	SDD-12
FEQ-10-03-02-039	ADA Faregate indicator lamps shall be used to indicate if particular rider classes or fare products are accepted by the ADA Faregate. Indicator lamps are primarily intended for fare enforcement purposes but may also be used to indicate special operational modes (emergency mode, free entry, or no entry).	SDD-12
FEQ-10-03-02-040	ADA Faregate indicator lamps shall be a series of high-intensity LEDs or use other lighted symbols. The LEDs shall be capable of displaying at least [16 unique colors or patterns] to indicate different results.	SDD-12
FEQ-10-03-02-041	ADA Faregate indicator lamps shall indicate the rider class and type of fare accepted in encoded patterns. Colors, lighting sequences, or symbols shall be coded to specific results and agreed upon during Design Review.	SDD-12
FEQ-10-03-02-042	ADA Faregate indicator lamps shall be programmable to activate based on any rider class, fare product, or operational mode. Indicator lamps shall be configurable per individual ADA Faregate or array.	SDD-12
FEQ-10-03-02-043	ADA Faregate indicator lamps shall be positioned to allow visibility from both the paid and unpaid sides of the ADA Faregate.	SDD-12
FEQ-10-03-02-044	ADA Faregates shall include an audio interface and speakers for customizable audio feedback on both entry and exit sides, including varying tones, alarms, full speech. Audio feedback settings shall be remotely configurable and adjustable.	SDD-12
FEQ-10-03-02-045	The decibel levels of all audio tones shall be programmable locally and remotely, and the emitted tones shall be perceivable up to [eight (8) feet] away.	SDD-12

Req #	Requirement	Assigned CDRL
FEQ-10-03-02-046	ADA Faregates shall include a Single-Board Computer (SBC) to control the operation of all local ADA Faregate functions. The SBC shall drive the ADA Faregate display and ADA Faregate barrier, and respond with minimal perceivable delay to customer input.	SDD-12
FEQ-10-03-02-047	ADA Faregate SBCs shall be equipped with all necessary computing components including CPU, RAM, I/O, non-volatile memory, removable solid state drive, and software capable of performing all functions specified in this SOS.	SDD-12
FEQ-10-03-02-048	ADA Faregate SBC memory shall maintain all operational information, data records, and files upon loss of power and unexpected reboot.	SDD-12
FEQ-10-03-02-049	ADA Faregates shall include at least [three (3) spare USB ports] to support removable memory, SAMs, or future connection of ancillary devices and subcomponents.	SDD-12
FEQ-10-03-02-050	ADA Faregates shall communicate with the back-office through a secure communications interface to send and receive data. Communications shall be secured using strong encryption, as defined by NIST. All data transmission protocols shall be, at minimum, TLS-1.2 encrypted with [zero (0) weak cipher suites] enabled, and shall be kept up to date with the latest protocol version.	SDD-12
FEQ-10-03-02-051	All communications between the ADA Faregate and back-office shall be performed using a hardwired connection.	SDD-12
FEQ-10-03-02-052	At least [one (1) ADA Faregate cabinet] in each array (e.g., the end cabinet) shall be capable of housing a network switch or hub to consolidate the host connections of all local area devices, enable a single connection to the station communications room, and limit the number of Ethernet runs required to each installation location.	SDD-12
FEQ-10-03-02-053	Each ADA Faregate array shall integrate with the SEPTA alarm panel to control all ADA Faregates in that array. The alarm panel signals may be daisy-chained from other devices or fed directly from a station input.	SDD-12
FEQ-10-03-02-054	The emergency signal interface may be tied to local station controllers, emergency management control panels, alarm panels, or remote-control systems to initiate emergency mode. ADA Faregates shall remain in emergency mode until the signal is closed or deactivated.	SDD-12

Req #	Requirement	Assigned CDRL
FEQ-10-03-02-055	The emergency signal shall supersede any other control signals, including those from the SMMA. For example, if the emergency signal initiates emergency mode and an “enter revenue service” signal is sent from the SMMA, the ADA Faregate shall remain in emergency mode.	SDD-12
FEQ-10-03-02-056	Each ADA Faregate shall be equipped with a modular, filtered power supply which shall be connected to the incoming grounded electrical service. The power supply shall be connected to the incoming electrical service and deliver all of the necessary operating voltages for the machine. Voltages internal to the ADA Faregate shall not exceed [125V].	SDD-12
FEQ-10-03-02-057	A power switch shall turn the ADA Faregate power supply on or off and shall be separate from the main circuit breaker that terminates all power to the ADA Faregate. ADA Faregates shall not produce any electrical safety risks to maintenance personnel when the power supply is turned off.	SDD-12
FEQ-10-03-02-058	A GFCI duplex convenience outlet shall be installed within the interior of each ADA Faregate cabinet. Outlets shall be protected by a separate circuit breaker internal to the machine enclosure and shall be grounded.	SDD-12
FEQ-10-03-02-059	Appropriate warning labels shall be provided on or near any ADA Faregate components or cables that may have hazardous voltages present.	SDD-12
FEQ-10-03-02-060	In the event that ADA Faregates lose power or malfunction such that power is unavailable, the ADA Faregate barriers shall automatically open and remain open during power loss. Upon restoration of power, ADA Faregates may automatically resume operations, or enter into emergency mode. ADA Faregate behavior after resuming from power loss shall be configurable and agreed upon during Design Review.	SDD-12
FEQ-10-03-02-061	ADA Faregates shall be equipped with a battery supplemental power supply. Battery power supplies shall be used in the event the incoming voltage falls below the reliable machine operating voltage or in the event of AC power loss to the ADA Faregate.	SDD-12
FEQ-10-03-02-062	Upon restoration of the primary power supply, the backup battery shall be recharged. Battery life shall be rated at [four (4) years] or [500 discharge and charge cycles].	SDD-12

Req #	Requirement	Assigned CDRL
FEQ-10-03-02-063	ADA Faregates shall include the International Symbol of Accessibility label placed on visible locations on both the entry and exit sides of the ADA Faregate.	SDD-12
FEQ-10-03-02-064	ADA Faregates shall include an ambient temperature sensor and monitor for extreme temperature failures. The thresholds for which extreme temperature events are triggered shall be configurable.	SDD-12
FEQ-10-03-02-065	ADA Faregates shall include an internal clock to maintain the date and time independently of the network time. Each clock shall be synchronized with a centralized time source to be within [one (1) second] at all times.	SDD-12
FEQ-10-03-02-066	ADA Faregates shall include a hardware mechanism to enable local configuration of operational modes or settings by authorized users (e.g., key switch). Unauthorized users shall not have access to the mechanism.	SDD-12
FEQ-10-03-02-067	ADA Faregates shall include a unique identification number capable of being electronically read.	SDD-12

10.3.3 ADA Faregates Software

Req #	Requirement	Assigned CDRL
FEQ-10-03-03-001	ADA Faregates shall generate, store, and transmit a discrete data record for each transaction and/or validation performed.	SDD-12
FEQ-10-03-03-002	Each transaction record shall be unique and shall include the following information, at a minimum: (1) Date and time; (2) Device ID; (3) Station ID; (4) Media type; (5) Unique credential/account number; (6) Fare category (e.g., full fare, reduced fare); (7) Action performed; (8) Fare instrument or product used (where applicable); (9) Transaction value (where applicable); (10) Transaction result (e.g., success, failure); (11) Transaction ID; and (12) Base and transfer ride type. All transaction data fields shall be PCI-compliant and transaction record details shall be finalized during Design Review.	SDD-12

Req #	Requirement	Assigned CDRL
FEQ-10-03-03-003	ADA Faregates shall maintain local data records in non-volatile memory in the event that communication to the back-office is unavailable. Local records shall only be removed from memory when the back-office commits and verifies each record in database storage.	SDD-12
FEQ-10-03-03-004	All offline payment validations shall include an offline attribute in the transaction record to facilitate the identification and tracking of such records.	SDD-12
FEQ-10-03-03-005	ADA Faregates shall interface with the Station Agent Console to enable station-level monitoring and remote control of each individual device.	SDD-12
FEQ-10-03-03-006	ADA Faregates shall provide audit register counts for data tracking and analysis. The audit registers shall store counts of specific events in non-volatile memory and shall not be modifiable or erasable outside of the counting condition.	SDD-12
FEQ-10-03-03-007	At a minimum, ADA Faregates shall generate, store, and transmit each of the following events as audit registers and include the date/time stamp: (1) Total validation counts; (2) Rider class counts; (3) Count of approved transactions; (4) Count of denied transactions; (5) Count of read failures; (6) Fare products validated (as applicable); and (7) Fare value deducted (as applicable). Final audit register events shall be determined during Design Review.	SDD-12
FEQ-10-03-03-008	Audit register records shall be transmitted to the back-office at the end of service day for reconciliation, or upon a configurable time-period.	SDD-12
FEQ-10-03-03-009	ADA Faregates shall generate an error record for every unsuccessful validation of a fare payment credential, including both contactless reads/writes and barcode scans. Error records shall contain details on the failure reason, time and date, and credential data as applicable.	SDD-12
FEQ-10-03-03-010	ADA Faregates shall provide real-time status of device events and alerts, and shall maintain local data records of all such statuses in the event that communication to the back-office is unavailable.	SDD-12
FEQ-10-03-03-011	ADA Faregates shall transmit periodic "heartbeat" messages to the back-office to confirm successful communication and provide basic status information. The "heartbeat" frequency shall be adjustable per ADA Faregate.	SDD-12

Req #	Requirement	Assigned CDRL
FEQ-10-03-03-012	At a minimum, ADA Faregates shall generate, store, and transmit to the back-office an event record for each of the following events with their corresponding date/time: (1) Power on; (2) Power off; (3) Reboot; (4) Back-office communications failed/restored; (5) Maintenance parameter changed; (6) New fare table received/activated; (7) New software received/activated; (8) New configuration data received/activated; (9) New list received/activated; (10) Anti-virus definitions and security updates downloaded; (11) Internal clock reset; (12) Clock error; (13) Data memory near full/full; (14) Low battery; (15) Barrier failure; (16) Barrier forced open; (17) Aisle sensor blocked alarm; (18) Unauthorized access (intrusion alarm sounded); (19) Operating mode changed; (20) Emergency mode; (21) Maintenance mode; (22) Gate direction set; (23) ADA Faregate “heartbeat” check; and (24) Cover door open. Final event records shall be determined during Design Review.	SDD-12
FEQ-10-03-03-013	ADA Faregates shall be capable of storing a minimum of [one (1) year] of event and alarm data locally.	SDD-12

10.3.4 ADA Faregates Operations

Req #	Requirement	Assigned CDRL
FEQ-10-03-04-001	ADA Faregate connectivity to the SEPTA alarm panel shall have a configurable delay that can be adjusted for [zero (0) to 45 seconds] to allow the alarm to be deactivated from the Station Terminal in the event there is a false alarm.	SDD-12
FEQ-10-03-04-002	ADA Faregates shall be capable of opening the barriers in either entry and exit directions to allow a single passage. The single passage command shall be available to local and remote control interfaces.	SDD-12
FEQ-10-03-04-003	ADA Faregates shall implement an anti-collision algorithm to ensure validation attempts are only accepted from a single payment credential when multiple valid credentials are presented to the ADA Faregate readers.	SDD-12
FEQ-10-03-04-004	ADA Faregates shall be equipped with real-time communication to the back-office to enable online fare validation processing using the Contractor-provided Fare Validation API.	SDD-12

Req #	Requirement	Assigned CDRL
FEQ-10-03-04-005	Prior to transmitting fare validation requests to the back-office, ADA Faregates shall perform local credential validity checks, including checks against any locally maintained positive and negative lists (e.g., risk lists), as deemed necessary for security and the efficient processing of transactions.	SDD-12
FEQ-10-03-04-006	ADA Faregates shall generate a fare validation transaction from data returned from back-office validation results. The validation results to display on ADA Faregate displays shall be determined during Design Review. Results shall be configurable and set by downloadable configuration parameters from the back-office.	SDD-12
FEQ-10-03-04-007	ADA Faregates shall include ADA-compliant visual and audible indicators that provide distinctive messages for approval or denial of all payment credential validations and validator status. All visual and audio output shall be fully configurable and subject to SEPTA review and approval during Design Review.	SDD-12
FEQ-10-03-04-008	ADA Faregates shall be capable of accepting fares in an offline condition and shall accommodate scenarios where a full authorization is not received within the required timeframe. In these scenarios, risk mitigation strategies shall be employed to limit exposure for declined payments.	SDD-12
FEQ-10-03-04-009	ADA Faregates shall not explicitly indicate an offline status to the customer when operating in an offline condition.	SDD-12
FEQ-10-03-04-010	All ADA Faregate transactions generated in an offline condition shall be uploaded to the back-office immediately upon the restoration of communications.	SDD-12
FEQ-10-03-04-011	ADA Faregate barriers shall not close if aisle sensors remain blocked. If the aisle sensors remain blocked for a configurable period of time, an audible alert shall sound, and an event shall be reported to the back-office.	SDD-12

Req #	Requirement	Assigned CDRL
FEQ-10-03-04-012	ADA Faregates shall support remote operation in both direct and pre-scheduled modes. Remote control shall include the following commands, at a minimum: (1) Change from bi-directional to single direction mode; (2) Change ADA Faregate direction when in single direction mode; (3) Release one ADA Faregate or array to open for one passage; (4) Lock one ADA Faregate or array to close; (5) Change ADA Faregate display; (6) Reboot ADA Faregate; and (7) Set ADA Faregate into a specific operating mode. Final list of remote commands shall be determined during Design Review.	SDD-12
FEQ-10-03-04-013	ADA Faregates shall provide the capability of remotely controlling all integrated visual and audio interfaces, including the customer displays, speakers, and indicator lamps.	SDD-12
FEQ-10-03-04-014	ADA Faregates shall provide the capability of full remote control through integration with the Station Agent Console (SAC) and the back-office SMMA component.	SDD-12
FEQ-10-03-04-015	ADA Faregates shall support the following operating modes, at a minimum: (1) Revenue mode; (2) Open mode; (3) Free exit mode; (4) Out of service mode; (5) Emergency mode; and (6) Maintenance mode. ADA Faregates shall be capable of applying any operating mode to a single ADA Faregate or array, and changing modes on an automatic schedule specified to the minute. The final list of operating modes shall be determined during Design Review.	SDD-12
FEQ-10-03-04-016	ADA Faregates shall boot into revenue mode by default. The default operational mode shall be configurable per ADA Faregate or array.	SDD-12
FEQ-10-03-04-017	Revenue mode shall be capable of validating customer travel in the entry-only, exit-only, and bi-directional directions. When the entry-only and exit-only settings are enabled, only the corresponding side of ADA Faregate readers shall be activated to accept validations. When the bi-directional setting is enabled, both sides of ADA Faregate readers shall be activated to accept validations.	SDD-12
FEQ-10-03-04-018	Revenue mode shall operate with the ADA Faregate barriers in a closed position while idle and shall prevent customers from traversing the ADA Faregate without an accepted fare validation.	SDD-12

Req #	Requirement	Assigned CDRL
FEQ-10-03-04-019	Revenue mode shall indicate to customers the direction for which travel is accepted while idle and shall indicate when a fare validation attempt is accepted. Revenue mode shall indicate to customers the reason for when a fare validation is declined. The complete visual and audio feedback design shall be determined and approved during Design Review.	SDD-12
FEQ-10-03-04-020	Revenue mode shall open the ADA Faregate barrier when a fare validation attempt is accepted and shall close the barrier when the customer completes the passage through the aisle or after a configurable timeout period, whichever occurs first.	SDD-12
FEQ-10-03-04-021	Open mode shall be capable of validating customer travel in the entry-only, exit-only, and bi-directional directions. When the entry-only and exit-only settings are enabled, only the corresponding side of ADA Faregate readers shall be activated to accept validations. When the bi-directional setting is enabled, both sides of ADA Faregate readers shall be activated to accept validations.	SDD-12
FEQ-10-03-04-022	Open mode shall operate with the ADA Faregate barriers in an open position while idle and during validation processing. Open mode shall prevent customers from traversing the ADA Faregate without an accepted fare validation through the use of visual and audio indications and feedback.	SDD-12
FEQ-10-03-04-023	Open mode shall indicate to customers the direction for which travel is accepted while idle and shall indicate when a fare validation attempt is accepted. Open mode shall indicate to customers the reason for when a fare validation is declined. The complete visual and audio feedback design shall be determined and approved during Design Review.	SDD-12
FEQ-10-03-04-024	Free exit mode shall be capable of validating customer travel in the entry-only direction and shall activate the entry-side ADA Faregate reader to accept fare validations.	SDD-12
FEQ-10-03-04-025	Free exit mode shall operate with the ADA Faregate barriers in a closed position while idle and shall prevent customers from traversing the ADA Faregate in the entry direction without an accepted fare validation. When a customer approaches from the exit direction, the barriers shall open and allow traversal in the exit direction without a fare validation.	SDD-12

Req #	Requirement	Assigned CDRL
FEQ-10-03-04-026	Free exit mode shall indicate to customers the direction for which travel is accepted while idle and shall indicate when a fare validation attempt is accepted. Free exist mode shall indicate to customers the reason for when a fare validation is declined. The complete visual and audio feedback design shall be determined and approved during Design Review.	SDD-12
FEQ-10-03-04-027	Free exit mode shall open the ADA Faregate barrier when a fare validation attempt is accepted and shall close the barrier when the customer completes the passage through the aisle in the entry direction or after a configurable timeout period, whichever occurs first.	SDD-12
FEQ-10-03-04-028	Emergency mode shall disable ADA Faregate readers and shall operate with the ADA Faregate barriers in an open position to allow entry and exit without fare validation.	SDD-12
FEQ-10-03-04-029	Emergency mode shall indicate to customers the direction for which travel is allowed and indicate that fare is not being accepted. The complete visual and audio feedback design shall be determined and approved during Design Review.	SDD-12
FEQ-10-03-04-030	ADA Faregates shall be capable of being set to emergency mode through the SMMA, alarm panel, SAC, or other local station controllers (e.g. emergency management control panels or fire key switch at gate arrays).	SDD-12
FEQ-10-03-04-031	ADA Faregates shall remain in emergency mode until the emergency signal is closed, the local switch is returned to normal revenue mode, or a remote control command is received. Remote control commands from the SMMA shall not override the emergency interface.	SDD-12
FEQ-10-03-04-032	A reboot of the ADA Faregate shall not take the ADA Faregate out of emergency mode while the emergency signal is active.	SDD-12
FEQ-10-03-04-033	Upon power loss or critical malfunction, ADA Faregates shall use back-up battery power to transition into emergency mode, the barriers shall automatically open, and an event shall be reported to the back-office. ADA Faregates shall power the customer display and indicator lamps until battery power is exhausted and perform a graceful shutdown. ADA Faregate barriers shall remain open following complete power loss.	SDD-12
FEQ-10-03-04-034	Maintenance mode shall enable authorized users to view all local configuration settings, update all local configuration settings, update the operating mode, and perform diagnostics to troubleshoot issues.	SDD-12

Req #	Requirement	Assigned CDRL
FEQ-10-03-04-035	ADA Faregates shall be capable of ride banking as a configurable feature. Ride banking parameters shall be configurable per ADA Faregate or array.	SDD-12
FEQ-10-03-04-036	Ride banking shall allow valid rides to be accumulated without a corresponding barrier opening and closing between each fare validation. Each accepted validation shall correspond to a fare being paid and a ride banked. ADA Faregates shall decrement the number of banked rides as each passage is completed. Once the last banked ride is used, the barrier shall close and the ADA Faregate shall return to idle state.	SDD-12
FEQ-10-03-04-037	A configurable ride banking counter shall allow a maximum number of rides to be banked. The bank counter shall reset to zero (0) after a configurable time-out period if rides are banked.	SDD-12
FEQ-10-03-04-038	ADA Faregate customer displays shall be capable of displaying the total number of the banked rides and update the display as rides are incremented and decremented.	SDD-12
FEQ-10-03-04-039	ADA Faregates shall be capable of multi-rider acceptance using a single fare payment credential by automatically overriding the passback timer for a credential when the corresponding passage is complete. The maximum number of accepted taps for a single fare payment credential shall be configurable.	SDD-12
FEQ-10-03-04-040	ADA Faregates shall detect and maintain the total count of completed passages through the aisle in any operational mode and maintain independent counts for both directions. Completed passages shall be categorized as validated passages, free passages, and fare evasion passages. The period for which the running count is maintained shall be configurable.	SDD-12
FEQ-10-03-04-041	ADA Faregates shall completely boot into an operational mode within [five (5) minutes] of initially applying power (i.e., turn on) or restoring primary power after power loss.	SDD-12

10.4 Station Agent Console (SAC)

10.4.1 SAC Hardware Requirements

Req #	Requirement	Assigned CDRL
FEQ-10-04-01-001	The SAC Shall include a touchscreen display with no less than XGA resolution.	SDD-12
FEQ-10-04-01-002	The touchscreen shall provide suitable touch sensitivity and resolution to satisfy selection and input requirements.	SDD-12
FEQ-10-04-01-003	The SAC shall include integrated 10BaseT Ethernet or a cellular broadband modem to satisfy the requirements of the configuration.	SDD-12
FEQ-10-04-01-004	If possible, there is a preference for the SAC to be delivered as a web-based application.	SDD-12

10.4.2 SAC Communications Requirements

Req #	Requirement	Assigned CDRL
FEQ-10-04-02-001	The SAC shall communicate with the back-office via a secure Internet connection to send and receive information, event and status information, clock synchronization information, and configuration parameters. This shall be possible both automatically at scheduled times and manually by authorized users.	SDD-12
FEQ-10-04-02-002	All communications between the back office and the SAC shall be via a direct Ethernet/fiber connection.	SDD-12
FEQ-10-04-02-003	SAC communication with the back-office shall be able to be initiated manually at any time without affecting the automated procedures.	SDD-12
FEQ-10-04-02-004	If the SAC has missed a scheduled communication with the back-office, upon restoration of communications, the Console shall automatically initiate communications.	SDD-12

10.4.3 SAC Operation Requirements

Req #	Requirement	Assigned CDRL
FEQ-10-04-03-001	The SAC shall be capable of remotely managing and operating Turnstile Faregates and ADA Faregates individually and by array, station mezzanine, and multiple selectable station mezzanines.	SDD-12
FEQ-10-04-03-002	The SAC shall be able to put Turnstile Faregates, ADA Faregates, and FVM in and out of revenue service.	SDD-12
FEQ-10-04-03-003	The SAC shall provide controls to adjust the brightness of the customer display background lighting on Turnstile Faregates, ADA Faregates, and FVM.	SDD-12
FEQ-10-04-03-004	Remote control of Turnstile Faregates and ADA Faregates shall include direct and pre-scheduled configuration of the gate direction, release, and customer display. Commands shall include, and are not limited to: (1) Open; (2) Lock; (3) Switch direction; (4) Reboot; and (5) Shutdown.	SDD-12
FEQ-10-04-03-005	Remote control shall allow configuration of the visual and audio feedback of the Turnstile Faregates and ADA Faregates, including selectable options to turn on and off faregate audible alarms and adjust alarm volume.	SDD-12
FEQ-10-04-03-006	The SAC shall be able to manage and distribute configuration controls to Turnstile Faregates and ADA Faregates.	SDD-12
FEQ-10-04-03-007	The SAC shall support user roles with different permissions and functionality. User roles shall be configured in the AFC System back-office and enforced regardless of the console that Station Agents log into.	SDD-12
FEQ-10-04-03-008	Authorized users shall be able to deactivate Turnstile Faregate and ADA Faregate alarms from the SAC. Error events that trigger the alarms shall be captured and reported in the back-office.	SDD-12
FEQ-10-04-03-009	Turnstile Faregate and ADA Faregate status and directional configuration status shall be displayed on the SAC.	SDD-12
FEQ-10-04-03-010	The SAC shall provide selectable options to turn on and off Turnstile Faregate and ADA Faregate concession fare light indicators.	SDD-12
FEQ-10-04-03-011	The SAC shall include a fare card reader to read fare media data and display card type, balance, entry/exit transaction configuration, and valid fare products.	SDD-12

10.5 Fare Vending Machine (FVM) (Option)

The Fare Vending Machine (FVM) is envisioned to be a simple, low-cost, low-complexity machine that allows first-time and regular riders to purchase and reload EU fare media. This simple FVM is expected to reduce the capital costs, maintenance activities, and customer complexity associated with traditional transit FVMs. SEPTA prefers the flexibility to enable and disable features or components of the FVM, as necessary.

10.5.1 FVM General Requirements

Req #	Requirement	Assigned CDRL
FEQ-10-05-01-001	FVM software shall include the flexibility and configurability to accommodate SEPTA's existing fare and future fare policies without software modifications. The back-office shall provide authorized SEPTA users the ability to manage and modify all FVM-related fare policies, fare tables, and configurations, and to download those changes to the FVMs.	SDD-13
FEQ-10-05-01-002	The Contractor shall deliver [two (2) types of FVMs]: (1) a Full-Service FVM; and (2) a Cashless FVM.	SDD-13
FEQ-10-05-01-003	FVMs shall be capable of supporting at least [three (3) fare tables], [one (1) current] and [two (2) future], that includes all fare and configuration data required to sell and validate fare products.	SDD-13
FEQ-10-05-01-004	Fare tables shall be individually and dynamically remotely configurable through the SMMA or other Contractor-provided device management or fare configuration tools to specific FVM or group of machines, locations or stations.	SDD-13
FEQ-10-05-01-005	Fare tables shall include a SEPTA-configurable date and time for the fare table to become active. Only [one (1) fare table] shall be active at any time.	SDD-13
FEQ-10-05-01-006	The Contractor shall design the FVMs to be simple, low-maintenance, and low-complexity machines that provide the functionality specified in this SOS and satisfy the Common Design Requirements.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-01-007	The Contractor shall design the FVMs to accommodate first-time or occasional users, as well as regular riders who need to reload their accounts. At a minimum, the FVM shall support these functions: (1) Purchase one or more new smartcards (each associated with a new transit account) with and without value; (2) Purchase one or more LU ticket; (3) Load stored value or fare product(s) to an existing account; (4) Review account balance and history; (5) Accept and recirculate U.S. coins (Full-Service FVM only); (6) Provide additional coin change capacity via Supplemental Coin Hoppers (Full-Service FVM only); (7) Accept and recirculate U.S. bills using a Bill Recycling Unit (BRU) (Full-Service FVM only); (8) Accept authorized magnetic strip, contact, and contactless bank cards; (9) Accept mobile payments including Apple Pay, Google Pay, and Samsung Pay; (10) Scan UPC, QR Code, and Aztek bar code media; (11) Return deposited cash if a transaction is canceled (Full-Service FVM only); (12) Print and issue receipts; (13) Display instructions and notices; (14) Upon user demand at the FVM, provide audio output of messages and instructions; (15) Contain required intrusion alarm system with audible alarm at FVM location; (16) Contain a camera that is activated upon door opening, with live recording sent to FVM back-office for real-time viewing and record storage; (17) Contain a full-color, high-definition information display on the front of the FVM for advertisements and messaging with a Content Management System for SEPTA to update the content in real-time; and (18) Communicate over a network to send and receive transaction data, event messages, configuration parameters, fare tables, and other operational data in real-time. A full list of transactions, detailed process flows, and other exchanged data shall be determined during Design Review.	SDD-13
FEQ-10-05-01-008	The FVMs shall be modular and have the ability to replace, activate, or de-activate the hardware components. The modules and components shall be easily serviced.	SDD-13
FEQ-10-05-01-009	If a component or function is enabled/disabled, the FVM shall automatically adjust its display, operation, and maintenance status according to the active components.	SDD-13
FEQ-10-05-01-010	The Full-Service FVM shall issue change by default using optimal combinations of bills and coins. Change algorithms shall be SEPTA-configurable.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-01-011	The FVM shall dispense two types of fare media: (1) the EU contactless media; and (2) LU paper-based QR code media. Alternate media types may be configured for issuance in the future if it does not have an impact on the simple design of the machine.	SDD-13
FEQ-10-05-01-012	The FVM shall be PCI- and EMV-certified for the acceptance of bank-issued contact and contactless credit and debit cards using all common formats based on the latest version of the standard at the time of Final Acceptance. FVMs shall be capable of re-certification with newer versions of the PCI and EMV standards via software upgrades, as necessary.	SDD-13

10.5.2 FVM Hardware

Req #	Requirement	Assigned CDRL
FEQ-10-05-02-001	The FVM outer door lock shall utilize an electronic high-security lock such as Cyber Lock® or SEPTA-approved equivalent.	SDD-13
FEQ-10-05-02-002	All internal locks for the FVM shall utilize high-security designs.	SDD-13
FEQ-10-05-02-003	The keyways for all internal high-security locks shall be registered to SEPTA, and replacement keys shall be available only to authorized SEPTA personnel, or their authorized representative. The Contractor shall serialize all keys for inventory and control purposes.	SDD-13
FEQ-10-05-02-004	Sensors shall detect the status of the outer door lock. The FVM door shall be considered open and unsecure if the outer door lock is not in the fully locked position.	SDD-13
FEQ-10-05-02-005	All internal security locks shall capture and hold the key whenever the lock is open.	SDD-13
FEQ-10-05-02-006	FVM cabinets shall be constructed from 304 stainless steel without any visible fasteners. The enclosure finish and corners shall be rounded to avoid sharp edges, corners, or protrusions that may cause injury to customers. Pedestals shall be constructed of type 316 stainless steel.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-02-007	The overall dimensions of the FVM enclosure shall not exceed [80 inches high], [36 inches wide], and [24 inches deep]. SEPTA prefers a simple design without excess size or features that may contribute to increased costs.	SDD-13
FEQ-10-05-02-008	The FVMs shall be located in underground and above-ground stations (sheltered) and on open-air platforms (unsheltered) and shall be rugged and function under extreme environmental conditions in Philadelphia. FVMs shall be designed to function in SEPTA's operating environment, including direct sunlight, wind-driven precipitation, temperature extremes, dust/grit/sand, rail dust, humidity, electrical storms, station cleaning equipment and chemicals, exposure to an urban environment, and shock and vibration.	SDD-13
FEQ-10-05-02-009	The FVM enclosure shall prevent pest intrusion by use of mesh or other restrictive designs at all ventilation openings.	SDD-13
FEQ-10-05-02-010	While the outer door is closed, the FVM enclosure shall direct all liquids that enter the machine to the outside of the cabinet.	SDD-13
FEQ-10-05-02-011	FVM enclosures shall be resistant to corrosion, abrasion, scratching, impacts, and vandalism, and withstand standard cleaning materials. Color and finish shall be such that it minimizes reflection and is highly resistant to fading, cracking, and peeling.	SDD-13
FEQ-10-05-02-012	The cabinet shall provide the highest protection against vandalism and burglary. The FVM cabinet shall include structural reinforcement at the locations (screen, door hinges, locking latches, access ports, etc.) where there is a higher possibility of vandalism.	SDD-13
FEQ-10-05-02-013	The FVM mounting pedestal and any external features (such as button panels, rain shields, and light fixtures) shall be weatherized, robust, and vandal resistant.	SDD-13
FEQ-10-05-02-014	The FVM cabinet and mounting hardware shall accommodate variations in station and sidewalk construction. Mounting pedestals shall be sized according to need, and SEPTA shall provide specific platform and other location conditions during Design Review.	SDD-13
FEQ-10-05-02-015	To prevent pest infestation, as part of the installation procedures, the Contractor shall use high-grade silicone caulk or other SEPTA-approved methods to seal the base of the cabinet to the platform surface.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-02-016	All installed FVMs shall fully comply with ADA requirements, including but not limited to the distance (minimum and maximum height) of user functions.	SDD-13
FEQ-10-05-02-017	The FVM cabinets shall provide controlled levels of access to the interior of the equipment for maintenance personnel, revenue servicing personnel, and cash processing personnel, as defined by SEPTA.	SDD-13
FEQ-10-05-02-018	The FVM enclosure shall accommodate signage, markings, and other instructional materials produced by SEPTA.	SDD-13
FEQ-10-05-02-019	The Contractor shall supply blanking plates to install over any outer door openings resulting from the removal of an external component or module. All such blanking plates shall be easily secured from the FVM interior and shall provide security against intrusion and vandalism. Ideally, the Contractor shall use the same blanking plates in the cashless FVM to cover door openings for the BRU and the coin insertion slot, thereby simplifying conversion from cashless to Full-Service configuration, should SEPTA choose to do so in the future.	SDD-13
FEQ-10-05-02-020	The Contractor shall submit the FVM enclosure and pedestal design to SEPTA for review and approval during the Design Review.	SDD-13
FEQ-10-05-02-021	The design of the FVM enclosure shall permit FVM installation as stand-alone units, side-by-side units, back-to-back units, and in recessed areas.	SDD-13
FEQ-10-05-02-022	The FVM cabinets shall be capable of housing a SEPTA-provided network switch or hub to enable all devices in one area to be connected through a single connection to the station communications room and limit the number of Ethernet runs required to each installation location.	SDD-13
FEQ-10-05-02-023	The FVM front door shall include a convex “fisheye” mirror, which shall enable a customer using the FVM to see behind them.	SDD-13
FEQ-10-05-02-024	Final FVM cabinet configurations for the Full-Service and Cashless FVMs shall be determined during Design Review.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-02-025	Each FVM shall be equipped with an alarm unit with the ability to monitor machine security conditions and provide alerts to the back-office in real-time, as well as video recording. If the FVM does not have power or is disabled for any reason, the alarm unit shall continue to operate independently and monitor the machine for security breaches and impacts. All alarms and alerts shall be recorded in the back-office and viewable from the Contractor-provided device monitoring tool for ad-hoc reporting purposes.	SDD-13
FEQ-10-05-02-026	To eliminate unintentional intrusion alarms, the FVM shall allow authorized users to disable the alarm prior to opening the door. The alarm unit shall be disarmed through an authorized entry and shall be triggered by an unauthorized entry. Each time the alarm unit detects an unauthorized entry, the FVM shall create, store, and transmit to the back-office an event record with date, time, and video recording.	SDD-13
FEQ-10-05-02-027	Adjustable sensors shall detect direct physical impacts to the FVM enclosure, breakage of the customer display or Variable Message Display (VMD) protective barrier, and attempts at unauthorized or forced entry. The alarm unit shall activate the siren as soon as the impact sensor is triggered. The siren shall shut off and re-arm after an adjustable period of time unless continued impacts or attempts at intrusion are detected.	SDD-13
FEQ-10-05-02-028	The FVM shall include an alternative method to access the interior during loss of power or malfunction of any component required to authorize entry. The alternative method shall include the ability to disable the FVM siren, and shall not interfere with the alarm unit's ability to transmit an event record of the alternative authorized entry.	SDD-13
FEQ-10-05-02-029	The FVM alarm unit shall contain a "silent alarm" button installed in a discrete but easily accessed location in the FVM interior.	SDD-13
FEQ-10-05-02-030	During Design Review, the Contractor shall submit a security and alarm process for FVM access for review and approval by SEPTA.	SDD-13
FEQ-10-05-02-031	The FVM Electronic Control Unit (ECU) shall be a solid-state device with sufficient computing power, memory, and interfaces to provide the functions and performance required. The ECU shall provide at least [two (2) spare USB ports] to support future expansion.	SDD-13
FEQ-10-05-02-032	The ECU shall provide the ability to expand Random Access Memory (RAM) storage by no less than [50%] to support potential future Operating System requirements.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-02-033	The ECU shall: (1) Be easily replaceable without the use of tools; (2) Use Solid State Disk Drive (SSDD) in lieu of rotating magnetic disk technology; and (3) Include an easily accessible removable static memory device, such as a flash drive, that shall store status information (such as the FVM ID, content of all cash containers, ticket and card stocks, and other dynamic data that is unique to an operating FVM).	SDD-13
FEQ-10-05-02-034	The FVM ECU shall include the necessary hardware components to communicate in real time with the back-office via Ethernet hard-wired connection. Additionally, as necessary, the Contractor shall add FVM modules to provide Wi-Fi or cellular data communications with the back-office. The quantities of each communication type shall be finalized during Design Review.	SDD-13
FEQ-10-05-02-035	If required for PCI certification, the Contractor shall supply a second Ethernet port in the FVM ECU to transmit payment data separate from other transaction data.	SDD-13
FEQ-10-05-02-036	Each FVM shall incorporate an emergency signal interface. The emergency signals may be daisy-chained from other devices or fed directly from a station input.	SDD-13
FEQ-10-05-02-037	The FVM shall be equipped with a modular, filtered power supply. The Contractor shall connect the power supply to the incoming electrical service [nominally 120 VAC]. The FVM power supply shall deliver all of the necessary operating voltages for the machine. Voltages internal to the FVM shall not exceed the nominal incoming electrical service voltage.	SDD-13
FEQ-10-05-02-038	A power switch shall turn the power supply on or off and shall be separate from the main circuit breaker that removes all power to the FVM. The FVM shall be designed to minimize safety risks to maintenance personnel with the machine power turned off.	SDD-13
FEQ-10-05-02-039	The FVM shall include a [15A GFCI duplex convenience outlet] installed within the interior of each cabinet. The outlet shall be properly grounded and protected by a separate circuit breaker internal to the machine enclosure.	SDD-13
FEQ-10-05-02-040	The Contractor shall apply appropriate warning labels on or near any components or cables that may have hazardous voltages present.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-02-041	The FVM shall include a supplemental battery power supply. This battery power supply shall support full FVM operation for a SEPTA-configurable interval of no less than [60 seconds] without commercial power. If a transaction is in progress when commercial power is lost, the FVM shall continue operations and complete the transaction (if possible) and then go out of service. If commercial power is lost when the FVM is idle, the FVM shall go out of service. If power is restored before the configurable interval lapses, the FVM shall resume operations. If commercial power remains unavailable after the configurable interval has elapsed, the FVM shall cancel any transaction in progress, return inserted cash (if applicable), and commence an orderly shutdown. Upon restoration of commercial power, the FVM shall resume operations and recharge the backup battery.	SDD-13
FEQ-10-05-02-042	The supplemental battery shall be rated at [four (4) years] or [500 discharge and charge cycles].	SDD-13
FEQ-10-05-02-043	The FVM shall include a customer display bearing simple and easy to read instructions which sequentially instruct the customer how to perform available functions.	SDD-13
FEQ-10-05-02-044	All portions of the customer display screen shall be visible and not obstructed by any portion of the FVM door, mounting bezels, or other external elements.	SDD-13
FEQ-10-05-02-045	The customer display screen shall be installed as high as possible in the FVM cabinet while remaining compliant with ADA height requirements and close enough to the FVM door outer surface to avoid any parallax effect, or the apparent shift of screen objects relative to customer touches.	SDD-13
FEQ-10-05-02-046	The customer display screen shall consist of a color, trans-reflective LCD flat panel display with an LED backlight, or an Organic Light Emitting Diode (OLED) flat panel display.	SDD-13
FEQ-10-05-02-047	The customer display screen shall provide a resolution of no less than [1024 x 768 pixels], and at least [65,000 colors (RGB 16 bit) per pixel].	SDD-13
FEQ-10-05-02-048	The customer display screen shall produce a minimum of [1,000 nits] brightness with at least a [750:1 contrast ratio], and provide a level of visibility sufficient to allow all displayed instructions to be read easily by the customer under all ambient light conditions, including direct sunlight, and without the need for any additional peripheral light source or shading device.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-02-049	The customer display screen shall display characters and symbols compliant with all ADA requirements. Character fonts on the FVM display shall be as large as practical and where possible, no less than [(0.375) inches high].	SDD-13
FEQ-10-05-02-050	The FVM customer display shall include an integrated touch screen interface suitable for outdoor application.	SDD-13
FEQ-10-05-02-051	The customer display's associated touchscreen shall be responsive and accommodate customers wearing gloves, and/or prosthetics. There shall be no difference in the responsiveness to touch between a clean or touchscreen under optimal conditions and a dusty, dirty, wet, or icy screen under harsh conditions.	SDD-13
FEQ-10-05-02-052	The touch region of the customer display within ADA height requirements shall measure no less than [100 square inches].	SDD-13
FEQ-10-05-02-053	The touchscreen surface of the customer display shall be constructed of tempered glass or other robust material that is resistant to impacts, scratches, and other normal wear. The touchscreen surface may be additionally protected with coatings or other easily replaceable materials that do not negatively affect touchscreen functionality. The touchscreen outer surface and any coatings or other materials applied to the touchscreen outer surface shall withstand normal customer use and industry-standard station cleaning and disinfectant materials.	SDD-13
FEQ-10-05-02-054	The visibility and usability of the customer display and associated touchscreen shall be unaffected by precipitation, temperature, sunlight, dust, heat, ice, and other environmental conditions typical of the Philadelphia operating region.	SDD-13
FEQ-10-05-02-055	The customer display screen and the associated touchscreen shall be easily replaceable from within the FVM interior and require minimal maintenance effort.	SDD-13
FEQ-10-05-02-056	The Full-Service FVM shall include a BRU that accepts and recirculates valid U.S. paper currency. The BRU shall include a bill validator, bill recirculating module, bill escrow, and bill vault.	SDD-13
FEQ-10-05-02-057	The BRU shall identify valid acceptable bills with at least [99.999%] accuracy.	SDD-13
FEQ-10-05-02-058	Each time the BRU rejects an inserted bill, the BRU shall inform the ECU of the event and the reason for the rejection.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-02-059	The BRU shall inform the ECU whenever the BRU detects an operational failure, and whenever the BRU detects that a failure has been resolved. These messages shall include accompanying data to identify the failure mode.	SDD-13
FEQ-10-05-02-060	The BRU may reject bills with excessive physical defects and bills with attached foreign material (e.g., tape), faded or worn ink, or defacements (e.g., permanent marker).	SDD-13
FEQ-10-05-02-061	The BRU shall detect counterfeit bills, including copies made in either single or double-sided printing on an electronic copier and those made with color printers.	SDD-13
FEQ-10-05-02-062	If the BRU deems the inserted document to be invalid, the BRU shall return the document and retain hold of the item until the user retrieves it, or until a SEPTA-configurable time elapses, at which time the BRU shall fully eject the item. If the BRU fully ejects the item, the BRU shall inform the ECU of the event.	SDD-13
FEQ-10-05-02-063	The BRU shall reject or expel pieces of paper or other foreign material that can be introduced into the bill insertion slot.	SDD-13
FEQ-10-05-02-064	A high security lock shall secure the BRU to mounting brackets within the FVM interior.	SDD-13
FEQ-10-05-02-065	Upon acceptance of each inserted bill, the BRU shall forward the bill to its associated recirculating module (if applicable and if the associated recirculating module has capacity) or an escrow to be stored temporarily until completion or cancellation of the transaction.	SDD-13
FEQ-10-05-02-066	The BRU shall include [three (3) separately removable and secure bill recirculating modules] to provide inserted bills as a source of change. Denominations assigned to these modules shall be SEPTA-configurable and shall by default be: \$1, \$5, and \$10. The recirculation modules shall have at minimum, capacity to hold approximately [50 bills] each.	SDD-13
FEQ-10-05-02-067	The bill escrow module shall have the capacity to store a minimum of [10 bills].	SDD-13
FEQ-10-05-02-068	If the customer inserts a SEPTA-configurable limit of bills for a transaction, the BRU shall cease accepting bills, and the FVM shall display a configurable warning message on the customer screen.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-02-069	If the customer cancels the transaction or the FVM aborts the transaction, the BRU shall return from recirculating modules and escrow the same bills inserted for the transaction.	SDD-13
FEQ-10-05-02-070	When returning bills (from escrow and/or the recirculating modules), the BRU shall return all bills in a single stack and retain hold of the stack until the user retrieves it, or until a SEPTA-configurable time elapses, at which time the BRU shall fully eject the stack.	SDD-13
FEQ-10-05-02-071	The BRU shall be capable of accepting all variations of \$1, \$2, \$5, \$10, \$20, \$50, and \$100 bills in widespread circulation at the time of Final Acceptance. SEPTA shall be able to configure the denominations and varieties of accepted bills via the back-office.	SDD-13
FEQ-10-05-02-072	When a transaction is completed, the BRU shall transfer all bills in the bill escrow module to the bill vault for retention.	SDD-13
FEQ-10-05-02-073	Using sensors or other means, the BRU shall confirm the passage of all bills to the escrow, recirculating modules, and bill vault. If a bill fails to complete passage to its destination module, the BRU shall declare a jam and cease accepting bills.	SDD-13
FEQ-10-05-02-074	The BRU shall include a removable bill vault. The bill vault shall have a capacity of no less than [500 stacked bills] in street condition and weigh no more than [25 pounds] when full.	SDD-13
FEQ-10-05-02-075	A high security lock shall secure the bill vault to the BRU. The bill vault access lock keys shall be distinct from maintenance keys and available only to SEPTA revenue service personnel.	SDD-13
FEQ-10-05-02-076	The bill vault shall be constructed of sturdy and tamper-proof material and shall withstand normal handling and regular removal and replacement without deformation that would in any way interfere with the insertion and removal process.	SDD-13
FEQ-10-05-02-077	It shall not be possible to open the bill vault while installed in the BRU, nor shall it be possible to install an open or unlocked bill vault into the BRU. When properly installed in the BRU, it shall not be possible to access bills in the bill vault without damaging the vault in an obvious manner.	SDD-13
FEQ-10-05-02-078	The bill vault shall remain secure when removed from the FVM. The bill vault contents shall be protected by a high-security lock opened with a key that shall only be available to SEPTA money room staff.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-02-079	The bill vault shall have one or more handles placed to avoid injury and provide adequate hand clearance for easy insertion, removal, and carrying.	SDD-13
FEQ-10-05-02-080	Each bill vault shall include a SEPTA-unique printed and electronically encoded serial number. The BRU shall inform the FVM of the bill vault serial number upon insertion and removal.	SDD-13
FEQ-10-05-02-081	As the U.S. Treasury releases new designs of bills, the bill validator shall be capable of being programmed to accept the new designs while continuing to accept the current designs.	SDD-13
FEQ-10-05-02-082	The BRU shall be equipped with a protective shutter to limit insertion of bills and foreign matter while the BRU is not accepting bills.	SDD-13
FEQ-10-05-02-083	The BRU insertion slot shutter shall remain closed until a transaction is selected for which cash payments are available. The shutter shall automatically open once the payment due has been displayed.	SDD-13
FEQ-10-05-02-084	The BRU shall be able to accept bills inserted in any of the [four (4) possible lengthwise orientations].	SDD-13
FEQ-10-05-02-085	The BRU shall accept one bill at a time and shall determine the denomination and validity of the currency.	SDD-13
FEQ-10-05-02-086	The BRU shall determine the denomination and validity of both sides of a document by a combination of some or all of the following: dimension checks, pattern and color recognition, and magnetic ink detection.	SDD-13
FEQ-10-05-02-087	The BRU shall meet the following acceptance rates: (1) At least [98%] of valid bills are accepted upon initial insertion, and (2) At least [99%] of valid bills are accepted in no more than two insertion attempts.	SDD-13
FEQ-10-05-02-088	After acceptance of a valid bill, the BRU shall be ready to accept a subsequent bill in no more than [two (2) seconds].	SDD-13
FEQ-10-05-02-089	Full-Service FVMs shall include a Coin Handling Unit (CHU) consisting of, and not limited to, a coin acceptor/verifier, a coin recirculating module, at least [two (2) supplemental coin hoppers], and a coin vault. SEPTA is seeking a low-cost CHU based on a COTS module that recirculates and does not escrow inserted coins.	SDD-13
FEQ-10-05-02-090	The CHU shall include at least [four (4) tubes] or similar containers to recirculate at least [four (4) denominations] of inserted coins.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-02-091	Each CHU recirculating container shall have capacity to store a minimum of [50 coins].	SDD-13
FEQ-10-05-02-092	The coin acceptor/verifier shall accept all variations of nickels, dimes, quarters, and dollar coins in circulation at the time of Final Acceptance.	SDD-13
FEQ-10-05-02-093	The coin acceptor/verifier shall identify valid acceptable U.S. coins with at least [99.99%] accuracy.	SDD-13
FEQ-10-05-02-094	The coin acceptor/verifier shall meet the following acceptance rates: (1) At least [98%] of valid coins are accepted upon initial insertion; (2) At least [99%] of valid coins are accepted in no more than [two (2) insertion attempts]; and (3) All known counterfeit coins, common slugs, foreign coins, and coins of denominations not accepted by the CHU are rejected upon every insertion.	SDD-13
FEQ-10-05-02-095	The coin acceptor/verifier shall determine the denomination and validity of coin types and identify invalid or counterfeit objects ("slugs").	SDD-13
FEQ-10-05-02-096	As the U.S. Treasury releases new designs of coins, the coin acceptor/verifier shall be capable of being programmed to accept the new designs while continuing to accept the current designs.	SDD-13
FEQ-10-05-02-097	Upon acceptance of each inserted coin, the CHU shall forward the coin to its associated recirculating container.	SDD-13
FEQ-10-05-02-098	If the associated recirculating container is full, or if the inserted coin denomination has no assigned recirculating container, the CHU shall direct the inserted coin into the coin vault.	SDD-13
FEQ-10-05-02-099	The coin acceptor/verifier shall reject and return to a coin return bin unverified, counterfeit, excessively bent, and foreign coins, as well as slugs and other foreign objects.	SDD-13
FEQ-10-05-02-100	If the customer inserts a SEPTA-configurable limit of coins for a transaction, the CHU shall cease accepting coins, and the FVM shall display a configurable warning message on the customer screen.	SDD-13
FEQ-10-05-02-101	If the customer cancels the transaction or the FVM aborts the transaction, the CHU shall return from the recirculating containers the same number of coins of each denomination inserted.	SDD-13
FEQ-10-05-02-102	The CHU shall provide SEPTA the ability to securely load and replenish the recirculating containers with a supply of coins for change.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-02-103	Using several sensors or other means, the CHU shall confirm the passage of all coins to the recirculating containers, the coin vault, and to the coin return cup (from either the recirculating containers or the supplemental coin hoppers). If a coin fails to complete passage to its destination, the CHU shall declare a jam and cease accepting coins.	SDD-13
FEQ-10-05-02-104	Each CHU shall include a removable coin vault that has a capacity of at least [300 cubic inches] and weighs no more than [40 pounds] when full.	SDD-13
FEQ-10-05-02-105	A high security lock shall secure the coin vault to the CHU. The coin vault access lock keys shall be distinct from maintenance keys and available only to SEPTA revenue service personnel.	SDD-13
FEQ-10-05-02-106	The coin vault shall withstand regular removal, replacement, and normal handling without deformation or in any way interfering with the insertion and removal process.	SDD-13
FEQ-10-05-02-107	It shall not be possible to open the coin vault while installed in the machine, nor shall it be possible to install an open or unlocked coin vault into the machine. When properly installed in the machine, it shall not be possible to access coins in the coin vault without damaging the vault in an obvious manner.	SDD-13
FEQ-10-05-02-108	The CHU shall provide SEPTA the ability to securely transfer the contents of the recirculating containers to the coin vault.	SDD-13
FEQ-10-05-02-109	The coin vault shall be self-locking and self-closing so that when removed from the CHU, it cannot be opened other than through an authorized process. Coin vaults shall remain secure when removed from the CHU. The coin vault contents shall be protected by a high-security lock opened with a key that shall only be available to SEPTA money room staff.	SDD-13
FEQ-10-05-02-110	The coin vault shall have a handle or handles placed to avoid injury, which provides adequate hand clearance for easy insertion, removal, and carrying.	SDD-13
FEQ-10-05-02-111	Each coin vault shall include a printed and electronically encoded serial number. The CHU shall communicate the serial number to the FVM upon coin vault insertion and removal.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-02-112	The CHU shall contain a coin insertion slot sized to limit the dimensions of inserted material to the largest U.S. coin accepted. To minimize jams, the coin slot shall also be sized to prevent the simultaneous insertion of [two (2) coins].	SDD-13
FEQ-10-05-02-113	The coin insertion slot shall include a protective shutter to ensure that coins and foreign matter do not enter the CHU while the FVM is not accepting coins.	SDD-13
FEQ-10-05-02-114	The coin insertion slot shall remain closed until a transaction is selected for which cash payments are available. The shutter shall automatically open once the payment due has been displayed.	SDD-13
FEQ-10-05-02-115	The geometry of the coin path and other provisions of the CHU shall prevent the retrieval of coins by fishing such as with wire or attached thread.	SDD-13
FEQ-10-05-02-116	The coin acceptor/verifier shall be key locked into the FVM and shall be removable for service and replacement.	SDD-13
FEQ-10-05-02-117	The CHU shall contain at least [two (2) removable coin hoppers] to be used as a supplemental source of change.	SDD-13
FEQ-10-05-02-118	The coin hopper shall withstand regular removal, replacement, and normal handling without deformation or in any way interfering with the insertion and removal process.	SDD-13
FEQ-10-05-02-119	Each coin hopper shall have the capacity to store no less than [500 coins] of any single denomination and shall weigh no more than [25 pounds] when full.	SDD-13
FEQ-10-05-02-120	Each coin hopper shall be locked in place with a high security lock.	SDD-13
FEQ-10-05-02-121	The coin hopper shall be locked closed so that when the hopper is removed from the CHU, no coins are accessible or removable without obvious damage to the hopper enclosure.	SDD-13
FEQ-10-05-02-122	The coin hopper shall have a mechanical or electronic means of informing the CHU the denomination of coins contained in the hopper. SEPTA shall have the ability to configure hopper denomination.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-02-123	Coin hoppers shall be filled prior to insertion in the CHU. Upon insertion of a hopper, the CHU shall automatically configure its operating parameters to reflect the number of coins in the full hopper. The number of coins in a full hopper shall be SEPTA-configurable by denomination.	SDD-13
FEQ-10-05-02-124	Each coin hopper shall include a printed and electronically encoded serial number. The CHU shall read and record the serial number upon coin hopper insertion and removal.	SDD-13
FEQ-10-05-02-125	The FVM shall include a full-color, high-resolution VMD.	SDD-13
FEQ-10-05-02-126	The VMD shall consist of a color, trans-reflective LCD flat panel display with an LED backlight, or an OLED flat panel display.	SDD-13
FEQ-10-05-02-127	The VMD shall be installed near the top of the FVM cabinet to maximize its visibility in crowded station environments.	SDD-13
FEQ-10-05-02-128	SEPTA prefers the VMD to be optimally sized to be nearly the width of the FVM door, based on a "half-height" High-definition (HD) display. Accordingly, the VMD screen shall be approximately [24 inches wide] and [6 inches tall], or the equivalent of a "half-high" [27 inch (16:9 aspect ratio) diagonal] HD screen.	SDD-13
FEQ-10-05-02-129	The VMD screen shall have resolution of approximately [1920 x 540 pixels], and brightness of at least [700 nits].	SDD-13
FEQ-10-05-02-130	The FVM shall include the necessary interfaces, either in the EMU or in a separate video controller module, to convey SEPTA-configurable information to the display.	SDD-13
FEQ-10-05-02-131	The VMD shall be easily replaced from the inside of the FVM.	SDD-13
FEQ-10-05-02-132	The FVM shall include a Bank Card Processing Unit (BCPU) to process bank cards (credit and debit), including Apple Pay, Google Pay, and Samsung Pay, for the payment for fare products and media.	SDD-13
FEQ-10-05-02-133	The BCPU shall include: (1) Magnetic stripe reader; (2) Contactless bank card reader; (3) Contact (or chip) bank card reader; and (4) PCI- and ADA-compliant Personal Identification Number (PIN) pad.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-02-134	The layout of the keys on the PIN keypad shall be similar to those of touchtone telephones, and the central “5” key shall have a raised dot or other identifying tactile feature to aid the visually impaired, in compliance with all applicable ADA requirements. The PIN pad shall be easily accessible to ensure users with dexterity issues or that require two hands to operate the PIN pad have the space to do so.	SDD-13
FEQ-10-05-02-135	The PIN keypad shall employ encryption as required in accordance with banking requirements. The Contractor shall supply all PIN keypads with production encryption keys injected in a secure, PCI-compliant manner.	SDD-13
FEQ-10-05-02-136	The PIN keypad shall be capable of operating in both an encrypting and non-encrypting or “clear” mode so that it can be used for data entry and customer selection by the visually impaired.	SDD-13
FEQ-10-05-02-137	The PIN keypad shall support PIN entry when magnetic stripe debit cards are used, and whenever EMV-enabled cards are used, and transaction procedures dictate. The PIN keypad may also be used to enter ZIP codes to satisfy address verification requirements, as a configurable parameter.	SDD-13
FEQ-10-05-02-138	The magnetic stripe and contact bank card reader shall be combined to accept and process standard-size cards with ISO/IEC 7811 magnetic data stripes and all EMV-complaint contact (chip and PIN) cards, with a configurable parameter to process debit and credit cards or to process all payment cards as credit.	SDD-13
FEQ-10-05-02-139	The magnetic stripe/contact bank card reader shall consist of a push/pull (insert/remove) card reader such that the bank card is not captured completely by the reader. Sensors shall detect the insertion and removal of cards from the reader unit.	SDD-13
FEQ-10-05-02-140	The magnetic stripe/contact bank card reader card slot shall be sealed so that no liquids introduced into the slot enter the interior of the FVM.	SDD-13
FEQ-10-05-02-141	The contactless bank card reader shall read and support all open payment contactless standards, including but not limited to: (1) Visa payWave; (2) MasterCard® PayPass™; (3) American Express® ExpressPay; (4) Discover® D-PAS; and (5) Contactless EMV (e.g., Apple Pay, Google Pay).	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-02-142	The BCPU shall include a secure bank card PIN keypad. The PIN Pad shall be vandal resistant, weather-resistant, and not be removable from outside and be easily replaceable. The PIN Pad shall have a life expectancy of [five (5) million cycles] for the overall keypad and a minimum of [two (2) million cycles] for each individual key.	SDD-13
FEQ-10-05-02-143	The FVM shall incorporate an internal ISO/IEC 14443 contactless Smartcard Reader/Dispenser (SRD).	SDD-13
FEQ-10-05-02-144	The SRD shall read and dispense SEPTA-issued contactless media stored in the FVM. Dispensed cards shall comply with ISO 7810 dimensions and be [nominally 0.030 inches thick (30 mils)].	SDD-13
FEQ-10-05-02-145	The SRD shall utilize not less than [two (2) removable cassettes] to store the contactless media card stock. The cassettes shall securely hold cards and enable service staff to replenish or exchange cassettes quickly and securely and shall include a serialized key set.	SDD-13
FEQ-10-05-02-146	In total the installed SRD cassettes shall have a capacity of no less than [500 cards].	SDD-13
FEQ-10-05-02-147	The SRD shall dispense cards into a media dispense tray or slot no more than [three (3) seconds] after commencing the read/dispense process.	SDD-13
FEQ-10-05-02-148	Prior to dispensing a new card, the SRD shall read the card and confirm that the card is functioning properly. If the SRD cannot read the card's UID and verify all other card data is encoded correctly, the SRD shall capture the card in a card reject bin and attempt to read/dispense another card.	SDD-13
FEQ-10-05-02-149	The card reject bin shall have a capacity of no less than [10 cards] and shall send rejected card information to the back-office for tracking and inventory. If the SRD reject bin is full, the FVM shall disable the SRD and send a maintenance alert to the back-office.	SDD-13
FEQ-10-05-02-150	If the SRD fails to issue a card after a configurable number of attempts (default 3), the FVM shall cancel the transaction, disable the SRD module, and send a maintenance alert to the back-office.	SDD-13
FEQ-10-05-02-151	The contents of the SRD cassettes and the corresponding SRD operation shall be SEPTA configurable to support an identical card type in all SRDs or different card types.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-02-152	The FVM front door shall incorporate a 2D barcode reader to enable customers to scan barcode media displayed on a mobile ticket application and paper tickets.	SDD-13
FEQ-10-05-02-153	The FVM barcode reader shall at minimum read Aztek, QR and UPC codes.	SDD-13
FEQ-10-05-02-154	The barcode reader shall have a sensor with a minimum of [752 x 480 pixel] resolution.	SDD-13
FEQ-10-05-02-155	The barcode reader shall be optimized for scanning barcodes from mobile screens and shall accommodate a wide range of mobile device screen sizes and barcode sizes, environmental factors (e.g., sun glare, phone screen protectors).	SDD-13
FEQ-10-05-02-156	The barcode reader shall be able to accommodate real-world environmental factors such as different scanning angles minimum range of [zero (0) to 30 degrees] at varying distances from the reader minimum range of [two (2) to six (6) inches] and shall be designed to maximize usability without customer education.	SDD-13
FEQ-10-05-02-157	If necessary to assist users, the barcode reader shall emit a narrow beam of light to direct the user's placement of the barcode and to illuminate the barcode in low ambient light.	SDD-13
FEQ-10-05-02-158	SEPTA prefers a forward or upward facing mirrored configuration with a scan range between [zero (0) inches (flush) and six (6) inches] from the barcode reader.	SDD-13
FEQ-10-05-02-159	The FVM shall be equipped to print and issue receipts for fare transactions and audit tickets for maintenance activities. Receipts shall be printed on separate receipt stock using a thermal receipt printer.	SDD-13
FEQ-10-05-02-160	The Receipt Printer shall issue receipts and audit tickets from paper-based roll stock that is commercially available in the U.S. Each roll of receipt stock shall produce no less than [2,000 receipts] that are [nominally two-and-one-half (2.5) inches by three (3) inches].	SDD-13
FEQ-10-05-02-161	The Receipt Printer shall be able to print all alphanumeric characters in both upper and lower case and all ASCII characters. Printed characters shall be produced with a minimum height of [0.12 inches] and a maximum height of up to [one (1) inch].	SDD-13
FEQ-10-05-02-162	The Receipt Printer shall utilize a thermal print head that provides no less than [100 dots per inch] of resolution.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-02-163	Receipt Printer thermal print heads shall produce no fewer than [250,000 receipts] without misprinted pixels due to wear or electronic failure.	SDD-13
FEQ-10-05-02-164	The Receipt Printer shall be equipped with a cutting mechanism to cut individual receipts from the roll supply. Each cutter shall perform at least [one (1) million cuts] without requiring replacement or sharpening. The cutter shall require no adjustment.	SDD-13
FEQ-10-05-02-165	The FVM shall include a Ticket Printer which shall produce thermally-printed tickets from roll stock.	SDD-13
FEQ-10-05-02-166	The Ticket Printer shall: (1) Produce a ticket, nominally credit-card sized, within [one (1) second] of receiving the request from the ECU; (2) Support printing from [two (2) separate rolls], either by employing a dual stock feeding mechanism or fully redundant printer module; (3) Provide a combined capacity of no less than [3,000 tickets] that are nominally credit-card sized and at least [0.007 inches (7 mil) thick]; (4) Monitor the amount of remaining stock in each roll, enabling the FVM to send event messages for low and depleted stock conditions; (5) Provide thermal printing with resolution of at least [200 dots per inch]; (6) Be capable of printing text and graphics, including UPC, Aztek, and QR codes; and (7) Have a self-sharpening cutter mechanism capable of producing [one (1) million cuts].	SDD-13
FEQ-10-05-02-167	The Ticket Printer shall be able to print all alphanumeric characters in both upper and lower case and the standard symbols of the ASCII character set. Printed characters shall be produced with a minimum height of [0.12 inches] and a maximum height up to [one (1.0) inch]. The approximate height to width ratio of the characters shall be 5:3.	SDD-13
FEQ-10-05-02-168	The Ticket Printer shall be SEPTA-configurable to print tickets with the following configurations: (1) Various print sizes on the same ticket; (2) Reverse printing (white characters on black background); (3) Vertical and horizontal character orientation; and (4) Multiple fonts and styles (e.g., bold, italic) on the same ticket.	SDD-13
FEQ-10-05-02-169	Ticket Printer thermal print heads shall be easily replaceable, and shall produce no fewer than [250,000 nominally credit-card sized tickets media] without the loss of a single pixel due to wear or electronic failure.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-02-170	The Ticket Printer shall be SEPTA-configurable to define distinct ticket stock types in each roll, or identical ticket stocks in both rolls. If both ticket stocks are identical, upon depletion of a ticket stock roll, the Ticket Printer shall commence using the second roll.	SDD-13
FEQ-10-05-02-171	The Ticket Printer shall sense the progress of the ticket through the module and detect the completion of the dispensing process. A final sensor in the ticket path shall detect when the media has left the Ticket Printer on its way to the Media Tray. If the Ticket Printer detects an unrecoverable ticket jam or the failure of the ticket to clear the final sensor, the FVM shall cancel the transaction and respond accordingly.	SDD-13
FEQ-10-05-02-172	The FVM shall include a customer-facing Contactless Card Reader (CCR) compliant with both Type A and B variants of the ISO/IEC 14443 standard. The CCR shall perform the following functions at a minimum: (1) Read contactless media to bring FVM out of idle state; (2) Load fare products or value; (3) Check account balance and history; and (4) Write data back to the card.	SDD-13
FEQ-10-05-02-173	The FVM shall include a Media Tray that shall safely hold dispensed media, receipts, and change (Full-Service FVM only).	SDD-13
FEQ-10-05-02-174	The Media Tray shall be recessed and covered with a clear polycarbonate spring-loaded or weighted door. The dispense tray and its door shall be robust, scratch-resistant, visually prominent, and resistant to intrusion from the outside.	SDD-13
FEQ-10-05-02-175	The Media Tray shall drain any liquids that enter to the outside of the FVM.	SDD-13
FEQ-10-05-02-176	The FVM front door shall include identification labels adjacent to all customer-operable controls, payment modules, and the Media Tray.	SDD-13
FEQ-10-05-02-177	FVM identification labels shall be modular and configurable to match different FVM configurations, as applicable.	SDD-13
FEQ-10-05-02-178	FVM identification labels shall include raised letter text, Braille and tactile diagrams in full compliance with ADA requirements.	SDD-13
FEQ-10-05-02-179	The design of instructional labels shall minimize glare and other effects of sunlight and ambient lighting.	SDD-13
FEQ-10-05-02-180	Identification labels adjacent to the bill insertion slot and bank card slot reader shall include diagrams that clearly depict proper insertion orientation of bills and bank cards into their respective slots.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-02-181	The Contractor shall submit conceptual designs of the FVM identification labels and related graphics for SEPTA review and approval during Design Review.	SDD-13
FEQ-10-05-02-182	The FVM shall incorporate a removable information signage holder in a prominent position to display printed information, including but not limited to: (1) Fare pricing and information; (2) SEPTA contact information; and (3) Service announcements.	SDD-13
FEQ-10-05-02-183	The information signage holder shall be suitable for use in an outdoor environment, securely mounted, and may supplement information on the customer display.	SDD-13
FEQ-10-05-02-184	SEPTA shall be responsible for the design and production of the signage to be placed in the information signage holder.	SDD-13
FEQ-10-05-02-185	In addition to the touchscreen interface integrated into the customer display, the FVM shall include ADA-compliant options for Customers with sight and/or hearing challenges to easily cancel a transaction and operate the Voice Annunciation System (VAS).	SDD-13
FEQ-10-05-02-186	Buttons to duplicate touchscreen selections or provide other functions may be used if necessary.	SDD-13
FEQ-10-05-02-187	If pushbuttons are employed by the FVM, the pushbuttons shall: (1) Be made of stainless steel, hardened aluminum, or other SEPTA-approved hardened and weather-resistant material; (2) Provide approximately [one (1) square inch] in surface area; (3) Have tactile movement when pressed; (4) Be accompanied by an audible tone when pressed; (5) Provide less than [eight (8) ounces of resistance] when pressed; (6) Be protected against vandalism, including impact from customers; (7) Be liquid-proof and sealed from outside moisture; (8) Not be removable from the outside; and (9) Comply with all applicable ADA guidelines.	SDD-13
FEQ-10-05-02-188	The FVM shall include an audio interface and internally mounted vandal-resistant speaker to provide configurable audio tones and to support the VAS.	SDD-13
FEQ-10-05-02-189	Default FVM audio volume shall be remotely and field adjustable for each FVM. FVM audio content shall be audible in all station environments.	SDD-13
FEQ-10-05-02-190	The volume of the VAS shall be user controllable, per ADA regulations.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-02-191	The FVM shall provide a standard jack for headphone use in addition to the internally mounted speaker. Whenever a user plugs headphones into the jack, the FVM shall disable the external speaker and direct all tones and voice messages to the headphone jack.	SDD-13

10.5.3 FVM Software

Req #	Requirement	Assigned CDRL
FEQ-10-05-03-001	The FVM ECU shall use a currently supported OS with no less than [seven (7) years] of committed support remaining from the OEM supplier at the time of Final Design Review (FDR).	SDD-13
FEQ-05-03-002	FVMs shall generate, store, and transmit a discrete data record for each transaction performed.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-03-003	<p>The FVM shall communicate real-time with the back-office through a secure communications interface to send and receive data including but not limited to: (1) Transaction information; (2) Event (alarm and maintenance) status alerts, including but not limited to: Hard drive failures, Low battery and battery failures, Overheating, Door malfunctions, All revenue component malfunctions, UPS failures, Out of service events, Number of swipe payment card transactions (for life cycle maintenance), Number of bill note transactions (for life cycle maintenance), Payment card acceptance failures including reason codes (e.g., insufficient funds), Payment card reader failures, Bill note component failures, Bill vault component failures, Communication failures, Smartcard Encoder/Dispenser (SED) failures, Time synchronization information, Positive/negative lists, Configuration parameters, Remote commands or status inquiries, FVM identifier (unique name or number), and Station/platform name, video equipment failure, video recording failure, information display failures; and (3) Video recording including date and time stamp of each recording. The list of communications information, including events and the name of the events that need to be sent to the back-office, shall be finalized during Design Review. All data shall be exportable from the back-office to CSV and PDF file formats. Video recordings shall be exportable from the back-office to a format approved during Design Review (e.g., MPEG, AVI, MOV). A web-based dashboard shall be available to maintenance personnel to identify maintenance issues by FVM, using simple graphical displays, as well as the ability to easily drill down to detailed failures by FVM. The dashboard shall be displayed on Personal Computer (PC) screens and at least [two (2) large, flat-panel monitors (not less than [50-inch] displays)].</p>	SDD-13
FEQ-10-05-03-004	<p>Each transaction record shall be unique and shall include the following information, at a minimum: (1) Date and time; (2) Device ID; (3) Station/Location ID; (4) Card/account number (where applicable); (5) Transaction type (e.g., card sale, value load, account inquiry, ticket sale); (6) Cards sold (where applicable); (7) Stored value or fare products loaded (where applicable); (8) Fare category (e.g., full fare, reduced fare); (9) Transaction value (where applicable); (10) Payment type and amount; (11) Transaction result (e.g., success, failure); (12) Transaction ID; and (13) A unique sequence number for any media validated upon issuance. Transaction records details shall be finalized during Design Review.</p>	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-03-005	FVMs shall maintain local data records in non-volatile memory in the event that communications to the back-office systems are unavailable. The local records shall only be removed when verification of database storage of each record is received from the back-office.	SDD-13
FEQ-10-05-03-006	Any offline transactions shall be recorded as such as part of the transaction data so that offline transactions can be easily identified and tracked. Once communications are online, all offline transactions and events shall be immediately sent to the back-office for processing.	SDD-13
FEQ-10-05-03-007	All FVMs shall provide audit register counts for purposes of data tracking and analysis. The audit registers shall store counts of specific events, including access logs of maintenance personnel logging into the FVM, in non-volatile memory, and shall not be able to be modified or erased.	SDD-13
FEQ-10-05-03-008	The audit registers shall maintain counts and value of the following events as applicable: (1) New fare media issued; (2) Fare product sold; (3) Stored value loaded; (4) Account inquiries; (5) Cash transaction by amount and denomination; (6) Credit Card transactions by amount; (7) Debit Card transactions by amount; (8) Count of approved and denied transactions; (9) Count of read failures; and (10) Count of media sent to card reject bin. Final audit register events shall be determined during Design Review.	SDD-13
FEQ-10-05-03-009	Audit register records shall be transmitted to the back-office at the end of service day for reconciliation or based on a configurable period of time.	SDD-13
FEQ-10-05-03-010	FVMs shall provide real-time status of device events and alarms through the SMMA. The FVM shall maintain local event and alarm logs in the event that communications to the back-office are unavailable.	SDD-13
FEQ-10-05-03-011	Events shall be considered alarm conditions of varying severity. The assigned priority of all alarms shall be configurable by SEPTA.	SDD-13
FEQ-10-05-03-012	For each alarm event, a corresponding event to clear the alarm shall be transmitted by the FVM as soon as the alarm condition is no longer present. Alarm conditions may be cleared either automatically by the FVM or manually by service staff.	SDD-13
FEQ-10-05-03-013	The FVM shall have the capacity to locally store a minimum of [one (1) year] of event and alarm data.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-03-014	In addition to transmitting real-time events and alarms, the FVM shall transmit periodic “heartbeat” messages that confirm communication with back-office and basic status. The “heartbeat” frequency shall be adjustable by FVM.	SDD-13
FEQ-10-05-03-015	The FVM shall generate, store, and transmit alert information for relevant events, including but not limited to: (1) Power on; (2) Power off; (3) Reboot; (4) Back-office communications failed/restored; (5) Maintenance parameter changed; (6) New fare table received/activated; (7) New software received/activated; (8) New configuration data received/activated; (9) New list received/activated; (10) Anti-virus definitions and security updates downloaded; (11) Internal clock reset; (12) FVM clock error; (13) Data memory near full/full; (14) Low battery; (15) Failed bank card authorization request; (16) Defective media captured in reject bin; (17) Maintenance technician log in and logout; (18) Maintenance parameter changed; (19) Revenue service technician log in and logout; (20) Bill vault removed/installed; (21) Coin vault removed/installed; and (22) FVM “heartbeat” check. Final events and alerts shall be determined during Design Review.	SDD-13
FEQ-10-05-03-016	The Contractor shall supply software so that SEPTA may modify FVM ticket print format and content, and create new ticket types and designs. Printing format, including information to be printed, print location, orientation, size and font, shall be configurable from the back-office system.	SDD-13
FEQ-10-05-03-017	The Contractor shall provide the software utilities for adding, changing, and deleting text on FVM tickets, passenger display messages, and accounting/registration printouts where products and transaction types are listed. The Contractor shall demonstrate these software utilities during the Factory Acceptance Tests (FAT).	SDD-13

10.5.4 FVM Operations

Req #	Requirement	Assigned CDRL
FEQ-10-05-04-001	The FVM Ticket Printer shall include a SEPTA-adjustable sensor to detect when each ticket roll is at [10% to 25%] of capacity. When this sensor is activated, the ECU shall record it as an event and transmit an alert to the back-office system.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-04-002	When a ticket roll is depleted, the ECU shall record a corresponding event and transmit a ticket stock empty event to the back-office system.	SDD-13
FEQ-10-05-04-003	Ticket selections that are unavailable from the FVM (due to stock depletion or other malfunction) shall be omitted from the menu of selections available shown on the customer display.	SDD-13
FEQ-10-05-04-004	The Contactless Card Reader shall be active (in “read mode”) while the FVM is in the idle state (to allow initiation of the interface via a contactless read), and during those portions of transactions where reading a contactless card is necessary.	SDD-13
FEQ-10-05-04-005	The FVM shall generate, store, and transmit to the back-office an event record for all barcodes scanned by the reader, including where possible read errors.	SDD-13
FEQ-10-05-04-006	Content displayed on the VMD shall be downloaded from the back-office and shall include industry-standard files containing static images, animations, and full-motion video.	SDD-13
FEQ-10-05-04-007	Once downloaded to the FVM, the FVM shall control the sequence, timing, and frequency of the content displayed on the VMD independent of communications with the back-office.	SDD-13
FEQ-10-05-04-008	The BRU shall provide SEPTA the ability to securely load and replenish the recirculating modules with a supply of bills for change.	SDD-13
FEQ-10-05-04-009	The BRU shall provide SEPTA the ability to securely transfer the contents of the recirculating modules to the bill vault.	SDD-13
FEQ-10-05-04-010	When the bill escrow is full, or a SEPTA-configurable limit of inserted bills per transaction is reached, the BRU shall cease accepting bills, and the FVM shall display a configurable warning message on the customer screen.	SDD-13
FEQ-10-05-04-011	The FVM emergency signal interface shall be tied to local station controllers, fire alarm control panels, or remote-control systems to initiate emergency mode. The FVMs shall remain in emergency mode until the emergency signal is closed or deactivated.	SDD-13
FEQ-10-05-04-012	The emergency control signals shall supersede any other control signals, including those from the SMMA. For example, if the emergency signal initiates emergency mode and an “enter revenue service” signal is sent from the SMMA, the FVM shall remain in emergency mode.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-04-013	If an ECU requires replacement, the removable flash drive shall be removed from the inoperative ECU and inserted into the replacement module. Upon restarting, the new ECU shall retrieve data from the flash drive and configure itself with the contents from the flash drive. Thereafter, the FVM shall resume operations without requiring configuration, resetting of registers, exchanging of money containers, or any other such actions.	SDD-13
FEQ-10-05-04-014	When an authorized technician presents an employee ID card to the FVM CCR, the FVM shall prompt the user to enter a PIN on the customer display touchscreen interface. Upon entry of a valid PIN associated with the employee ID, the FVM shall enable the outer door electronic lock and authorize entry with permissions associated with the employee ID.	SDD-13
FEQ-10-05-04-015	Authorized access to the interior of the FVM for maintenance and servicing shall disable the alarm while service is being performed.	SDD-13
FEQ-10-05-04-016	If the FVM outer door is opened or FVM outer door lock is unlocked without proper FVM access authorization, the FVM shall activate the intrusion alarm and video camera. The FVM shall record and transmit an intrusion event and commence video recording and storage. The intrusion alarm condition shall remain in effect until manually cleared by an authorized user via the maintenance user interface, or remotely by an authorized back-office user.	SDD-13
FEQ-10-05-04-017	Upon pressing the Silent Alarm button, the FVM shall transmit a silent alarm event to the back-office and commence video recording and storage. The silent alarm condition shall remain active until manually cleared by an authorized user via the maintenance user interface, or remotely by an authorized back-office user.	SDD-13
FEQ-10-05-04-018	The FVM shall detect when the bill vault is near-full and full, and record and transmit an event record. The determination of a nearly empty condition shall be adjustable by SEPTA for each FVM.	SDD-13
FEQ-10-05-04-019	The BRU shall cease to accept bills and the FVM shall indicate a “no bills accepted” message on the customer display when the bill vault becomes full.	SDD-13
FEQ-10-05-04-020	The BRU shall automatically reset all appropriate counters when the bill vault is removed and/or replaced.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-04-021	The CHU shall not accept coins once the coin vault has reached [90%] capacity or configurable amount.	SDD-13
FEQ-10-05-04-022	The SRD shall monitor the contents of the card stock and transmit an event to the back-office when the inventory is below a configurable threshold, and when the inventory is empty.	SDD-13
FEQ-10-05-04-023	Whenever an alarm siren or condition is active, the FVM shall go out of service. When the alarm condition ends, the FVM shall perform self-diagnostics, and resume normal operations.	SDD-13
FEQ-10-05-04-024	The FVM shall activate the VAS when the customer selects the Voice button or when the customer inserts a headphone plug into the headphone jack. The VAS shall provide context-sensitive voice messages, in audio form, conveying information shown on the customer display to meet all ADA requirements.	SDD-13
FEQ-10-05-04-025	Each voice annunciation message shall occur as close as possible to the event or change in transaction status as possible and be as brief as possible to convey the necessary information.	SDD-13
FEQ-10-05-04-026	The voice annunciation shall support multiple languages in concert with the multi-lingual capabilities. Required languages shall be finalized during Design Review.	SDD-13
FEQ-10-05-04-027	The VAS shall utilize Text To Speech (TTS) technology, which shall enable SEPTA to create and modify VAS audio content without the use of recorded human voice talent.	SDD-13
FEQ-10-05-04-028	The volume of the VAS shall be user controllable, per ADA regulations. The FVM may integrate activation, volume control, and deactivation of the VAS into a single physical button or use [two (2) physical buttons].	SDD-13
FEQ-10-05-04-029	If the FVM employs a single physical button for the VAS, the button shall function as follows: (1) First use activates the VAS at maximum volume (as individually configured for each FVM); (2) Second through fourth uses incrementally decrease the volume; and (3) Fifth use deactivates the VAS.	SDD-13
FEQ-10-05-04-030	If the FVM employs [two (2) physical buttons] for the VAS, [one (1) button] shall activate the VAS (at maximum volume) on first use and deactivate the VAS on the second use. The second button shall cycle the VAS volume from maximum to minimum and then back to maximum in [four (4) increments].	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-04-031	The FVM shall include a selection button or [one (1) or more touchscreen selection regions] to change the display and the VAS language between English and up to [five (5) other available languages].	SDD-13
FEQ-10-05-04-032	SEPTA shall provide text translations to the Contractor for use in the VAS. All TTS output shall be subject to SEPTA review and approval during the Factory Acceptance Tests (FAT).	SDD-13
FEQ-10-05-04-033	English shall be the default language while the FVM is in idle mode and the FVM shall return to English after a transaction is completed or canceled.	SDD-13
FEQ-10-05-04-034	The alternate language button or touchscreen selection regions shall be active at all times and available on all screens while the FVM is in service. Selecting an alternate language at any time shall cause the display and audio messages to switch the selected language.	SDD-13
FEQ-10-05-04-035	SEPTA shall identify the alternate languages during Design Review.	SDD-13
FEQ-10-05-04-036	The FVM shall provide the following core functions to support customer operations: (1) Sell [one (1) or more new cards] in a single transaction where the associated transit accounts are initialized only (no value) or are loaded with value; (2) Load stored value and all available fare products to previously issued cards (e.g., transit accounts); (3) Query the back-office to retrieve the balance and transaction history for existing transit accounts; and (4) Query the back-office to retrieve the number of remaining trips and transaction history for trip-based limited use media (e.g., barcode tickets).	SDD-13
FEQ-10-05-04-037	The FVM user interface and selection screens shall enable English-speaking customers to purchase a new card (with stored value or a pass) or ticket, or load value to an existing account, in a maximum of [three (3) screens].	SDD-13
FEQ-10-05-04-038	For new card purchase transactions, the SRD shall read and/or encode cards as necessary to capture account numbers and initialize the media. The FVM shall send the card data to the back-office, along with all relevant fare purchase and payment information, to create and load the associated transit accounts, and generate sales transactions.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-04-039	For card reload transactions, the CCR shall read (and, if necessary, for risk mitigation, encode data to) the customer's card. The FVM shall send the card data to the back-office, along with all relevant fare purchase and payment information, to load the associated account, and generate a sales transaction.	SDD-13
FEQ-10-05-04-040	For balance check transactions, the CCR shall read the customer's card. The FVM shall send the card data to the back-office to retrieve the associated balance and transaction history information.	SDD-13
FEQ-10-05-04-041	For all transactions, the FVM shall individually record, store, and transmit associated data to the back-office using the Contractor-provided APIs.	SDD-13
FEQ-10-05-04-042	For all transactions, the FVM shall initiate communication with the back-office to query or modify transit accounts associated with the fare media in real-time. If communications with the back-office are unavailable, the FVM shall enter a limited or "degraded" mode. Degraded functionality shall be defined during Design Review.	SDD-13
FEQ-10-05-04-043	For full-service FVMs, in offline mode, the FVM shall be able to take cash payments to sell single rides or other limited fare products, in order to provide a means for customers to enter gated rail stations. The details of which products shall be sold in offline mode, and the risk mitigations strategies to be employed (such as writing to the media), shall be determined during Design Review.	SDD-13
FEQ-10-05-04-044	For full-service FVMs, if the FVM loses communications with the back-office, upon restoration, the FVM shall automatically initiate communications and send any data generated in offline mode.	SDD-13
FEQ-10-05-04-045	The FVM customer display shall indicate degraded operating conditions on all transaction screens requiring customer input. Because multiple degraded operating conditions can occur simultaneously, the FVM shall be able to simultaneously display at least [three (3) degraded conditions] on the customer display.	SDD-13
FEQ-10-05-04-046	FVM degraded operating conditions conveyed on the customer display shall include at minimum: (1) No Bills Accepted; (2) No Coins Accepted; (3) Cash Sales Only; (4) Credit/Debit Sales Only; (5) Exact Fare Only; (6) No Tickets Available; (7) No Smart Cards Available; (8) No Receipts Available; (9) No Account Balance or Reloads; (10) Paper Ticket Sales Only; and (11) No Barcodes Accepted.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-04-047	The text shown on the customer display for FVM degraded operating mode conditions shall be SEPTA-configurable via the back-office.	SDD-13
FEQ-10-05-04-048	In general, when dispensing change, the Full-Service FVM shall prioritize use of change source in the following order: (1) Recirculating bill containers; (2) Recirculating coin containers; and (3) Supplemental coin hoppers.	SDD-13
FEQ-10-05-04-049	In addition, the FVM change algorithm shall balance customer convenience and operational efficiency: (1) When dispensing bills, the FVM shall return change in the fewest number of bills, except when a lower denomination recirculating bill container is nearing capacity. For example, if the \$1 bill container is past a configurable near-full threshold, for a transaction requiring \$5 in change, the FVM shall dispense [five (5) \$1 bills] in lieu of [one (1) \$5 bill]. By doing so, the BRU shall deposit fewer bills in the vault, reducing the need to service the bill vault while still providing customer convenience; and (2) When dispensing coins, the FVM shall return change in the fewest number of coins, using coins from the recirculating containers when available in favor of coins in the supplemental coin hopper. For example, for a transaction requiring [\$0.75 change], the FVM shall dispense quarters from the recirculating coin container first, and if necessary, from the quarter hopper.	SDD-13
FEQ-10-05-04-050	The FVM shall support several parameters to configure change operations and the conditions governing “Exact Fare Only” mode operations. These parameters shall at minimum include: (1) Maximum change payout value (generally determined by assuming a passenger pays for the smallest possible transaction with the largest accepted bill denomination); (2) Maximum coin payout value (generally determined by assuming a passenger pays for a transaction priced with the smallest fractional dollar value, such as \$2.25, with a bill); (3) Maximum number of dispensed coins and bills for change, by denomination (to limit change payouts using large numbers of small denominations); and (4) Maximum overpayment value.	SDD-13
FEQ-10-05-04-051	Using these parameters, at the conclusion of each cash transaction, the FVM shall calculate whether it has sufficient change to issue the maximum change payout value as constrained by the parameters defining the maximum number of each denomination dispensed. If the FVM determines that it cannot dispense the maximum change, the FVM shall enter “Exact Fare Only” mode, showing that status on the passenger display and sending a corresponding event message to the back-office system.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-04-052	Similarly, at the conclusion of each cash transaction, the FVM shall calculate whether it has sufficient coins on hand to dispense change that would include the maximum value of coins to dispense. If the FVM determines it cannot dispense the maximum coin value, the FVM shall enter "Exact Fare Only" mode.	SDD-13
FEQ-10-05-04-053	While in Exact Fare Only mode, the FVM shall continue to dispense change if possible while adhering to the payout parameters.	SDD-13
FEQ-10-05-04-054	While in Exact Fare Only mode, if a cash transaction results in additional coins or bills that enable the FVM to satisfy the change payout requirements, the FVM shall resume normal operations.	SDD-13
FEQ-10-05-04-055	If a customer pays in cash while the FVM is in Exact Fare Only mode and the FVM cannot issue the required change, the FVM shall compare the overpaid amount to the maximum overpayment parameter.	SDD-13
FEQ-10-05-04-056	Based on the comparison of the overpaid amount and the maximum overpayment parameter, the FVM shall function as follows: (1) If the overpaid amount equals or exceeds the maximum overpayment parameter, the FVM shall cancel the transaction and return the inserted cash; (2) If the overpaid amount is less than the maximum overpayment parameter, the FVM shall prompt the customer whether to continue the transaction without change; (3A) If the customer opts to continue, the FVM shall complete the transaction and issue a coupon indicating the overpaid amount. The coupon shall include a secure (encrypted) barcode with the value of the coupon and a unique identifier; and (3B) If the customer declines to continue, the FVM shall cancel the transaction and return inserted cash.	SDD-13
FEQ-10-05-04-057	When payment is required, the FVM shall automatically detect what form of payment the customer has inserted. Customers shall not have to choose whether the transaction shall be by cash or bank card.	SDD-13
FEQ-10-05-04-058	When paying by cash, the FVM shall permit the customer to deposit coins and bills in any sequence.	SDD-13
FEQ-10-05-04-059	The operating status, configuration, and active fare table for each FVM shall determine the available options. Only options that are enabled shall be shown to the customer.	SDD-13
FEQ-10-05-04-060	Prior to authorizing a bank card transaction, the FVM shall prompt the customer to choose whether the purchase is a credit or debit transaction. For debit transactions, the FVM shall prompt for PIN entry.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-04-061	The FVM shall 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 SEPTA and accommodates acceptance of both U.S. and non-U.S. issued cards. When a U.S. bank card is used for payment, the FVM shall prompt the customer to enter the billing address ZIP code.	SDD-13
FEQ-10-05-04-062	All bank card transactions shall be authorized prior to dispensing media or loading fare products. If a bank card is declined for any reason the FVM shall display related information to the customer and cancel the current transaction.	SDD-13
FEQ-10-05-04-063	For full-service FVMs, if bank communications are unavailable, bank card transactions shall be disabled, and the FVM shall enter “cash only” mode.	SDD-13
FEQ-10-05-04-064	The customer shall have the ability to cancel a transaction at any point before full payment has been inserted in cash or a bank card authorization has been received.	SDD-13
FEQ-10-05-04-065	If any failure occurs during a transaction, the FVM shall automatically cancel the current transaction and indicate the cancellation on the screen.	SDD-13
FEQ-10-05-04-066	If a transaction is canceled automatically or by the customer, all inserted cash shall be returned, and credit/debit card transactions shall be reversed, as necessary.	SDD-13
FEQ-10-05-04-067	The FVM shall be configurable to provide receipts: (1) Upon customer request; (2) Automatically for transactions above a configurable dollar value, or optionally for transactions below the configurable value; (3) For every transaction; and (4) Never (when receipt stock is empty).	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-04-068	All receipts shall have a printed indication that the receipt is not a valid ticket, and shall contain at least the following information: (1) Machine Number – up to [eight (8) alphanumeric characters]; (2) Date – month, day and the last [two (2) digits] of the year, totaling [nine (9) characters]; (3) Time – [four (4) digits] separated by a colon and followed by [two (2) letters] “AM” or “PM,” using a [12-hour clock]; (4) Station name or location where purchased – up to [16 characters]; (5) Payment Type (i.e., cash or payment card and last four digits of payment card number, if applicable); (6) Last [four (4) digits] of the SEPTA media linked to the account affected by the transaction (if applicable); (7) Itemized product description(s) and dollar amount; (8) Transaction amount; (9) Transaction ID number; (10) Phone number field; and (11) Branding logo, if desired by SEPTA. Final receipt information shall be determined during Design Review.	SDD-13
FEQ-10-05-04-069	Receipts for bank card transactions shall include information as identified in Federal Regulations E and Z, and other information necessary to comply with banking and Federal regulations.	SDD-13
FEQ-10-05-04-070	For all transactions, the FVM shall display a progression of screens to the customer that shall be easy to understand and intuitive.	SDD-13
FEQ-10-05-04-071	The FVM shall employ an adjustable time-out period to return the FVM to the idle state if no input is received between transaction steps. The time-out period shall be configurable by SEPTA.	SDD-13
FEQ-10-05-04-072	A screen saver or marketing information may be activated after a programmable idle period has passed, and shall support the following at a minimum: (1) Static image in any common graphics format, e.g., JPG, TIFF, BMP, GIF; (2) A repeating “slide show” of static images; (3) Text messages and imported text-based files; (4) Webpages and other dynamic markup language files; and (5) Pre-recorded video in any common format, including MPEG, WMV, MOV, and AVI. Any combination of the above.	SDD-13
FEQ-10-05-04-073	The screen saver shall automatically terminate and the FVM shall display the home screen as soon as any button is pressed, or a card is presented to the contactless reader.	SDD-13
FEQ-10-05-04-074	For all new card purchase transactions, the time from acceptance of the cash payment or credit/debit card approval to media issuance shall not exceed [five (5) seconds].	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-04-075	Where transactions produce multiple media, the time between successive media being deposited in the return tray shall not exceed [three (3) seconds] each.	SDD-13
FEQ-10-05-04-076	When applicable, the receipt printer shall deposit receipts in the return tray within [three (3) seconds] of the completion of a transaction.	SDD-13
FEQ-10-05-04-077	For any completed or canceled transaction that results in media, receipts, or coins being deposited into the return tray, the FVM shall illuminate the tray starting when the first item is deposited in the tray and for a SEPTA-configurable number of seconds (default 5) after the last item is deposited in the tray.	SDD-13
FEQ-10-05-04-078	For completed or canceled transactions, the FVM readiness to begin another transaction shall not exceed [three (3) seconds].	SDD-13
FEQ-10-05-04-079	All information presented by the FVM shall be capable of being modified by authorized SEPTA staff. Modifications shall be able to be made remotely or by removable storage media.	SDD-13
FEQ-10-05-04-080	A detailed customer operations document, including screen flows depicting “snapshots” of each screen layout arranged as a logical flow chart shall be provided during Design Review for SEPTA review and approval.	SDD-13
FEQ-10-05-04-081	Each FVM shall be ready to respond to customer input when in the idle condition. Input may be a button press or touching fare media to the contactless reader.	SDD-13
FEQ-10-05-04-082	The FVM “home” or starting screen, shall include the following options at a minimum: (1) Purchase a new card or cards; (2) Reload an existing card; (3) Check card balance; and (4) “Express” purchase of a card with [one (1) ride] (configurable). Screen flows and functions shall be finalized during Design Review.	SDD-13
FEQ-10-05-04-083	The FVM shall have clear instructions to indicate the steps a customer must follow to perform any transaction. The sequence of steps shall be clearly indicated by the use of graphics and text. Wherever possible, universal graphics and symbols shall be used that can be understood without having to read the displayed text.	SDD-13
FEQ-10-05-04-084	The FVM shall emit distinctive audio tones to provide feedback each time a button is pressed.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-04-085	A detailed service operations document including service procedures and screen flows shall be provided during Design Review for SEPTA review and approval.	SDD-13
FEQ-10-05-04-086	To support revenue servicing and maintenance authorized technicians, the FVM shall produce audit tickets, including but not limited to: (1) Coin vault removal/insertion; (2) Bill vault removal/insertion; (3) Software versions and FVM configuration; (4) FVM revenue status; and (5) FVM maintenance alert status. Final audit ticket information shall be determined during Design Review.	SDD-13
FEQ-10-05-04-087	Each audit ticket shall indicate at a minimum: (1) Date; (2) Time; (3) FVM number; (4) Technician name or number; and (5) Activity information.	SDD-13
FEQ-10-05-04-088	Each FVM shall automatically perform self-diagnostic tests upon startup, and at adjustable regular intervals (once per day by default). Self-diagnostic tests shall at a minimum: (1) Confirm communications with back-office; (2) Check the status of all major electronic modules; (3) Exercise all electro-mechanical devices; and (4) Confirm all software and configuration files are up to date. Any failures or exceptions identified during self-diagnostics shall be recorded in the FVM's internal audit registers and transmitted to the back-office.	SDD-13
FEQ-10-05-04-089	Each FVM ECU shall synchronize its internal clock with a master network clock at least once per day and each time the ECU initializes.	SDD-13
FEQ-10-05-04-090	Each FVM shall be capable of performing test diagnostic tests that are manually initiated by service staff while the FVM is out of service and the front door is open.	SDD-13
FEQ-10-05-04-091	Inside the FVM shall be a keypad, and keyboard if needed, and optional display for use by maintenance and revenue service personnel while the outer door is open. The customer display may be used for maintenance purposes if viewable while using the service keypad.	SDD-13
FEQ-10-05-04-092	The service keypad shall be used to enter access (login) codes and maintenance and diagnostic commands. All routine service interaction with the FVM shall be via this keypad.	SDD-13
FEQ-10-05-04-093	The service display shall be used to indicate FVM error codes and shall have the capability of displaying multiple error codes, such that one error code shall not need to be cleared to display other error codes.	SDD-13

Req #	Requirement	Assigned CDRL
FEQ-10-05-04-094	As an alternative to the interior service keypad and display, the Contractor may provide tablets (quantity to be determined at Design Review) that communicate wirelessly with the FVM to support maintenance activities. In this alternative scenario, revenue servicing (e.g., exchanging vaults) shall not require the use of a wireless tablet.	SDD-13
FEQ-10-05-04-095	The FVM shall not commence in-service operation until the outer door is closed and the outer door lock is returned to its fully secured position.	SDD-13
FEQ-10-05-04-096	All-access shall be traceable through the SMMA, and all access transactions shall be individually recorded and transmitted to the SMMA at the time of occurrence.	SDD-13
FEQ-10-05-04-097	If the FVM shuts down due to loss of power, upon restoration of power the FVM shall automatically resume operations within no more than [two (2) minutes].	SDD-13
FEQ-10-05-04-098	The FVM shall support users of a SEPTA mobile application to reload their accounts at the FVM using cash. To do so, the FVM shall activate the barcode reader to read a UPC barcode displayed on the customer's mobile device. The barcode shall contain the customer's account ID. After verifying with the back-office that the account ID is valid, the FVM shall continue with the account reload transaction in the same manner as if the customer used a contactless smart card as the account credential.	SDD-13
FEQ-10-05-04-099	The FVM shall accept for payment barcoded coupons issued by FVMs when a customer overpays, or when the FVM is unable to dispense change. To accept a coupon, the FVM shall be online with the back-office. When a customer presents a barcode coupon for payment, the FVM shall verify with the back-office that the coupon is valid. If the coupon is valid, the FVM shall redeem the entire value of the coupon and credit its value to the transaction in progress. If additional funds are required, the FVM shall prompt the user to continue payment. If the coupon exceeds the value of the transaction, the FVM shall dispense change or issue another coupon in the value of the excess payment. At completion of the transaction, the FVM shall inform the back-office, and the back-office shall record the coupon's redemption and cancel the coupon.	SDD-13

10.6 Customer Service Terminal (CST)

The Customer Service Terminals (CST) are intended for in-person retail sales, issuance of photo ID Key Cards for specific groups and remote bulk order fulfillment. The retail sales terminals shall accommodate different configurations to support the various retail implementations for SEPTA. Different configurations shall leverage the same core software that limits functionality and associated peripherals based on the intended use. These configurations include:

- Full-service CST – Intended for SEPTA Ticketing Sales offices or card issuance office
- Streamlined CST – Intended for sales at stations and shall include limited functionality
- Order fulfillment – intended to fulfill orders (e.g., bulk orders for media and/or products)
- Portable CST – intended to be a mobile CST for pop-up sales, card personalization at community outreach events, etc.

The associated CST equipment shall vary based on the different configurations as described in the following requirements and includes:

- Integrated touchscreen and computer enclosure
- Keyboard and mouse
- Touchscreen laptop computer or tablet
- Contactless smartcard reader
- 2D Barcode scanner to read barcoded fare media
- Cash drawer
- Bank card processing module
- Customer information display
- Receipt printer
- DSM/LU smart card printer/encoder
- Printer for packing/mailling slip (specific for bulk/order fulfillment)
- Cellular broadband data modem (specific to Portable CST Terminal)
- Digital camera and stand
- EU smartcard printer/encoder
- Uninterruptible power supply
- Other communications interfaces as necessary.
- Mobile cabinet for the portable CST

10.6.1 CST General Requirements

Req #	Requirement	Assigned CDRL
FEQ-10-06-01-001	The Contractor shall provide CSTs that are modular and used to support in-person customer service and sales transactions and remote order fulfillment. The CST shall support multiple configurations, depending on the peripheral modules included, and shall be optimized for its intended use and configuration. Potential CST Peripherals include: (1) Integrated touchscreen and computer enclosure; (2) Keyboard and mouse; (3) Contactless smartcard reader; (4) 2D Barcode scanner to read barcoded fare media; (5) Cash drawer; (6) Bank card processing module; (7) Customer information display; (8) Receipt printer; (9) DSM/LU smart card printer/encoder; (10) printer for packing/mailling slip; (11) Cellular broadband data modem (specific to Portable CST Terminal); (12) Touchscreen laptop computer or tablet (specific to Portable CST Terminal); (13) Digital camera and stand; (14) EU smartcard printer/encoder; (15) Uninterruptible power supply; and (16) Other communications interfaces as necessary.	SDD-14
FEQ-10-06-01-002	The Contractor-provided CSTs shall permit the rapid exchange of the device and peripheral modules to restore service in minimal time. Repairs shall be performed in the field and not require special tools or instruments.	SDD-14
FEQ-10-06-01-003	The Contractor shall design, deliver, and install CSTs in multiple configurations that use the same Contractor-supplied application and OEM software. The different configurations shall include the addition or removal of the peripheral equipment, as well as access to specific features and functions as determined during design review. Such configurations may include: (1) Full-service CST installed in a SEPTA ticket sales office or card issuance office; (2) Streamlined CST with fewer peripherals (e.g., does not include camera or card personalization printer) installed at rail stations; (3) CST dedicated to fulfilling bulk orders at a remote site; and (4) Portable CST. All CST configurations and associated peripherals shall be determined during Design Review.	SDD-14
FEQ-10-06-01-004	The Contractor shall deliver and install full-service CST intended for SEPTA ticketing sales offices to support walk-up customer transactions, and the card issuance office where personalized fares are issued. Ticketing offices sell all products to new and existing transit accounts and issues various forms of physical fare media including EU smartcard fare media, LU smartcard fare media, and on-demand limited use barcoded (e.g., QR code) media. Card issuance office is used to determine eligibility for reduced fare or discount fare programs and issue personalized or specialized fare media.	SDD-14

Req #	Requirement	Assigned CDRL
FEQ-10-06-01-005	The Contractor shall deliver and install streamlined CST intended for sales at stations that provides limited functionality for walk-up customer transactions. The streamlined CST configuration shall include all peripherals needed to sell and replace fare media and perform product sales limited to specific products or passes. Sales at stations may be conducted by a third-party retailer (e.g., non-SEPTA employees).	SDD-14
FEQ-10-06-01-006	The CST configuration intended for bulk sales fulfillment shall provide functionality that supports remote customer transactions such as orders placed through the mail, customer interfaces (e.g., websites, mobile app), and customer service interfaces (e.g., CRM, CST). The order fulfillment CST shall include all peripherals needed to fulfill bulk sales including pre-paid and invoiced sales, and the generation of a packing/mailing slip for shipment.	SDD-14
FEQ-10-06-01-007	To accommodate the required variety of installation locations, the CST (excluding peripherals) shall be compact and easily positioned for user comfort. This may include being behind a glass dividing wall separating the customer and the sales agent.	SDD-14
FEQ-10-06-01-008	The Portable CST configuration shall support remote sales and card personalization programs. The device shall include cellular broadband data modem for the Portable CST and other communications interfaces as necessary. The portable CST shall be able to fit into a mobile cabinet provided by the Contractor for easy transport.	SDD-14

Req #	Requirement	Assigned CDRL
FEQ-10-06-01-009	<p>The CST shall conduct a variety of transactions. These transactions may vary based on the intent of the CST (e.g., full-service, streamlined, order fulfillment, card issuance) and the role of the user who is signed in. At a minimum, these transactions shall include: (1) Sell all supported fare media (and create new transit accounts); (2) Sell all supported fare products (e.g., stored value and passes) and load fare products to transit accounts; (3) Query transit account status (e.g., associated rider classification, active/inactive, blocked/unblocked); (4) Query fare payment transaction history; (5) Query sales transaction history; (6) Query adjustment transaction history; (7) Enable fare product for autoload (requires funding source in customer account); (8) Generation of fare payment reversal (e.g., cancellation); (9) Generation of sales reversal (e.g., refund); (10) Generation of an account adjustment (e.g., credit or debit); (11) Transfer of balance between two accounts; (12) Block/unblock card, account, or individual fare product; (13) Lost, stolen, or damaged card replacement (e.g., associate new card with an existing account); (14) Generation of an opt-out refund (e.g., close transit account and issue refund); (15) Create new individual customer account; (16) Create new institutional customer account; (17) Query customer account status/data; (18) Modify customer account data; (19) Register (e.g., link) a transit account to an individual or institutional customer account; (20) Unregister (e.g., unlink) a transit account from an individual or institutional customer account; (21) Add a funding source to an individual or institutional customer account; (22) Close an individual or institutional customer account; and (23) Encoding, printing, and issuance of personalized EU and LU fare media (when configured to do so), including the addition of a photo for EU personalized media. The CST shall also support the ability to pay for and manage parking permits and passes at SEPTA-managed parking facilities. A full list of transactions shall be determined during Design Review for SEPTA approval at no additional cost to SEPTA.</p>	SDD-14
FEQ-10-06-01-010	<p>All communications between the back-office and the CSTs shall be via a secure connection to the back-office. All data shall be encrypted during transmission between the CST and back-office. The CSTs shall be configured to communicate with the back-office via a Gigabit Ethernet connection, Wi-Fi, and cellular data. The Contractor shall configure each CST as necessary based on the best available communication at each sales location. The Contractor shall adhere to all SEPTA network policies and configurations.</p>	SDD-14

Req #	Requirement	Assigned CDRL
FEQ-10-06-01-011	The CST shall communicate with the back-office via a secure Internet connection to send and receive transaction information, event and status information, clock synchronization information, positive/negative lists, and configuration parameters. This shall be possible both automatically at scheduled times and manually by authorized users.	SDD-14
FEQ-10-06-01-012	For all transactions requiring back-office access to a transit account, or establishing a new account, the CST shall communicate with the back-office in real-time using the Contractor-provided APIs. If the CST is unable to communicate with the back-office, all transactions or functions requiring back-office communication shall be disabled and visually identifiable as being unavailable.	SDD-14
FEQ-10-06-01-013	CST communication with the back-office shall be able to be initiated manually at any time without affecting the automated procedures. If the CST has missed a scheduled communication with the back-office, upon restoration of communications, the CST shall automatically initiate communications.	SDD-14
FEQ-10-06-01-014	SEPTA prefers that the CST to be delivered as a web-based application, where the required peripheral modules could also be attached to existing, SEPTA-provided PCs.	SDD-14

10.6.2 CST Hardware

Req #	Requirement	Assigned CDRL
FEQ-10-06-02-001	The Contractor shall provide an integrated flat panel touchscreen display with full HD [1920 × 1080] resolution that provides suitable touch sensitivity and resolution to satisfy agent selection and input requirements. The screen size shall be at least [17 inches], however larger sized screens may present operational and space challenges at some retail store counters.	SDD-14
FEQ-10-06-02-002	The Contractor shall provide a touchscreen laptop computer or tablet that includes cellular broadband data modem for communications for the portable CST. As part of the portable CST, the Contractor shall also include a mobile cabinet that is designed for easy transport of the portable CST.	SDD-14

Req #	Requirement	Assigned CDRL
FEQ-10-06-02-003	The Contractor shall provide a separate full-sized keyboard and a mouse with a scrolling wheel for the full-service CST. If the Contractor provides a wireless keyboard and/or mouse, the devices shall include an integrated battery such that they may be recharged by connecting it to the PC or integrated touchscreen display.	SDD-14
FEQ-10-06-02-004	The CST shall support the ability to interface with [two (2) contactless smartcard readers] and [two (2) bank card processing modules] (as needed), [one (1) each] for the customer and the sales agent for sales locations divided by a glass wall. The Contractor shall install and provide all devices as needed to accommodate the layout of the sales offices and locations.	SDD-14
FEQ-10-06-02-005	The barcode reader provided by the Contractor shall be optimized to read QR codes from mobile screens, and where necessary through a glass divider.	SDD-14
FEQ-10-06-02-006	The Contractor-provided cash drawer shall open only under command of the CST, which shall monitor the status of the drawer at all times. When the cash drawer opens or closes, an alarm or bell shall sound indicating when the drawer has released and is open, and when the drawer has been closed and is locked.	SDD-14
FEQ-10-06-02-007	The cash drawer shall include a removable till with space for [five (5) bill denominations] and [five (5) coin denominations], and shall accommodate installation under a counter, be pry-resistant, and be made of high-quality, heavy-gauge steel. Each cash drawer shall include a secure physical key/lock cylinder override for managers or supervisors.	SDD-14
FEQ-10-06-02-008	The CST shall 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. CSTs shall be capable of re-certification with newer versions of the PCI and EMV standards via software upgrades, as necessary throughout the term of the Contract.	SDD-14
FEQ-10-06-02-009	The bank card processing module shall include: (1) Magnetic stripe reader; (2) Contactless bank card reader; (3) Contact (or chip) bank card reader; and (4) Secure bank PIN pad that is PCI- and ADA-compliant.	SDD-14

Req #	Requirement	Assigned CDRL
FEQ-10-06-02-010	The contactless bank card reader shall read and support all open payment contactless standards, including but not limited to: (1) Visa payWave®; (2) MasterCard® PayPass™; (3) American Express® ExpressPay; (4) Discover® D-PAS; (5) Contactless EMV; (6) Google Pay; (7) Apple Pay; (8) Samsung Pay; and (9) LG Pay.	SDD-14
FEQ-10-06-02-011	The bank card processing module shall 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.	SDD-14
FEQ-10-06-02-012	The PIN keypad shall 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.	SDD-14
FEQ-10-06-02-013	The Contractor shall provide a CST receipt printer that: (1) Prints on a single roll of continuous thermal paper; (2) Provides easy loading of new rolls; and (3) Includes a cutting edge.	SDD-14
FEQ-10-06-02-014	The Contractor shall provide an ADA-compliant customer display that can be installed for optimum visibility for customers to convey transaction price, status, and other pertinent information. The customer display shall use a backlit Liquid Crystal Display (LCD), LED, or other highly visible display technology suitable for the sales office environment, and include no less than [two (2) lines of text], with a minimum of [24 characters per line], with each character no less than [0.5 inches high].	SDD-14
FEQ-10-06-02-015	The Contractor shall provide a digital camera and stand (e.g., tripod) for capturing customer photos. The camera shall be optimized for the specific CST installation and photo-capture location. If necessary, the camera shall include a built-in flash with sufficient megapixels to produce images of suitable resolution, clarity, and contrast to satisfy the requirements of photo ID cards.	SDD-14
FEQ-10-06-02-016	The Contractor shall provide EU smartcard printer/encoder module that: (1) Utilize re-transfer printing technology; (2) Print edge-to-edge (e.g., “full bleed”) in full color; (3) Apply the printed images to a laminate film and then apply the laminate to either side of the card; (4) Provide print resolution no less than [300 dots per inch]; and (5) Includes replaceable ribbons for the transfer printing and lamination films that can be replaced quickly by CST agents.	SDD-14

Req #	Requirement	Assigned CDRL
FEQ-10-06-02-017	The EU smartcard printer/encoder shall be suitable for high-volume card printing and include input and output card hoppers with a capacity of no less than [150 cards] each.	SDD-14
FEQ-10-06-02-018	The EU smartcard printer/encoder shall encode EU smartcards with requisite data (such as an encrypted token) in coordination with the printing process. Upon successful printing and encoding, the EU smartcard printer/encoder shall inform the CST of the successful issuance of each card, and the identification number of each issued card.	SDD-14
FEQ-10-06-02-019	The Contractor shall provide a DSM/LU smartcard printer/encoder that encodes DSM/LU with the pre-populated data and prints the details on the LU media. The LU printer shall also allow the CST to print QR codes on-demand to non-smartcard LU tickets (e.g., QR code QuickTicket sales). The DSM/LU printer shall be suitable for high-volume printing and shall encode printed smartcards with the required data in coordination with the printing process.	SDD-14
FEQ-10-06-02-020	The DSM/LU smartcard printer/encoder shall inform the CST of the successful issuance of each card and include the identification number. For LU smartcard media, the CST shall be notified of the successful issuance of each card after media encoding and printing is successful. Detail printed to fare media shall be determined with SEPTA during design review.	SDD-14
FEQ-10-06-02-021	The Contractor shall provide a dedicated Uninterruptible Power Supply (UPS) with sufficient battery capacity to operate all components of the CST for a minimum of [10 minutes], and perform a controlled shut down without any loss of data whenever the UPS determines that there has been a loss of primary power.	SDD-14
FEQ-10-06-02-022	The UPS shall provide no less than [500 joules] of overvoltage (surge) protection for all connected devices.	SDD-14

10.6.3 CST Software

Req #	Requirement	Assigned CDRL
FEQ-10-06-03-001	The CST shall be API-driven and utilize a standard, current Microsoft Windows® OS. All OEM-supplied OS and application software shall be subject to SEPTA review and approval during the Design Review. SEPTA prefers a COTS POS application for retail sales.	SDD-14
FEQ-10-06-03-002	On each CST, the Contractor shall supply, install, and configure client versions of anti-virus and anti-malware software that meet or exceed the SEPTA IT standards.	SDD-14
FEQ-10-06-03-003	The CST shall use application software that is developed with a high-level language and that supports all functions described herein.	SDD-14
FEQ-10-06-03-004	The CST shall generate and store a data record for all transactions and events, including successful and unsuccessful agent login, logout, and system diagnostics or self-correcting events. Each data record shall incorporate a unique identification number for that CST and day and shall be date/time stamped.	SDD-14
FEQ-10-06-03-005	Each CST customer transaction record shall consist of the following, at a minimum: (1) Date and time; (2) Device ID; (3) Location ID; (4) Agent (e.g., agent) ID; (5) Card/account number; (6) Transaction type (e.g., card sale, value load, account inquiry); (7) Cards sold (where applicable); (8) Stored value or fare products loaded (where applicable); (9) Fare category (e.g., full fare, reduced fare); (10) Transaction value (where applicable); (11) Payment type and amount; (12) Transaction result (e.g., success, failure); and (13) Transaction ID. Transaction records details shall be finalized during Design Review.	SDD-14
FEQ-10-06-03-006	If risk mitigation (e.g., positive/negative) lists are employed, the CST shall receive, and store updated lists from the back-office. If a card presented for replenishment is on a risk mitigation list, the CST shall act accordingly.	SDD-14
FEQ-10-06-03-007	When a user signs on or logs off the CST the following data shall be stored in a data record: (1) Date and time; (2) Device ID; (3) Location ID; (4) Agent ID; and (5) Login attempts.	SDD-14
FEQ-10-06-03-008	Once installed, the CST shall not enter service until it has communicated with the back-office to receive current fare tables, application software, administrative and maintenance logins, positive/negative lists, and other configuration data.	SDD-14

Req #	Requirement	Assigned CDRL
FEQ-10-06-03-009	The CST shall be capable of detecting basic internal malfunctions and shall annunciate failures directly on the agent display and to the SMMA. The malfunction detection shall 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.	SDD-14
FEQ-10-06-03-010	Authorized users shall be able to monitor and manage the CSTs using the SMMA remotely. Remote management functions shall include: (1) Changing configuration parameters; (2) Enabling and disabling payment methods; (3) Downloading data; (4) Extracting transaction and event records; (5) Synchronizing date and time; and (6) Software updates and patching.	SDD-14
FEQ-10-06-03-011	The CST shall store data locally (e.g., log files) representing no less than [30 days] worth of events including changes in status, communication problems, and problems detected during the automatic diagnostic testing. At a minimum, each event record shall include: (1) Date and time; (2) Device ID; (3) Event code; (4) Any associated event data; (5) Identifier of the failed transaction; (6) Reason for failure (unique code); and (7) Additional information to define the nature of the failure.	SDD-14
FEQ-10-06-03-012	Each CST shall contain audit registers that track the following information at a minimum: (1) The total count and value of all transactions completed by the CST since data was last uploaded to the back-office; and (2) The date and time of the last successful data upload to the back-office. These registers shall be modified only by the CST itself and shall not be manually alterable.	SDD-14
FEQ-10-06-03-013	Audit register records shall be transmitted to the back-office at the end of service day for reconciliation, or upon a configurable time-period.	SDD-14
FEQ-10-06-03-014	Each time the CST communicates with the back-office, the back-office shall (1) Transmit any updates to the fare table; the CST shall store any such updates, as necessary. With each update of the fare table, the CST shall confirm that the table has been properly updated; and (2) Transmit any update to the CST application software. The CST shall not commence updating the application software until it has received and verified the complete update. Upon receipt and verification of the software update, the CST shall apply the update (rebooting if necessary) at a time configurable by SEPTA for each CST.	SDD-14

Req #	Requirement	Assigned CDRL
FEQ-10-06-03-015	The CST shall maintain a table of fares which shall include the list of all products to be sold or replenished, their prices, characteristic parameters (such as the validity periods for unlimited ride passes), and other dynamic information such as the text to display on the operating and customer displays and receipts.	SDD-14
FEQ-10-06-03-016	The CST shall retain in non-volatile memory the current and at least [two (2) future fare tables]. Each future fare table shall include all entries to reflect the intended fare structure and the date and time at which the new fare structure is to take effect. Any new fare table shall be activated automatically in the CST at the specified date/time as programmed by SEPTA.	SDD-14
FEQ-10-06-03-017	When required, modification of the CST application software and any OEM application or OS software shall be performed by downloading new software from the back-office. The back-office database shall record and track the version number of all such software in each CST, and the date that the software versions were downloaded and installed.	SDD-14
FEQ-10-06-03-018	Operating parameters shall be downloadable to the CST from the back-office via the wide-area network provided by SEPTA and cellular data networks, as appropriate for each installation or CST configuration.	SDD-14
FEQ-10-06-03-019	The CST shall support configurability through numerous adjustable parameters. The CST application software shall at minimum support configuration for: (1) Value of deposit to be collected for new or replaced fare media; (2) Fare products available for sale and upgrade; (3) Pricing; (4) Payment method selection; (5) Receipt content; (6) All text and touchscreen labels; (7) Authorized users and passwords (if stored locally at the CST); and (8) All other relevant fare table entries.	SDD-14
FEQ-10-06-03-020	Upon issuance and/or initialization of a smartcard, the CST shall 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 CST shall transmit this record to the back-office.	SDD-14
FEQ-10-06-03-021	The MIMS shall track the smartcards distributed to each SEPTA 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 shall 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.	SDD-14

Req #	Requirement	Assigned CDRL
FEQ-10-06-03-022	The CST software design submittals shall include details regarding: (1) CST data registers; (2) CST transaction, event, login, etc. records; (3) CST agent interface and functionality (including screenshots/wireframes); (4) CST configuration parameters and their value range; (5) CST risk mitigation list storage, update, and processing (if applicable); (6) CST transaction limitation procedures; (7) CST setup and administration procedures; (8) CST login types and permitted functions; and (9) CST anti-virus and anti-malware software and procedures.	SDD-14

10.6.4 CST Operations

Req #	Requirement	Assigned CDRL
FEQ-10-06-04-001	The Contractor shall use a POS UX/UI firm with expertise in POS solutions for the software interface to design and develop an intuitive Graphical User Interface (GUI) and experience that reflects a streamlined solution for in-person sales and customer service, and remote order fulfillment. The UX/UI firm shall work with SEPTA during Design Review to develop the user interface.	SDD-14
FEQ-10-06-04-002	The CST shall function as an intelligent cash register, allowing customers and agents to interact in a manner that is as similar as possible to normal retail sales transactions. Sales transactions shall include: (1) Purchase of new fare media; (2) Adding or refunding stored value and passes (including automatically calculated partial refunds) to transit accounts; (3) Discounting, providing goodwill or courtesy adjustments and products; (4) Replacement of fare media associated with existing transit accounts; (5) Sale of non-fare items (e.g., service area maps, lanyards, keychains, etc.); and (6) Parking sales and management.	SDD-14
FEQ-10-06-04-003	The CST shall remain inactive and unable to perform any functions unless a proper login has been completed. If the CST has not been used in a number of minutes configurable by SEPTA, the CST shall automatically log off the user and close the shift. The CST shall close all files and display the login prompt screen.	SDD-14

Req #	Requirement	Assigned CDRL
FEQ-10-06-04-004	The CST shall support at least [five (5) levels of logins] with assigned functionality configurable by SEPTA. Different levels of login shall also include varying thresholds for items like maximum refund amount, or sales amount. Other thresholds based on login level shall be defined during Design Review.	SDD-14
FEQ-10-06-04-005	The CST shall require the agent to enter or confirm the starting cash drawer balance at the start of each shift. At the end of the shift (e.g., shift log off), the CST shall produce and print a detailed transaction report that includes a summarization of the ending balance of the cash drawer. Details regarding the content and layout of the report shall be determined during Design Review.	SDD-14
FEQ-10-06-04-006	The CST shall support relief or break mode where the system allows the main agent to enter a relief or break mode and the new agent logs in with a new cash drawer. The CST shall maintain transaction records and statistics for the relief shift separately and shall not affect the main shift information or generate an end-of-shift report.	SDD-14
FEQ-10-06-04-007	The CST shall enable an agent to display and print (via the receipt printer) the details of all completed transactions for that agent for the current day at any point during or after the shift. The detailed shift report shall include a summarization of all transactions by type, volume and amount to facilitate a detailed end-of-day reconciliation of all sales completed during the shift.	SDD-14
FEQ-10-06-04-008	The CST shall enable an administrative user or manager to display and print/reprint the detailed shift report (via the receipt printer) for any agent and/or CST for the current shift and up to the previous [seven (7)]. The administrative user or manager shall be able to access and print the shift report from any CST for all agents and CSTs.	SDD-14
FEQ-10-06-04-009	The CST shall provide the following real-time reports upon request by authorized users: (1) Transaction summary report; (2) Transaction detail report; (3) Maintenance Report; (4) Supervisor report; (5) Remittance report; and (6) Shift report. Details for each report shall be determined during the Design Review. Reports shall be customizable by user-defined date ranges, locations, and agent(s).	SDD-14
FEQ-10-06-04-010	The CST shall enable the agent to create a new customer account and modify existing customer accounts using the Contractor-provided customer account management API.	SDD-14

Req #	Requirement	Assigned CDRL
FEQ-10-06-04-011	The CST shall allow the agent to link and unlink fare media (transit accounts) to customer accounts.	SDD-14
FEQ-10-06-04-012	The CST shall enable the agent to modify any fields in the existing customer accounts that are deemed user alterable. Un-editable fields shall be locked and displayed differently from editable fields.	SDD-14
FEQ-10-06-04-013	The CST shall enable operators to establish, modify, and cancel customer subscriptions for autoloading, including the addition and modification of funding sources.	SDD-14
FEQ-10-06-04-014	To prevent manual data entry error, the identification number of the customer's card shall be captured by the contactless smartcard reader, and the bank card processor module shall be used to read any bank card data required for autoloading subscription.	SDD-14
FEQ-10-06-04-015	The CST shall support manual entry of customer account registration and/or card personalization data using a simple graphical user interface and shall capture customer photographs using the Contractor-provided camera. Customer photographs shall be editable (e.g., photo crop, zoom, etc.).	SDD-14
FEQ-10-06-04-016	When configured to do so, the CST shall include the necessary software and peripherals to enable SEPTA to issue personalized cards to customers all programs requiring card personalization from the SEPTA fare structure as determined during Design Review.	SDD-14
FEQ-10-06-04-017	SEPTA shall issue customers smartcards to qualified individuals with personalized information printed on the card, including a digital photograph and the name of the cardholder. Using the appropriate customized printing template for personalized fare media, the CST shall print and issue personalized cards.	SDD-14
FEQ-10-06-04-018	The CST shall support the capture of all data needed to validate, register, and issue personalized fare media for seniors, reduced fare, reduced fare and employer programs, CCT (e.g., paratransit) customers, and all other programs requiring card personalization from the SEPTA fare structure as determined during Design Review. Each fare program or group may include different card personalization artwork and/or card layout.	SDD-14
FEQ-10-06-04-019	Personalized cards shall include printing the cardholder's name and photograph on the card, accompanied by other SEPTA-defined graphics and information.	SDD-14

Req #	Requirement	Assigned CDRL
FEQ-10-06-04-020	The Contractor shall supply printing templates (also known as “masks”) using SEPTA-supplied graphic designs for all personalized card types. The CST shall support no less than [25 pre-loaded templates] from which the user shall select prior to printing. Where possible, template selection shall be automatic based on card type.	SDD-14
FEQ-10-06-04-021	When printing a personalized card, the CST shall scale the photo image to fit within the area defined by the printing template without distorting the image or changing its native aspect ratio.	SDD-14
FEQ-10-06-04-022	Upon successful production of the personalized smart card, the CST shall 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 CST shall transfer the entire transaction record, and all accompanying data, to the back-office.	SDD-14
FEQ-10-06-04-023	Reduced fare privileges (including Seniors and CCT customers) are subject to expiration. The CST shall include a function to re-authorize reduced fare privileges and update the customer and transit account information with a new reduced fare privilege expiration date without needing to reissue or print new fare media.	SDD-14
FEQ-10-06-04-024	All customer data and images captured and used by the CST shall be securely stored within the CRM System customer database using the Contractor-provided APIs and shall not be stored locally on the CST.	SDD-14
FEQ-10-06-04-025	Whenever fare media is presented to the CST contactless smartcard or barcode reader, the CST shall read the card/QR code and query the back-office using the Contractor-provided transit account management API to display the current status and value of the associated transit account on the agent display and customer display. If the customer’s smartcard or QR code is not functioning, the CST shall permit the agent to enter the card identification number manually.	SDD-14
FEQ-10-06-04-026	The CST shall provide an eCommerce checkout process optimized to provide the best user experience for purchases. The CST shall allow customers to purchase multiple cards with multiple fare products across multiple accounts in a single transaction with payment collected once.	SDD-14

Req #	Requirement	Assigned CDRL
FEQ-10-06-04-027	When configured to conduct sales, the CST shall support a variety of payment methods, including: (1) Cash; (2) Checks; (3) SEPTA and third-party issued vouchers; (4) Bank cards (credit and debit); or (5) Any combination of the above. The CST shall 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.	SDD-14
FEQ-10-06-04-028	The CST shall support split payments for up to [three (3) payment methods], including multiple bank cards, stored value, cash, checks and vouchers shall be able to be used to complete payment for a single sale.	SDD-14
FEQ-10-06-04-029	For each sales transaction, the CST shall enable the agent to select the payment method and value received from the customer. If a balance remains, the CST shall prompt the agent to select another payment method and enter the amount until the balance is covered, or a maximum of [three (3) payment methods] have been selected.	SDD-14
FEQ-10-06-04-030	Cash transactions shall provide the total amount due, allow the agent to enter the amount tendered, and display the change due.	SDD-14
FEQ-10-06-04-031	The CST shall control and monitor the cash drawer and open the cash drawer upon calculation and display of the amount of change due.	SDD-14
FEQ-10-06-04-032	The CST shall be configurable to print [two (2) receipts] for each CST transaction. SEPTA shall have the ability to enable or disable this as desired. One receipt shall be for the customer, and a second for the cash drawer. Receipts shall include the resulting status and balance, value or products loaded on the customer's account (where applicable), and the truncated or full printed card number(s) for the fare media associated with the transaction(s). Further details and the layout of the receipt and shall be determined during Design Review and are subject to SEPTA review and approval.	SDD-14
FEQ-10-06-04-033	The CST shall support the ability to issue electronic receipts via Short Message Service (SMS) or e-mail. Electronic receipts shall include the same data elements as printed receipts and shall be searchable and printable from the CST.	SDD-14
FEQ-10-06-04-034	When issuing a new EU smartcard, the CST shall permit the agent to select whether a SEPTA-configurable card fee (e.g., deposit) is to be collected.	SDD-14

Req #	Requirement	Assigned CDRL
FEQ-10-06-04-035	The CST shall prevent adding a pass to an account if doing so would result in the account having more than [one (1) active pass] valid for the same service.	SDD-14
FEQ-10-06-04-036	All unlimited ride rolling passes shall be added to the account in the pending state (without an expiration date set for the pass product).	SDD-14
FEQ-10-06-04-037	The CST shall allow customers enrolled in institutional, or special programs to purchase subsidized products associated with their institution.	SDD-14
FEQ-10-06-04-038	Each completed transaction at the CST shall be stored and transmitted to the back-office system using the fare distribution API.	SDD-14
FEQ-10-06-04-039	Upon request, the CST shall print a receipt of the current status and value of the account. The CST shall allow agents to search for and reprint past receipts from any agent across any CST for up to at least [two (2) weeks] prior using criteria (e.g., receipt ID, card number, location, date, time, staff ID, etc.) determined during Design Review. The CST shall be configurable to print multiple receipts (e.g., a customer copy and a SEPTA copy) at the end of the transaction if desired by SEPTA.	SDD-14
FEQ-10-06-04-040	CST operators with appropriate access rights shall be able to initiate transit account adjustments by reversing prior sales or fare payment transactions, void or cancel sales transactions, or directly adding or removing stored value or passes. Voiding or canceling a sales transaction shall immediately refund the value using the same payment method for the purchase. Additionally, if fare media was purchased in the transaction, the transit account shall return to an inactive state and the fare media shall be available for purchase again.	SDD-14
FEQ-10-06-04-041	CST operators with appropriate access rights shall 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.	SDD-14
FEQ-10-06-04-042	The CST shall fully record and transmit to the back-office all adjustment and reversal transactions.	SDD-14

Req #	Requirement	Assigned CDRL
FEQ-10-06-04-043	The CST shall support replacing lost, stolen, or defective fare media. After replacing the fare media, transaction history, fare products, balance, and capping status (etc.) associated with the previous fare media shall be immediately linked to the new fare media. The CST shall allow all fare media types to be replaced (EU, LU, digital). SEPTA shall determine, during Design Review, if the CST shall be configured to not allow specific types of fare media to be replaced.	SDD-14
FEQ-10-06-04-044	Prior to replacing a registered EU card, the CST shall require verification of the customer's identity through the entry of the customer's account information, and/or answers to security questions, as recorded in the back-office.	SDD-14
FEQ-10-06-04-045	If the replacement card requires no personalization, the CST shall prompt the agent to present the new card to the contactless smartcard reader.	SDD-14
FEQ-10-06-04-046	When replacing a previously issued personalized card, the CST shall support the 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.	SDD-14
FEQ-10-06-04-047	Replacing a malfunctioning smartcard shall be possible. Procedures to replace a defective card shall be similar to those used to replace a lost registered card, but the replacement of a defective card shall not require the card to be registered. The replacement process shall support the entry of the defective card's identification number as the means to initiate a replacement.	SDD-14
FEQ-10-06-04-048	Upon reading or issuing the replacement card, the CST shall 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.	SDD-14
FEQ-10-06-04-049	The CST shall support the ability to reprint the QR code media to address issues with printing or damage to the media that renders the QR code unreadable by fare validation devices. If the media has already been used (e.g., scanned) or is expired, the CST shall notify the sales agent with clear messaging.	SDD-14

Req #	Requirement	Assigned CDRL
FEQ-10-06-04-050	The CST shall support order fulfillment across all types of fare media supported by SEPTA (e.g., EU media, LU media, mobile/electronic fare media, etc.). Orders placed via customer-facing applications (e.g., customer website, mobile application, and institutional website) or customer service interfaces (e.g., the CST or CRM) shall be fulfilled using the CST, or a separate application or tool dedicated to remote order fulfillment. Remote order fulfillment is intended to support individual (e.g., single) orders as well as bulk (e.g., large quantity) orders.	SDD-14
FEQ-10-06-04-051	The CST shall support the issuance of both EU and LU personalized fare media in individual and bulk production modes.	SDD-14
FEQ-10-06-04-052	For EU bulk personalization production runs, the CST shall use data files imported in a Contractor-specified format. The data files shall include the customer name, digital photograph, and other information as required. For LU bulk personalization production runs, the CST shall use data including the product name, validity dates, and name of the organization.	SDD-14
FEQ-10-06-04-053	The CST or order fulfillment tool shall support production runs using data imported from an external application (e.g., the institutional website) for bulk card personalization, or on-demand DSM/LU order fulfillment in quantities as low as [one (1)], and as high as the largest SEPTA-supported institutional program (e.g., 10,000). For large bulk orders, the CST shall automatically arrange the order into batches that correlate with the available hopper/storage for the card printer being used.	SDD-14
FEQ-10-06-04-054	Upon successful production of each card, the Sales Office CST shall store a transaction record similar to those created for individually personalized cards and transmit all records to the back-office.	SDD-14
FEQ-10-06-04-055	Fulfillment or remote orders shall be designed to reduce user error due to manual entry of data, media printed card numbers, and manual selection of products/value loaded to transit accounts. Personalization data, fare products, media type, value from the originating order shall be automatically pre-populated when the order is selected for fulfillment.	SDD-14
FEQ-10-06-04-056	The CST shall display all orders including orders that are unfulfilled, in process, awaiting verification (e.g., for reduced fare orders that have not yet completed the SEPTA verification process) and fulfilled. Unprocessed bulk orders shall be assigned to specific employees.	SDD-14

Req #	Requirement	Assigned CDRL
FEQ-10-06-04-057	The agent shall be allowed to enter a serialized number range for order fulfillment to bulk load products/value on specific fare media. The CST shall automatically activate and load value/products to the associated transit accounts.	SDD-14
FEQ-10-06-04-058	For all bulk orders, the CST shall produce and print a packing slip that includes details from the originating order. Details for the packing slip shall be determined during Design Review and are subject to SEPTA review and approval.	SDD-14
FEQ-10-06-04-059	During the bulk printing, or personalization process, if a defective smartcard is identified the CST shall clearly identify the defective card(s) and the printers shall print VOID or other such messaging on the media to identify the defective fare media to the Agent and continue processing the bulk order. Identification of defective card(s) shall not require manual interaction during the order fulfillment process.	SDD-14
FEQ-10-06-04-060	Upon request, the CST shall query the back-office database for details of the most recent transactions posted to the transit account. Upon receipt of the transaction history, the CST shall display the results on the agent display. The number of prior transactions to display shall be SEPTA-configurable and shall initially be set to the last [15 transactions].	SDD-14
FEQ-10-06-04-061	For each prior transaction displayed, history details shall include, at a minimum: (1) Date and time of the transaction; (2) Generating device/system (e.g., FVM, retail location, autoload); (3) Transaction type (e.g., sales transaction, stored value usage, pass usage, adjustment); (4) Transaction value; (5) Transaction location (e.g., station name, bus route); and (6) Unique receipt ID.	SDD-14

10.7 Handheld Validation, Inspection, and Sales

The Contractor shall provide a comprehensive mobile solution that provides SEPTA with mobile fare inspection and validation using a handheld device. The solution shall also support fare sales, with the ability to sell a limited subset of fares by Conductors onboard regional rail trains. Compact, lightweight solutions suited for a field environment are preferred. SEPTA prefers minimizing the number of devices that field staff will have to carry.

10.7.1 Handheld Device General Requirements

Req #	Requirement	Assigned CDRL
FEQ-10-07-01-001	The Contractor shall provide PCI-compliant and NFC-enabled mobile handheld validation, inspection, and sales devices. The devices shall be designed for fare validation, inspection, and sales onboard the Regional Rail service with real-time communications to the back-office. Devices shall also be used by the agency as supplemental fare validation devices at bus stops (Bus Loaders) to support heavily congested locations by loading at the rear doors.	SDD-15
FEQ-10-07-01-002	The handheld devices shall be able to be updated via software update to support future card formats and PCI standards.	SDD-15
FEQ-10-07-01-003	The handheld devices shall be remotely monitored and managed through the SMMA Tool, which shall also include the ability to remotely disable the device if it is reported lost or stolen.	SDD-15
FEQ-10-07-01-004	All device software shall be installed and managed using the SMMA Tool. By default, only the Contractor-provided applications shall be enabled, and Conductors shall not have access to any other device features such as web browsing, e-mail, etc. SEPTA shall have the ability to enable and disable device features as needed.	SDD-15
FEQ-10-07-01-005	The Contractor shall identify and utilize third-party source code security analyzers, and follow best practices as recommended by the NIST for all software releases. Any security breach to the handheld solution shall be reported immediately to SEPTA.	SDD-15
FEQ-10-07-01-006	Users shall be able to interact and complete all transactions with the handheld devices using gloves (e.g., winter gloves, latex and non-latex material gloves). This shall include any use of a screen protector or case (e.g., to increase durability or ruggedness of the device).	SDD-15
FEQ-10-07-01-007	The handheld devices shall be capable of being housed in a case or mounted in a fixed cradle that contains power connection and meets lanyard breakaway safety standards. The handheld devices shall include replaceable batteries that are replaceable, and that can be installed and removed, without special tools. Battery life of the handheld devices shall last at least [one (1) full day] of active use. Standby times shall be considerably longer, but at least [two (2) days] without regular activity.	SDD-15
FEQ-10-07-01-008	The handheld solution shall be designed to function in both an online and offline mode. Where online means a connection via wireless communications to the Contractor back-office.	SDD-15

Req #	Requirement	Assigned CDRL
FEQ-10-07-01-009	The handheld device communications shall include short and long-range communications technologies, including NFC, cellular (4G LTE, 5G), Bluetooth (5.2 and above), Wi-Fi (802.11 ac), and an embedded GPS receiver.	SDD-15
FEQ-10-07-01-010	The Contractor back-office shall be the system of record for all handheld device transactions. If local data is written to the closed-loop fare media to support offline inspections or validations, the validation result displayed on the handheld device shall be provided to the Contractor back-office with all supporting details. This includes any data used to determine the result displayed to the user.	SDD-15
FEQ-10-07-01-011	The handheld application shall support persistent login, allowing the user to remain logged in until the end of the shift, manually logged off, or a configurable inactivity threshold is reached. The device may include security features such as locking the screen after a configurable amount of time and requiring the Conductor to enter a user-defined PIN to regain access to the application.	SDD-15
FEQ-10-07-01-012	The handheld application shall provide pre-defined reports needed for end-of-day reconciliation. This includes: (1) Transaction Summary – A summary of all Smart Media verifications, Fare Media (e.g., printed QR code media) sold, issued, or noted as damaged, and revenues collected during the user's shift; (2) Maintenance report – A listing of all maintenance issues, which have arisen since maintenance was last performed for the device; (3) Remittance report – A report that provides details of the revenues remitted by the user. These reports shall be uniquely serialized; and (4) Shift report – A report that provides details of sales and counts of fare media verifications performed during the shift, and including those logons and logoffs which have occurred between remittances. These reports shall be available ad-hoc from the handheld device and the back-office user interface. Additional pre-defined reports may be required at no additional cost based on the Contractor's solution to meet the end-of-day reconciliation requirements. Details for each report shall be designed collaboratively with SEPTA during Design Review.	SDD-15

Req #	Requirement	Assigned CDRL
FEQ-10-07-01-013	The handheld solution shall enforce the use of dual-custody or chain of custody confirmation for all tracked items (e.g., cash and fare media, Handheld devices, etc.) when issued, deposited, returned, and exchanged. This includes at a minimum: (1) Deposits or Remittance(s); (2) Cash Bank issuances or cash exchanges; and (3) Handheld devices issuance, exchange, or return. Other functions and details for dual custody or chain of custody may be identified by SEPTA during the Design Review.	SDD-15
FEQ-10-07-01-014	The handheld solution shall allow SEPTA to perform bank deposits (deposits made by the Clerk Remittance Office (CRO), to the agency's banking institution). Bank deposits made by Clerks shall not impact Conductor remittances or end of shift reconciliation.	SDD-15

10.7.2 Handheld Device Hardware

Req #	Requirement	Assigned CDRL
FEQ-10-07-02-001	The Contractor shall provide handheld devices designed to be comfortably and securely held one-handed and lightweight. The handheld device shall include a thermal printer capable of generating QR code fare media using durable, tear-resistant paper. SEPTA prefers an all-in-one device, however a separate printer may be acceptable. SEPTA shall have final approval on the handheld device form factor and design. The Contractor shall incorporate all feedback from SEPTA regarding the handheld unit hardware and all software developed to support the handheld solution.	SDD-15
FEQ-10-07-02-002	The handheld devices shall be ruggedized to function under normal environmental conditions common in Philadelphia, including dust, grit, and sand common on rail, intense humidity, rain, and splashes.	SDD-15
FEQ-10-07-02-003	The Contractor shall provide power chargers for the handheld devices that enable charging using either a standard [120V] AC power outlet or [12V] DC car charger.	SDD-15
FEQ-10-07-02-004	The handheld devices shall include embedded NFC functionality, including a contactless reader capable of reading all media compliant with both Type A and B variants of the ISO/IEC 14443 standard.	SDD-15

Req #	Requirement	Assigned CDRL
FEQ-10-07-02-005	The handheld devices shall have the ability to connect with peripheral devices via wireless connection (e.g., Bluetooth).	SDD-15
FEQ-10-07-02-006	The handheld devices shall include sufficient storage to hold the status list and a minimum of [seven (7) days] of transaction data.	SDD-15
FEQ-10-07-02-007	The handheld devices shall be GPS enabled to provide location or proximity to SEPTA rail station stops and automatically determine the appropriate zone.	SDD-15
FEQ-10-07-02-008	The handheld devices shall include a display that is easily readable by Conductors while performing their duties on a moving vehicle. The display shall include full color with adequate luminescence to differentiate between valid and invalid inspections easily.	SDD-15
FEQ-10-07-02-009	The handheld devices shall have a large, clearly marked capture area for NFC reads to allow for contactless reads on a moving train. The handheld device shall be designed not to block or impair the Conductor's ability to fully view the result on the device screen when the fare media is presented to the device.	SDD-15
FEQ-10-07-02-010	The handheld devices shall include means to read 2D barcodes that is optimized to scan 2D barcodes from mobile device screens and paper tickets.	SDD-15
FEQ-10-07-02-011	The handheld devices shall include the ability for different visual, audible, and haptic feedback based on the transaction result displayed to the Conductor. The audible feedback shall be audible to the Conductor during revenue service conditions. The volume controls should be available to increase or decrease volume as needed.	SDD-15

10.7.3 Handheld Device Application

Req #	Requirement	Assigned CDRL
FEQ-10-07-03-001	The Contractor shall design a handheld application that permits authorized users to: (1) Inspect all SEPTA-approved fare media (including Amtrak tickets, NJT and PATCO issued media) for valid fare payment; (2) Validate (e.g., tap and pay) all SEPTA-supported fare media, including barcodes, closed-loop smart cards, digital fare media, and open payments; (3) Perform cash or bank card sales for QuickTrip (QR code) fare media and stored value (e.g., Travel Wallet) top-ups and Regional Rail fare products for SEPTA-approved fare media; and (4) Issue customers a courtesy ticket. All functions shall be configurable based on user profile (e.g., Bus loader, Conductor, Inspector, etc.) and shall be able to be fully functional offline and online.	SDD-15
FEQ-10-07-03-002	The handheld application shall be built on the latest Android OS at the time of deployment. SEPTA is open to alternative OS if the Contractor has elected to use a different OS. The Contractor shall provide OS updates, patches, bug fixes, and system enhancements to address security issues throughout the duration of the Contract.	SDD-15
FEQ-10-07-03-003	The handheld application shall support multiple roles for users (e.g., Conductor, Supervisor, Admin, Bus Loader, etc.) that limit or expose functionality based on the assigned role of the logged-in user. SEPTA shall work with the Contractor to define roles and associated functionality during the Design Review.	SDD-15
FEQ-10-07-03-004	The handheld application shall generate transactions and events, including logins and logouts, hardware and software diagnostics, fare validations, and fare sales. Each data record shall incorporate a unique identification number, the device ID, and shall be date/time stamped.	SDD-15
FEQ-10-07-03-005	All inspections and validations shall generate transactions that include the following information, at a minimum: (1) Date and time; (2) Handheld Device ID; (3) User ID; (4) Run and Train Number; (5) Line and Direction (e.g., inbound, outbound); (6) Geo-location information (GPS data); (7) Fare Media type; (8) Printed card/account number; (9) Fare category (e.g., full fare, reduced fare); (10) Fare product used or sold; (11) Transfer validity (if applicable); (12) Inspection or validation result (valid, invalid, incomplete); (13) Reason code associated with the validation result (e.g., paid, card blocked, no tap, etc.); (14) Unique transaction ID; (15) Real-time vs offline result; (16) Transaction type; and (17) Payment method used (where applicable). SEPTA shall work with the Contractor to determine the final transaction data during Design Review.	SDD-15

Req #	Requirement	Assigned CDRL
FEQ-10-07-03-006	The handheld application shall maintain audit registers that track the following information at a minimum: (1) The overall activity of the user and/or device including the ability to identify how long the user is logged onto a specific device, how long a device has been active and all users that have been logged onto that device; (2) The cars the Conductor worked, and the crew members on the train; (3) The total count and value of all transactions were completed by the handheld device since data was last uploaded to the back-office; (4) Total count of all transactions that have not synced with the back-office; (5) The date and time of the last successful data upload to the back-office; and (6) The date and time of the last successful status list update from the back-office. These registers shall be modified only by the handheld device itself, shall not be manually alterable, and shall be available to view from within the software application.	SDD-15
FEQ-10-07-03-007	Audit register records shall be opened at login and continuously sync with the back-office. Following logoff, the audit register shall be closed and final records shall be transmitted to the back-office for reconciliation.	SDD-15
FEQ-10-07-03-008	The handheld application shall support fare verification and have the ability to override a result from the AFC System back-office (e.g., to accommodate FPVs operating offline), or to provide a fare validation result when the handheld device is operating offline. The validation logic shall be based on the following parameters at a minimum: (1) Rider classification (when online); (2) Zone; (3) Location; (4) Day and time written to the card; and (5) Status list stored on the device (including date/time of last update).	SDD-15
FEQ-10-07-03-009	The handheld application shall provide real-time verification results-based logic built into the application software solution that includes information written to the card, account-based transactions stored in the back-office, and the updated status list. The handheld device shall clearly show the date and time that the status list was updated from the back-office system.	SDD-15
FEQ-10-07-03-010	The handheld application shall use the Contractor-provided APIs to enable real-time transactions from the device. This includes the ability to query the transaction history for a transit account maintained within the back-office, validate (e.g., pay) fare media if the user forgot to tap before boarding, sell stored value (e.g., top up) to a transit account, or sell a single-ride Quick Ticket with a defined origin and destination.	SDD-15

Req #	Requirement	Assigned CDRL
FEQ-10-07-03-011	The handheld solution shall provide a clear validation result that is easy to read. If the validation result is for multiple open trips (e.g., multiple riders), the result shall clearly provide the number or open trips (riders) to the Conductor.	SDD-15
FEQ-10-07-03-012	The handheld solution shall provide real-time (and online) fare inspection and validations within [500ms]. The handheld solution shall support configurable fare inspections and validation timeouts by fare type (e.g., closed loop, open payment, barcode, virtual) for all SEPTA-supported fare media. For example, a fare inspection or validation result is provided in [500ms] for all closed-loop fare inspections and [750ms] for all open payment inspections.	SDD-15
FEQ-10-07-03-013	The handheld application shall maintain a table of fares which shall include the list of all products available to be sold via the handheld device (e.g., handheld sales channel).	SDD-15
FEQ-10-07-03-014	The handheld device shall retain at least [two (2) future fare tables] to enable offline fare sales. Each future fare table shall include all entries to reflect the intended fare structure and the date and time at which the new fare structure is to take effect. Any new fare table shall be activated automatically in the device at the specified date and time as programmed by SEPTA.	SDD-15
FEQ-10-07-03-015	At least daily, the handheld device shall automatically communicate with the back-office to receive any updates to the fare table. The handheld device shall allow users to manually sync with the back-office to receive any updates to the fare table; the handheld devices shall store any such updates, as necessary. With each update of the fare table, the handheld devices shall confirm that the table has been properly updated.	SDD-15
FEQ-10-07-03-016	The handheld application shall support user login via the Contractor-provided APIs by reading a contactless employee badge and entering a password/PIN, or by manually entering username and password (as a backup to the badge). The login shall be validated against a list of valid credentials. The handheld application shall provide user authentication and login controls such that brute-force login attempts are not allowed (e.g., the device shall lock after a reasonable number of unsuccessful login attempts until unlocked by an administrator. Once successfully logged in, the application shall pre-populate the Conductor's schedule for the day from the Crew Management System integration for the Conductor to confirm or edit. If no data is found, the Conductor shall be prompted to manually enter the Run and Train information.	SDD-15

Req #	Requirement	Assigned CDRL
FEQ-10-07-03-017	The handheld application shall support password reset and recovery actions to allow users to update, reset or recover a forgotten password. Password security best practices shall be used, including but not limited to enforcing minimum password length, use of letters/numbers/symbols, and notification to the user that account information has been modified. Final password security requirements shall be determined during Design Review.	SDD-15
FEQ-10-07-03-018	The Contractor shall develop a handheld application interface that supports common design standards and actions such as left/right swiping actions, pulldown to refresh, copy/paste functionality, view/hide passwords, and other such actions common in touchscreen applications. The Contractor shall develop the UX/UI in collaboration with SEPTA using collaboration tools (e.g., Figma, InVision, etc.) taking into account button/radial and text sizes, screen flow and other such usability items. All screens and buttons shall be easily configurable based on operational need.	SDD-15
FEQ-10-07-03-019	The handheld application shall clearly show the date and time that the status list was updated from the back-office system.	SDD-15
FEQ-10-07-03-020	The handheld application shall provide the Conductor with a clear and visible notification when the device is operating offline.	SDD-15
FEQ-10-07-03-021	The handheld solution shall display the fare inspection and validation status of the fare media. When fare media is presented to or scanned by the handheld device, the application shall display the result (e.g., valid or no valid fare payment). For valid payments, the application shall display the time and date of payment, location payment was made, fare product used, product validity, the amount paid, and fare category associated with the account shall be provided to the Conductor.	SDD-15
FEQ-10-07-03-022	For all invalid responses, the handheld application shall display the reason code (e.g., no open trips), stored value balance, and valid products with clear notification if the ride limit has been reached. The handheld application shall present the Conductor with available options specific to the transit account (e.g., Open Trip, Add value, etc.). SEPTA shall define all options during Design Review.	SDD-15
FEQ-10-07-03-023	The handheld application shall be capable of displaying up to [seven (7) days] of transactions performed by the Conductor. Transactions shall be filterable by date and time, run, train, line, and direction. The handheld application shall be able to show transactions even if the device is offline.	SDD-15

Req #	Requirement	Assigned CDRL
FEQ-10-07-03-024	The handheld validation and payment solution shall track cash on hand, and fare media sold by Conductors. At the beginning of each shift, the application shall allow Conductors to enter their cash on hand.	SDD-15
FEQ-10-07-03-025	The handheld validation and payment solution shall allow users to sell stored value to existing transit accounts and QuickTickets which shall generate a QR code linked to a transit account in the back-office and printed from the Handheld unit after a successful sale. Customers shall be able to pay using cash or bank cards.	SDD-15
FEQ-10-07-03-026	The sales interface shall include standard point of sale functionality including the ability to sell multiple products across different fare categories in a single sales transaction, back out or modify a sale (e.g., change zone, destination, quantity, payment type etc.) without needing to start over, and void a completed sale within a configurable time-period (e.g., [30 minutes]). If the voided sale included printing a QuickTicket QR code, the AFC System shall automatically remove all value loaded to the transit account and block the transit account such that use of the QR code on an offline validator shall result in an invalid response from the validator.	SDD-15
FEQ-10-07-03-027	Voided transaction made via cash shall automatically be reflected in the shift report to show the appropriate cash on hand. Voided transactions made by bank cards shall automatically generate payment reversal to the bank card used for the sale.	SDD-15
FEQ-10-07-03-028	When switching trains, or completing a shift, Conductors shall be prompted to enter passenger counts for the train just worked, confirm or add crew and car information. If skipped, the handheld solution shall prompt the Conductor to enter all missing data when remitting. Additionally, the Conductor shall be able to modify this data as needed until remittance is confirmed by the CRO.	SDD-15
FEQ-10-07-03-029	The handheld validation and payment solution shall provide an ad-hoc shift report when requested by the user. The shift report shall not be closed until closed by the user. At such point the device shall sync with the back-office and perform end of shift activities (e.g., close audit records, generate end of shift report, etc.). All functions shall be determined during Design Review and are subject to SEPTA review and approval.	SDD-15

Req #	Requirement	Assigned CDRL
FEQ-10-07-03-030	The handheld validation and payment solution shall allow Conductors to perform a mid-shift deposit or partial remittance meaning Conductors may deposit cash remittances to SEPTA clerk or perform other such actions without requiring a full remittance. The device shall track all mid-shift deposits and transactions.	SDD-15
FEQ-10-07-03-031	The handheld solution shall track and facilitate end-of-shift remittance. At the end of each shift, conductors shall be prompted to confirm the cash collected during their shift. Users shall be able to remit multiple times a day (e.g., users that work the AM shift, remit and then work the PM shift and remit). Users shall be able to add "Over in Cash" or "Debit Cash" amounts (e.g., overages) and comments even after remittance has occurred. However, the system shall not allow sales data to be modified at any time. Once remitted, the information shall sync with the back-office such that users logged into the software interface shall be able to confirm the remittance that the Conductor deposited at the CRO. All missed remittances shall be tracked in the Contractor back-office, and an e-mail notification shall be generated to the Conductor and supervisor.	SDD-15
FEQ-10-07-03-032	At the end of shift, the Conductor shall be able to add supplemental data and comments for SEPTA reporting. This includes other crew members and cars worked and passenger counts. The Contractor shall work with SEPTA to determine the supplemental data during Design Review.	SDD-15

10.7.4 Handheld Interface and Real-time Reporting

Req #	Requirement	Assigned CDRL
FEQ-10-07-04-001	The Contractor shall provide a web-based interface that allows authorized personnel to access, view and print all data and transactions received from handheld devices. Access to the handheld data and transactions shall be provided in real time through the back-office interface. The handheld interface shall allow authorized users to reconcile Conductor transactions performed on the handheld devices.	SDD-15

Req #	Requirement	Assigned CDRL
FEQ-10-07-04-002	The handheld interface shall support multiple user roles and permissions based on the login. The handheld interface shall also provide password management to assist users that forget their passwords. All actions taken from the interface shall be logged and a transaction record generated for all activities.	SDD-15
FEQ-10-07-04-003	The handheld interface shall provide a Conductor dashboard that provides authorized users to query a Conductor and view a snapshot of the current (e.g., real-time) and historical (limited to a configurable number of service days) Conductor data (e.g., sales, deposits, remittances, debits, printed/issued media, and other critical data required by SEPTA). The dashboard shall also clearly identify specific issues, deviations, or actions required.	SDD-15
FEQ-10-07-04-004	Authorized users shall be able to query and print the pre-defined reports described earlier in the general requirements based on real-time transactions from the handheld device for validation and sales information. Users shall be able to query by device ID, Conductor ID, run, train, date and time, or any combination of data. Final parameters required for ad-hoc queries shall be determined during Design Review.	SDD-15
FEQ-10-07-04-005	Authorized users shall be able to generate additional reports that provide the overall status of transactions for all Conductors. This includes at a minimum: (1) Audit report – a detailed report that identifies each transaction for cash and fare media printed by Conductors, cash and damaged fare media remitted to the CRO by Conductors, and remaining cash and fare media in circulation for Conductors; and (2) Supervisor Report – A listing of all users who have logged on to the handheld devices, a summary of the revenue collected by Conductors, Fare Media sold by Conductors, and the remittance status by shift for Conductors. This shall also include logon failures and other similar transactions. These reports shall be uniquely serialized. Details for all reports, parameters for queries or filtering capabilities and the overall format of the reports and data shall be determined during Design Review. SEPTA shall be able to create new reports as needed from the data provided.	SDD-15
FEQ-10-07-04-006	All data, transactions, and reports shall be accessible via the back-office for the full SEPTA data retention policy.	SDD-15

Req #	Requirement	Assigned CDRL
FEQ-10-07-04-007	To accommodate human error from manually entered data, Authorized users shall be able to correct or adjust limited details of the remittance entered by Conductors. All corrections or modifications shall be tracked within the back-office. Allowable adjustments to the remittance by user role shall be determined during Design Review.	SDD-15
FEQ-10-07-04-008	The Contractor shall provide a user-friendly handheld interface that minimizes manual entry. The user interface shall allow Supervisors and the CRO to assign fare media and allocate cash (e.g., Cash Bank) to Conductors. The solution shall also provide the ability to collect damaged printed QR code fare media and, or cash deposited by the Conductor as part of their remittance. If a Conductor does a mid-shift deposit, the handheld solution shall automatically record this and apply it to the transaction summary, remittance report and shift report. All actions shall generate a detailed summary (e.g., receipt) that is provided to the Conductor. All summaries shall be stored in the AFC System and re-printed as needed.	SDD-15
FEQ-10-07-04-009	The handheld solution system shall allow authorized users to modify remittances such as adding debits, update missing remittances, and other such actions as determined by SEPTA during Design Review. All changes or modifications shall be date/timestamped with the ID of the user that modified the information. Modified remittances shall be clearly identified in the system as Modified or Updated.	SDD-15
FEQ-10-07-04-010	The handheld interface shall provide a level of granularity that allows authorized users to identify all fare media printed by the handheld device, sold by Conductors, and identified as damaged by Conductors.	SDD-15
FEQ-10-07-04-011	Users shall be able to automatically reconcile returned, sold, and damaged fare media printed by the conductor on the handheld device. Discrepancies shall be clearly identified and reported.	SDD-15
FEQ-10-07-04-012	The handheld interface shall allow the CRO to issue memos and debits to Conductors, which are provided to the Conductor by the Clerk during their remittance. All memos and debits shall track the memo and debit including the creator, recipient, date/time, debit reason, and date the Conductor was notified, and the date the Conductor paid the debit. Once the debit is paid, the system shall automatically close the debit. The system shall allow authorized users to manually close or cancel the debit if necessary. All manual actions shall require a reason.	SDD-15

Req #	Requirement	Assigned CDRL
FEQ-10-07-04-013	The handheld interface shall provide a function for the CRO to track Conductor and Clerk Cash Banks (e.g., SEPTA-cash issued to Conductors for fare sales), including the issuing and returning of these banks. The interface shall track the issuer, recipient, date/time funds were issued or returned and comments (if any).	SDD-15

10.8 Required Submittals

CDRL ID	Contractor Deliverable	Due
SDD-11	Fare Payment Validator Hardware and Software Design	Design Review
SDD-12	ADA Faregate Hardware and Software Design	Design Review
SDD-13	Fare Vending Machine (FVM) Hardware and Software Design	Design Review
SDD-14	Customer Service Terminal (CST) Solution Design	Design Review
SDD-15	Handheld Validation, Inspection, and Sales Solution Design	Design Review
As required	<i>The Contractor shall provide confirmation of all requirements in all applicable system design documentation</i>	

11. Back-Office Requirements

This section includes the requirements for back-office functionality and applications. Most of the applications shall leverage the Contractor-provided APIs to support integration with the AFC System devices and other back-office components. Additionally, some applications include a preference or requirement for the use of COTS third-party solutions (e.g., Reporting System, CRM, and FMS), while others may be unique to the Contractor's proposed AFC System.

11.1 General Requirements

Req #	Requirement	Assigned CDRL
BOC-11-01-001	The Contractor shall develop a back-office software design specification that provides diagrams and narrative descriptions for each software component in the back-office. The back-office software design specification shall include at a minimum: (1) Functional description, purpose, supplier, and version of each software component; (2) Interfaces and communication flows between components; (3) Transaction and data flow diagrams; and (4) Installation and configuration documentation. The specification shall be submitted for SEPTA's approval during Design Review.	SDD-16
BOC-11-01-002	The Contractor shall develop a back-office hosting design specification that provides a detailed description of all hardware and hosting components that shall comprise the back-office, including the purpose, functions, interdependencies, configuration, and communication details for each component. Given the cloud-hosted nature of the AFC System, the back-office hosting design specification shall include detailed information on the configured environments, including virtualized server configurations and default resource allocations, high availability data and calculations, and backup and redundancy details. The specification shall be submitted for SEPTA's approval during Design Review.	SDD-16
BOC-11-01-003	All back-office components, with the exception of the Data Warehouse, shall provide real-time access to historical data for a configurable period, no less than [seven (7) years]. The Data Warehouse shall provide unlimited access to historical data.	SDD-16
BOC-11-01-004	All back-office applications and user interfaces shall manage user access via an identity and access management tool leveraging multi-factor authentication. Individual users and user groups shall have access to specific systems where appropriate for standard business operations. All access control mechanisms shall comply with SEPTA's security policies.	SDD-16
BOC-11-01-005	Software updates to back-office software, databases, and system components shall be centrally managed with appropriate version control in place. Software releases shall only be deployed by authorized system administrators following approval from SEPTA.	SDD-16

11.2 Account-Based Transaction Processor (ATP)

The primary component of the back-office shall be the Account-Based Transaction Processor (ATP). The Contractor shall deploy an ATP that maintains all transit accounts and performs real-time fare calculation and validation for closed-loop payments. Accurate and secure transaction processing shall be critical to ATP operation.

11.2.1 ATP Account Management

Req #	Requirement	Assigned CDRL
BOC-11-02-01-001	The Contractor shall deploy an Account-Based Transaction Processor (ATP) that manages all transit accounts in the AFC System, performs real-time fare calculation and validation in accordance with SEPTA's fare policy, and distributes fare products in accordance with SEPTA's fare structure.	SDD-17
BOC-11-02-01-002	All fare sales, validation, and inspection devices, and supporting back-office components, shall access ATP functions using the Contractor-provided APIs via a direct, real-time connection to the ATP.	SDD-17
BOC-11-02-01-003	The ATP shall enable the creation of new transit accounts to facilitate fare validation via stored value, pass products, and open payments. A new transit account shall be automatically created on introduction of new fare media to the AFC System, including closed-loop media and open-loop media.	SDD-17
BOC-11-02-01-004	The ATP shall maintain transit accounts that store all fare products (e.g., stored value and passes) loaded by customers, and deduct stored value in real-time as accounts are used for fare payment.	SDD-17
BOC-11-02-01-005	For transit accounts associated with closed-loop fare media, the ATP shall maintain separate stored value balances to segregate stored value loaded using pre-tax benefit cards and through pre-tax benefit programs. The AFC System shall support a general (i.e., post-tax) balance, a pre-tax transit balance, and a pre-tax parking balance, at a minimum. Order of precedence rules shall be configurable to deduct value from the pre-tax balances first when the service being paid for is eligible for the use of pre-tax funds.	SDD-17
BOC-11-02-01-006	The transit account shall store records of all transactions processed against the account, including load transactions, fare validation transactions, transfer transactions, inspection transactions, and any other transactions that impact the account balance or status (e.g., refund and adjustment transactions).	SDD-17

Req #	Requirement	Assigned CDRL
BOC-11-02-01-007	The ATP shall enable the modification of transit account balances based on adjustments, refunds, reversals, balance transfers, and goodwill gestures. All financial transactions shall create a corresponding journal entry in the FMS.	SDD-17
BOC-11-02-01-008	The ATP shall enable the blocking, unblocking, and permanent closure of transit accounts, and shall reflect all such actions in distributed risk lists. A history of all transit account status changes and the reason code triggering the change shall be tracked and maintained in the ATP.	SDD-17
BOC-11-02-01-009	The ATP shall determine the eligibility of all transit account operations (e.g., refunds, loading fare products) based on configurable business rules (e.g., account status, fraud controls). The complete list of eligibility rules shall be defined and approved during Design Review.	SDD-17
BOC-11-02-01-010	The ATP shall enable the creation and modification of transit account nicknames for customer personalization purposes.	SDD-17
BOC-11-02-01-011	The ATP shall create and maintain transit accounts associated with all open payment tokens used for payment within the AFC System. All such transit accounts shall track open payment token status and usage, enable the calculation of fares for open payment transactions, and facilitate aggregation of fare payments.	SDD-17
BOC-11-02-01-012	The ATP shall enable the creation and management of transit account groups to support entitlements, concessions, and special fare product distribution. Transit accounts may be assigned to zero (0) or more groups and the ATP shall ensure that only transit accounts assigned to a specific group may receive the eligible products and discounts configured for the given group. Transit account groups shall be configured to support the business rules of a single operator, a combination of operators, or the universal AFC System. The order of precedence for coinciding business rules shall be determined by SEPTA.	SDD-17
BOC-11-02-01-013	The transit account shall store any additional attributes tied to the fare payment credential which are necessary in determining which fare products may be loaded to the account, how a fare is calculated when the credential is used for payment, and the applicability of any other usage rules enforced by the ATP. Attributes stored in the transit account may include concession types, concession history, missed tap attributes, and default travel parameters.	SDD-17

Req #	Requirement	Assigned CDRL
BOC-11-02-01-014	The ATP shall enable the querying of all transit account attributes and details for external systems via an API, including account status, balance, fare products, transaction history, and preferred language. Transaction history data shall be available for a configurable period, no less than [seven (7) years].	SDD-17
BOC-11-02-01-015	The ATP shall ensure that transit accounts retain all fare validation, sales, and inspection history across all fare payment credentials associated to the transit account. Transit account history shall persist through all replacements and unlinking of credentials from the account.	SDD-17
BOC-11-02-01-016	The ATP shall maintain a set of events that are triggered by monitoring transit account activity to support the issuance of notification messages and warnings to customers. Monitored activity shall include transit account low balance, pass product expiration, autoload of fare products, and declined payments confirmations. The complete list of events shall be defined by SEPTA during Design Review.	SDD-17
BOC-11-02-01-017	The ATP shall provide all transit account data and facilitate all necessary workflows required to generate fare payment credentials for all supported fare media types.	SDD-17
BOC-11-02-01-018	The ATP shall provide the capability to automatically process customer refund requests for fare media and fare products associated with a transit account. Automatic refund eligibility shall be determined by rules and configurable conditions defined by SEPTA, including account status, refund history, and refund amount. The ATP shall calculate the qualified refund amount for automatic distribution based on product eligibility rules and shall support partial refunds.	SDD-17
BOC-11-02-01-019	The ATP shall provide the capability to manually review and approve all customer refunds requests not eligible for automatic processing. All refund requests shall include details on the time, reason, status, and history of the request. The ATP shall ensure that only authorized users have access to review and approve requests and shall capture user audit data, including name, time, and user notes.	SDD-17
BOC-11-02-01-020	The ATP shall provide the capability to automatically distribute refunds back to the original payment method used for purchase and allocate certain refund types for paper check issuance. The ATP shall export an electronic file for all refunds requiring a paper check in a format specified by SEPTA.	SDD-17

11.2.2 ATP Fare Sales

Req #	Requirement	Assigned CDRL
BOC-11-02-02-001	The ATP shall enable the sale and distribution of all supported closed-loop fare media and fare products. The sale of fare media and fare products shall be automatically associated with a transit account and enabled for use, in accordance with configured business rules.	SDD-17
BOC-11-02-02-002	The ATP shall support the real-time loading of fare products through all fare sales channels. No loading of fare products to a transit account shall be permitted without an active connection to the ATP.	SDD-17
BOC-11-02-02-003	The ability to load a particular fare product to a transit account shall be configurable based on the fare media type and rider classification associated with the account.	SDD-17
BOC-11-02-02-004	The loading of stored value shall be restricted based on configurable parameters, including the minimum and maximum amount that can be loaded in a single transaction, and the maximum balance threshold enforced for transit accounts.	SDD-17
BOC-11-02-02-005	The ATP shall enable: (1) the automatic reloading (i.e., autoloading) of eligible fare products; (2) the modification of active autoloading settings (e.g., frequency and threshold); and (3) the cancellation of active autoloading, in accordance with configured business rules. Eligible fare products and modifiable autoloading settings shall be determined by SEPTA.	SDD-17
BOC-11-02-02-006	Enabling autoloading shall require that the associated transit account be registered and that an accepted funding source, such as a credit or debit card, or transit benefit allocation, is linked to the customer account.	SDD-17
BOC-11-02-02-007	Customers shall be allowed [two (2) funding sources] associated with an autoloading, a primary funding source, and a secondary funding source, and may split payment between them, or use the secondary funding source as a backup in the event that the primary fails.	SDD-17
BOC-11-02-02-008	The autoloading feature shall 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).	SDD-17

Req #	Requirement	Assigned CDRL
BOC-11-02-02-009	All parameters governing threshold and calendar-based autoloads shall be fully configurable by the customer and SEPTA's staff, including enabling, disabling, pausing or unpausing an autoload, setting the threshold value (e.g., trigger), funding source, and minimum / maximum fare product and amount to be loaded. Final configuration parameters shall be defined during Design Review.	SDD-17
BOC-11-02-02-010	The account-based nature of the AFC System shall allow for autoload payment confirmation to occur prior to the loading of any value, and immediate use of the value by the customer once the load has occurred. If payment confirmation fails, the product shall not be loaded, and the rules to retry and disable autoload shall be configurable.	SDD-17
BOC-11-02-02-011	The ATP shall enable the transfer of stored value and pass products between distinct transit accounts based on configurable eligibility rules, which shall consider attributes such as product usage, balance thresholds, account status, product type, and fraud prevention parameters.	SDD-17
BOC-11-02-02-012	The ATP shall be capable of imposing a [one (1)-time charge], or "enablement fee," for the issuance of new fare media. The fee shall be configurable based on the 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. The fee shall be waivable by authorized individuals regardless of the set configurations and refundable per SEPTA-approved criteria.	SDD-17
BOC-11-02-02-013	The ATP shall be capable of imposing replacement 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). The fee shall be waivable by authorized individuals regardless of the set configurations and refundable per SEPTA-approved criteria.	SDD-17
BOC-11-02-02-014	The ATP shall support the configuration and sale of non-fare products (e.g., simple tickets, transit maps) to enable central accounting and management of all such sales. The ATP shall provide the capability to calculate and charge sales tax for the sale of such products.	SDD-17
BOC-11-02-02-015	The ATP shall provide the capability to deliver e-mail receipts to customers for all successfully completed sales, including for the fulfillment of autoload. Delivery of receipts shall be based on user-configured notification settings.	SDD-17

Req #	Requirement	Assigned CDRL
BOC-11-02-02-016	The ATP shall be capable of accepting audit registers generated locally by fare sales devices to serve as an independent data source for transactions performed at all such devices. These audit registers shall be automatically reconciled against the sales transactions generated by the ATP to validate transaction accuracy and completeness. Any discrepancies identified by the reconciliation process shall be raised as exceptions and populated in an exception report.	SDD-17
BOC-11-02-02-017	The ATP shall provide the capability to automatically resolve exceptions generated from missing or inaccurate sales transactions. The exception resolution process shall address inaccuracies at the transit account level and adjust accounting entries, where possible. The process shall be defined and approved during Design Review.	SDD-17

11.2.3 ATP Fare Validation

Req #	Requirement	Assigned CDRL
BOC-11-02-03-001	Generation of a fare validation response shall require real-time fare calculation, including querying of the transit account, full-fare calculation, and updating of the account balance, to be performed prior to providing an approval or denial response to the fare validation device.	SDD-17
BOC-11-02-03-002	When real-time communications are not available and device-level fare validation occurs using approved risk mitigation techniques, the original validation request, appended with the offline validation result, shall be sent to the ATP, and processed to update the account status and balance, as soon as communications are reestablished.	SDD-17
BOC-11-02-03-003	The ATP shall enable real-time fare validation including real-time fare calculation where required, such that all back-office-approved fare validation requests (i.e., with response received within established timeout) include a validation result, fare product used, and where applicable the fully calculated fare, balance remaining, transfer time remaining, and any other pertinent information.	SDD-17
BOC-11-02-03-004	The ATP shall enable processing of open payment transactions as described in the Payment Processing requirements.	SDD-17

Req #	Requirement	Assigned CDRL
BOC-11-02-03-005	The ATP shall accommodate late arriving transactions through the recalculation of individual fare validations, or the total fare due for a prior accounting period. Transactions occurring within an accounting period may remain in a pending state and updated directly until that accounting period (e.g., service month) is closed, after which an adjustment transaction may be generated. The accounting period start and end time, and the maximum time-period to accept late arriving transactions shall be configurable and determined by SEPTA.	SDD-17
BOC-11-02-03-006	Transit account transaction history and balance information shall be updated in real-time as late-arriving transactions are received and processed to reflect any recalculation performed. Modified transactions and adjustment transactions issued for prior accounting periods shall be identified when querying the transit account information.	SDD-17
BOC-11-02-03-007	The real-time fare calculation performed by the ATP shall be based on the fare structure configuration described in the Fare Structure requirements. The calculation shall incorporate all attributes of the ride being taken, transit account rider classification, transit account balance, available fare products and order of precedence rules, transfer status, fare capping status, classification of base ride status, and all other factors that influence the fare to be charged. The online fare validation calculation algorithm shall be presented for review and approval by SEPTA at Design Review.	SDD-17
BOC-11-02-03-008	The online fare validation response generated by the ATP shall include all data used to determine fare validity and shall be presented for SEPTA's review and approval at Design Review.	SDD-17
BOC-11-02-03-009	The ATP shall accept transactions for offline validations performed by integrated devices and services. The actions performed by the ATP shall depend on the online result the ATP would have given: (1) If the results match, the use of an offline result shall be recorded for reporting purposes, but no other action is required; (2) If the offline validation result denied entry, while the online result (determined by the ATP) was to allow entry, the transaction shall be flagged as an exception, and identified as such for customer service staff and in exception reports; and (3) If the offline validation result allowed entry, while the online result (determined by the ATP) was to deny entry, configurable business rules shall support the option to still charge any fare due to the associated account/credential and adjust the transit account balance accordingly (e.g., bring the balance negative). All fare adjustments shall be reflected accurately in all relevant queries and reports.	SDD-17

Req #	Requirement	Assigned CDRL
BOC-11-02-03-010	The ATP shall support the tracking of negative account balances that occur as a result of offline fare acceptance or configured fare policies for transit accounts associated with both closed-loop and open payment media.	SDD-17
BOC-11-02-03-011	The ATP shall be capable of accepting audit registers generated locally by fare validation devices to serve as an independent data source for transactions performed at these devices. These audit registers shall be automatically reconciled against the fare validation transactions generated by the ATP to validate transaction accuracy and completeness. Any discrepancies identified by the reconciliation process shall be raised as exceptions and populated in an exception report.	SDD-17
BOC-11-02-03-012	The ATP shall provide the capability to automatically resolve exceptions generated from missing or inaccurate fare validation transactions. The exception resolution process shall address inaccuracies at the transit account level and adjust accounting entries, where possible. The process shall be defined and approved during Design Review.	SDD-17

11.2.4 ATP Fare Inspection

Req #	Requirement	Assigned CDRL
BOC-11-02-04-001	The ATP shall enable fare inspection of closed-loop and open-loop payments, and shall support all media types, including EU smartcards and DSMs, paper and mobile 2D barcode and QR code tickets, mobile wallet-based virtual cards, and EMV contactless bank cards.	SDD-17
BOC-11-02-04-002	Generation of a fare inspection response shall be performed in real-time and require a query of the transit account to determine whether a fare validation occurred.	SDD-17
BOC-11-02-04-003	Real-time fare inspection determination by the ATP shall be based on the fare structure configuration described in the Fare Structure Requirements. The determination shall incorporate fare payment transactions (e.g., approved and denied) recorded by the ATP, transit account rider classification, available fare products, transfer status, fare capping status, and all other factors that influence possible payment by the customer. The online fare inspection algorithm shall be presented for SEPTA's review and approval during Design Review.	SDD-17

Req #	Requirement	Assigned CDRL
BOC-11-02-04-004	An online fare inspection response generated by the ATP shall include all data used to determine fare validity and shall be presented for SEPTA's review and approval during Design Review. The fare inspection response shall provide all information required to generate a receipt or citation if desired.	SDD-17
BOC-11-02-04-005	If the fare validation is determined to be invalid during an online fare inspection, an associated reason code shall be provided to identify the business rule violation causing the invalid result.	SDD-17
BOC-11-02-04-006	The ATP shall provide the capability to automatically deduct the missing fare and a configurable surcharge/penalty fare from a transit account following an invalid inspection result. The fare payment charged shall consider all relevant fare information described in the Fare Structure requirements and conform to the general fare calculation algorithm of the ATP.	SDD-17
BOC-11-02-04-007	The ATP shall provide the capability to issue a warning or citation following the result of a fare inspection. Information required to determine if a warning or citation is appropriate shall be returned to the fare inspection device, including warning and citation history and citation amount. The ATP shall accept the data required to issue a warning or citation, including customer name and address.	SDD-17
BOC-11-02-04-008	The ATP shall provide the capability to recommend whether a warning or citation should be issued based on configurable thresholds against a transit account's inspection, warning, and citation history.	SDD-17
BOC-11-02-04-009	The ATP shall allow the override of any inspection, warning, or citation result. In the event that an override is requested, the resulting transaction shall contain the override details.	SDD-17
BOC-11-02-04-010	The ATP shall enable the upload of offline fare inspection transactions and record them as such to facilitate the identification and tracking of offline transactions.	SDD-17
BOC-11-02-04-011	The ATP shall be capable of accepting audit registers generated locally by fare inspection devices to serve as an independent data source for transactions performed at these devices. These audit registers shall be automatically reconciled against the fare inspection transactions generated by the ATP to validate transaction accuracy and completeness. Any discrepancies identified by the reconciliation process shall be raised as exceptions and populated in an exception report.	SDD-17

11.3 Customer Relationship Management (CRM) System

The Contractor shall deploy a COTS, web-based 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. The CRM is designed for a 'card not present' customer service function allowing customer service agents to provide customer service over the phone.

11.3.1 CRM General Requirements

Req #	Requirement	Assigned CDRL
BOC-11-03-01-001	The Contractor shall deploy a COTS, web-based CRM System that provides user management (e.g., staff logon management and associated roles/responsibilities), central management for all customer data, customer service operations, and fare media and product ordering and fulfillment, as well as cradle-to-grave tracking of all customer service contacts and requests.	SDD-18
BOC-11-03-01-002	The core function of the CRM System shall be to support contact center operations with a tool that provides a 360-degree view of the customer, and enables the creation, viewing, and modification of customer service records and work tickets related to contacts, requests, and the actions taken to resolve those requests.	SDD-18
BOC-11-03-01-003	The CRM System shall be supported by a secure customer database, which shall be fully compliant with all applicable PCI standards published at the time of system launch, and all SEPTA, federal, state and, and local policies for the handling of PII.	SDD-18
BOC-11-03-01-004	The CRM System shall support the management of special fare programs, which shall allow transit accounts to be linked to an institutional customer (e.g., employer or school) for account management and the loading of value, as defined in the Fare Structure Requirements.	SDD-18
BOC-11-03-01-005	The CRM System shall include the capability to create bulk orders for fulfillment through the CST order fulfillment application. Orders placed through the CRM shall automatically be available via the CST immediately for fulfillment. The CRM shall provide central order management including the ability to monitor, track and update bulk orders placed through all sales channels. The CRM System shall record all changes to bulk orders and provide transactions in a history view.	SDD-18

Req #	Requirement	Assigned CDRL
BOC-11-03-01-006	The CRM System shall provide the ability to approve and reject refunds and account adjustments (e.g., credit or debit) requested by registered customers through customer channels (e.g., mobile applications, websites). The refund status, reason code, and user performing the refund shall be captured and stored by the CRM System.	SDD-18
BOC-11-03-01-007	The CRM System shall support the creation of new customer accounts and allow registration of zero (0) or more transit accounts to the same customer account for consolidated transit account management through all customer service channels. The maximum number of transit accounts that a customer account can support shall be configurable. A user may create and register a customer account using their name, personal information, e-mail address, security questions and answers. SEPTA shall have the option of adding or removing any customer data element at no additional charge. The determination of mandatory and optional data required shall be configurable.	SDD-18
BOC-11-03-01-008	The CRM System shall provide the capability to register a transit account to zero (0) or more customer accounts for the enablement of role-based transit account management. A primary customer account shall possess all management privileges and capabilities for a transit account, and shall have the option to assign and revoke privileges to other customer accounts, as desired. For example, a dependent may assign all management privileges to a guardian, or an employee may assign fare product purchasing privileges to an employer. A history of all customer account registration, un-registration (i.e., unlinking), and access changes shall be maintained in the transit account.	SDD-18
BOC-11-03-01-009	The CRM System shall maintain records of all transit accounts, and payment tokens (e.g., payment methods) associated with each customer account.	SDD-18
BOC-11-03-01-010	The CRM System shall support the deletion of customer information by customer service staff to comply with federal, state, and local privacy standards and privacy laws. Transit data outside of PII scope shall be maintained in the CRM System for auditing purposes.	SDD-18
BOC-11-03-01-011	The CRM System shall support the creation of customer accounts without linking a transit account. Anonymous accounts may have a subset of functions available which shall be defined and approved during Design Review.	SDD-18

Req #	Requirement	Assigned CDRL
BOC-11-03-01-012	The CRM System shall support secure login from customer facing channels to access customer accounts. The CRM System shall apply a unique username or email address as the login and enforce system-wide uniqueness for the login field. All available customer login information (e.g., timestamp, IP address) shall be recorded by the CRM System for auditing and security purposes.	SDD-18
BOC-11-03-01-013	The Contractor shall enable multi-factor authentication which utilizes a primary and secondary method, and appropriately authenticate customers for normal and sensitive access and operations, from all supported channels. Sensitive access requiring elevated authentication shall include creating or modifying payment methods, subscriptions or autoloan contracts, customer accounts and passwords, and other items identified during Design Review.	SDD-18
BOC-11-03-01-014	The CRM System shall support AVS to enhance the quality of collected customer information. The CRM System shall also support e-mail address verification if used as customer account registration data.	SDD-18
BOC-11-03-01-015	The CRM System shall enable the querying of all customer account attributes and details for external systems via API, including name, phone number, e-mail address, mailing address, preferred language, linked transit accounts, and payment token details.	SDD-18
BOC-11-03-01-016	The CRM System shall track and record all activities performed by customer service staff including accessing customer account details and records, modifying account data, and performing sales and refunds. The CRM System shall record all data required for auditing purposes.	SDD-18
BOC-11-03-01-017	The CRM System shall support the management of customer account passwords.	SDD-18
BOC-11-03-01-018	The CRM System shall provide the capability to send notification messages and transaction receipts to users based on contact information stored in the customer account. The customer account shall contain user notification settings specifying the categories of events that the customer has opted into (e.g., low balance alerts). All notification messages and transaction receipts shall contain messaging approved by SEPTA. Supported notification types shall include e-mail, text message, and mobile push notifications.	SDD-18

Req #	Requirement	Assigned CDRL
BOC-11-03-01-019	The Contractor shall provide outbound e-mail services delivering e-mails directly to customer inboxes. Additionally, the Contractor shall forward/relay e-mails originating from elsewhere within SEPTA if required by SEPTA.	SDD-18
BOC-11-03-01-020	The CRM System shall provide a user interface to enable the customization of notification messages and conditions for which notifications are triggered. Notification messages shall support HTML/CSS where possible (e.g., e-mails) and configurable conditions shall include value thresholds, period before expiration, reoccurring intervals, and specific date and time.	SDD-18
BOC-11-03-01-021	The CRM System shall capture and store all customer information required for anti-spam compliance, including date of consent, consent type, purpose of consent, and consenting method. A history of opt-in consent, unsubscribe requests, and all delivered electronic notifications shall be maintained in the customer account.	SDD-18
BOC-11-03-01-022	The CRM System web interface shall support all modern desktop and mobile browsers, including Edge, Firefox, Safari, Chrome, Mozilla, and Opera. Browser compatibility shall be tested and maintained through the life of the Contract.	SDD-18
BOC-11-03-01-023	The CRM System shall support multiple levels of logins roles configurable by SEPTA. SEPTA shall be able to adjust permissions to CRM features and functions based on user login role. Permissions based on login level shall be defined during Design Review. User login to the CRM shall include MFA.	SDD-18
BOC-11-03-01-024	The CRM System shall support the ability for customer facing interfaces (e.g., mobile application and websites) to create work tickets within the CRM based on inputs entered by the customer.	SDD-18
BOC-11-03-01-025	The CRM System shall support the ability to e-mail or text customers for customer support via email and text messaging.	SDD-18

11.3.2 CRM Database

Req #	Requirement	Assigned CDRL
BOC-11-03-02-001	An isolated customer database shall maintain customer accounts that store all customer data, including all personal and payment token information, associated with both individual and institutional customers. Any hierarchical data relationships (e.g., customer account to transit account) shall be structured and stored in the system. Credit and debit card payment methods shall be tokenized.	SDD-18
BOC-11-03-02-002	All data in the customer database shall be encrypted using strong cryptography, as defined by NIST, and all payment data shall be stored in a tokenized form.	SDD-18
BOC-11-03-02-003	The customer database shall serve as the repository for all information on customers applying for a reduced fare classification, including storage of applications and supporting documentation, eligibility parameters, and card personalization information, such as a customer photograph.	SDD-18
BOC-11-03-02-004	The customer database shall serve as the repository for all information on employees and contractors who are issued transit access cards, including name, date of birth (DOB), start date, termination date, and card personalization information, such as an employee photograph.	SDD-18
BOC-11-03-02-005	Customer information that is specific to a piece of fare media issued to a customer, such as card personalization data (e.g., printed name, DOB, and photograph) shall be stored in a unique cardholder record within the customer database. The cardholder record shall have a one-to-one relationship with the fare media issued (i.e., linked to the associated transit account), and shall be separate from customer accounts, to which many transit accounts may be linked.	SDD-18

11.3.3 CRM Tool

Req #	Requirement	Assigned CDRL
BOC-11-03-03-001	The COTS, web-based CRM Tool shall support contact center and in-person customer service operations by providing a complete view of the customer and related transit and customer account data, including all activity associated with both registered and anonymous transit accounts associated with all forms of accepted fare media.	SDD-18

Req #	Requirement	Assigned CDRL
BOC-11-03-03-002	The CRM Tool shall allow viewing and modification of all customer account data. A request by the customer to reset a password or IVR PIN shall require the answering of security questions set at the time of account registration. For password resets, a temporary password shall be automatically e-mailed to the customer.	SDD-18
BOC-11-03-03-003	The CRM Tool shall accept credit cards and debit cards for payment during fare media and product sales and the setup of autoload. The CRM tool shall 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.	SDD-18
BOC-11-03-03-004	The CRM Tool shall support supervision controls to enable approvals or rejections of actions to customer and transit accounts based on configurable conditions. For example, the CRM tool shall require supervisor approval to issue a refund over a configurable threshold.	SDD-18
BOC-11-03-03-005	The CRM Tool shall support the input of preconfigured codes and notes when performing customer and transit account actions to explain reasoning and operational details. Whether the input field is mandatory or optional shall be configurable based on the specific action being performed.	SDD-18
BOC-11-03-03-006	The CRM Tool shall connect to the ATP, CMS, and customer database using the system APIs, as defined in the System Architecture requirements, and provide a fully integrated interface for customer service staff to view and modify customer and transit account data.	SDD-18
BOC-11-03-03-007	The CRM Tool shall enable customer service staff to search the Customer Database using different search criteria for customer accounts and institution accounts. The results shall easily identify whether the account is a customer or institution account.	SDD-18
BOC-11-03-03-008	The CRM Tool shall enable customer service staff to create new individual customer accounts.	SDD-18
BOC-11-03-03-009	The CRM Tool shall enable customer service staff to create new institutional customer accounts.	SDD-18
BOC-11-03-03-010	The CRM Tool shall enable customer service staff to view customer account status and data.	SDD-18
BOC-11-03-03-011	The CRM Tool shall enable SEPTA customer service staff to modify customer account data.	SDD-18

Req #	Requirement	Assigned CDRL
BOC-11-03-03-012	The CRM Tool shall enable customer service staff to register (e.g., link) a transit account to an individual or institutional customer account.	SDD-18
BOC-11-03-03-013	The CRM Tool shall enable customer service staff to unregister (e.g., unlink) a transit account from an individual or institutional customer account.	SDD-18
BOC-11-03-03-014	The CRM Tool shall enable customer service staff to add a funding source to an individual or institutional customer account.	SDD-18
BOC-11-03-03-015	The CRM Tool shall enable customer service staff to close an individual or institutional customer account.	SDD-18
BOC-11-03-03-016	The CRM Tool shall enable customer service staff to sell all supported fare media (and create new transit accounts). The CRM tool shall support the ability to issue electronic receipts via SMS or e-mail.	SDD-18
BOC-11-03-03-017	The CRM Tool shall enable customer service staff to activate fare products for autoloading (requires funding source in customer account). The CRM tool shall support the ability to issue electronic receipts via SMS or e-mail.	SDD-18
BOC-11-03-03-018	The CRM Tool shall enable customer service staff to generate fare payment reversals (e.g., cancellation).	SDD-18
BOC-11-03-03-019	The CRM Tool shall enable customer service staff to generate full and partial sales reversals (e.g., refund). Refunds shall be enabled or disabled based on product eligibility rules defined by SEPTA. Full and partial refund amounts shall be automatically calculated.	SDD-18
BOC-11-03-03-020	The CRM Tool shall enable customer service staff to correct tap off transactions and trigger the automatic recalculation of a prior paid fare.	SDD-18
BOC-11-03-03-021	The CRM Tool shall enable customer service staff to generate account adjustments (e.g., credit or debit).	SDD-18
BOC-11-03-03-022	The CRM Tool shall support different adjustment categories to be determined during Design Review (e.g., goodwill).	SDD-18
BOC-11-03-03-023	The CRM Tool shall enable customer service staff to attempt reauthorization of a balance due against a payment token previously used for open payments. Upon successful authorization, the transit account shall be removed from the risk list.	SDD-18

Req #	Requirement	Assigned CDRL
BOC-11-03-03-024	The CRM Tool shall enable customer service staff to transfer balances between linked transit accounts under the same customer account.	SDD-18
BOC-11-03-03-025	The CRM Tool shall enable customer service staff to block and unblock fare media credentials, accounts, or individual fare products.	SDD-18
BOC-11-03-03-026	The CRM Tool shall enable customer service staff to issue lost, stolen, defective, or damaged fare media replacements. The new fare media shall be associated with the existing account, where applicable.	SDD-18
BOC-11-03-03-027	The CRM Tool shall allow registered customers to complete a card replacement online for unused, non-personalized cards. For the unused, new card (transit account), a card replacement shall be supported ensuring all previous transaction and trip history, stored value and/or product information is saved to the new card (transit account), while blocking the card (transit account) that is being replaced.	SDD-18
BOC-11-03-03-028	The CRM Tool shall allow registered customers to complete a card replacement online for used, non-personalized cards. If the new card and the card being replaced both contain any transaction history (e.g., fare capping, stored value, and/or partially used products) a card replacement wizard with easy-to-answer questions for the user to confirm their desired outcome (e.g., transfer balance, transfer product(s), name new card) shall be presented. The result of the replacement process shall provide a summary of essential information remaining on the replaced card (e.g., fare capping accumulation, transaction and trip history shall remain on blocked card). The data elements, information provided, and user flow for this card replacement feature shall be determined during Design Review.	SDD-18
BOC-11-03-03-029	The CRM Tool shall enable customer service staff to generate opt-out refunds (e.g., close transit account and issue refund).	SDD-18
BOC-11-03-03-030	The CRM Tool shall enable customer service staff to sell all supported fare products (e.g., stored value and passes) and load fare products to transit accounts (e.g., on behalf of a customer).	SDD-18
BOC-11-03-03-031	The CRM Tool shall enable customer service staff to query all transit account, customer account, and credential details (e.g., associated rider classification, active/inactive status, blocked/unblocked status).	SDD-18
BOC-11-03-03-032	The CRM Tool shall enable customer service staff to modify the reduced fare (e.g., concession) or fare type of a transit account.	SDD-18

Req #	Requirement	Assigned CDRL
BOC-11-03-03-033	The CRM Tool shall enable customer service staff to add and update cardholder record data.	SDD-18
BOC-11-03-03-034	The CRM Tool shall enable customer service staff to view fare payment transaction history associated with closed-loop media.	SDD-18
BOC-11-03-03-035	The CRM Tool shall enable customer service staff to manage closed-loop virtual cards (e.g., block, reset device counter) and view device credential types.	SDD-18
BOC-11-03-03-036	The CRM Tool shall provide a record in the transit account transaction history each time digital fare media is moved between devices.	SDD-18
BOC-11-03-03-037	The CRM Tool shall provide the ability to transition digital fare media to physical fare media. Transitioning to a physical card shall transfer transaction history, value, products, capping status, and all other attributes from the digital fare media to a physical card.	SDD-18
BOC-11-03-03-038	The CRM Tool shall allow customer service representatives reset the Apple Hash to enable a user to complete the provisioning or moving a card to their device.	SDD-18
BOC-11-03-03-039	The CRM Tool shall enable customer service staff to view open payment transaction history and authorizations through entry of card data (i.e., fPAN or tokenized PAN) provided by the customer.	SDD-18
BOC-11-03-03-040	The CRM Tool shall enable customer service staff to view fare capping progress against all configured fare caps.	SDD-18
BOC-11-03-03-041	The CRM Tool shall enable customer service staff to view sales transaction history.	SDD-18
BOC-11-03-03-042	The CRM Tool shall enable customer service staff to view adjustment transaction history.	SDD-18
BOC-11-03-03-043	The CRM Tool shall support split payments where up to [three (3) payment methods], including multiple tokenized bank cards and stored value, shall be able to be used to complete payment for a single sale.	SDD-18
BOC-11-03-03-044	The CRM Tool shall enable the bulk registration and loading of transit accounts in support of special fare programs through the entry of a transit account/fare media ID range or upload of a file.	SDD-18

Req #	Requirement	Assigned CDRL
BOC-11-03-03-045	The CRM Tool shall enable the bulk sale, issuance, and approval of EU, and LU fare media, including the initialization and loading of the associated transit accounts, through the entry of a transit account/fare media ID range or upload of a file.	SDD-18
BOC-11-03-03-046	The CRM Tool shall enable the bulk blocking of transit accounts and issuance of transit account adjustments through the entry of a transit account/fare media ID range or upload of a file. All proposed file formatting for the support of the CRM's bulk functionality shall be reviewed and approved by SEPTA during Design Review.	SDD-18
BOC-11-03-03-047	The CRM Tool shall support the enrollment of a participant in an institutional program. Participants shall be able to enter their unique identifier (e.g., e-mail, code, or other unique identifiers determined during Design Review) that enable access to the participant's travel benefits and unique products and passes for that institutional program.	SDD-18
BOC-11-03-03-048	The CRM System shall allow customer service staff to associate and disassociate transit accounts from the institutional program either individually or in bulk through an upload of a file. Disassociating the transit account shall not impact the association to a registered customer account or modify the status of the existing transit account. Once a transit account is disassociated, special products or discounts associated with the institutional program shall no longer be available for purchase for that transit account.	SDD-18
BOC-11-03-03-049	The CRM System shall allow customer service staff to remove fare products from transit accounts associated with an institution individually or in bulk by selecting an institution through an upload file, or by selecting multiple accounts from the CRM user interface.	SDD-18
BOC-11-03-03-050	The CRM Tool shall be able to: (1) Link their existing customer account to an institutional program; (2) Associate their virtual fare media to the institutional program; and (3) Convert physical fare media distributed by the institution to virtual fare media.	SDD-18
BOC-11-03-03-051	The CRM Tool shall support purchase, pay, and refunds for services supported by special fare programs offered by SEPTA (e.g., parking, bike share, and tourist transportation).	SDD-18

Req #	Requirement	Assigned CDRL
BOC-11-03-03-052	The CRM Tool shall be capable of issuing bulk refunds and account adjustments for fare payment / validation transactions queried by the tool. Refundable transactions shall be identified by querying attributes associated with fare payment, including device type, location, date, timestamp, transit agency, and transaction ID range.	SDD-18
BOC-11-03-03-053	The file format required to support the CRM bulk functionality shall be determined during Design Review.	SDD-18
BOC-11-03-03-054	The CRM Tool shall be capable of accepting and displaying characters (e.g., UTF-8 encoding) from multiple languages, including English, French, and Chinese.	SDD-18

11.3.4 CRM Customer Service Records

Req #	Requirement	Assigned CDRL
BOC-11-03-04-001	The CRM System shall 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 tool.	SDD-18
BOC-11-03-04-002	Customer service records shall be created automatically based on customer-initiated actions and requests performed through front end applications (e.g., customer website and mobile application). Customer Service Requests shall be categorized. The categories shall be determined during Design Review.	SDD-18
BOC-11-03-04-003	All actions performed by customer service staff that result in a change to a customer or transit account shall automatically generate a customer service record.	SDD-18
BOC-11-03-04-004	Customer service staff shall be able to manually create or update (e.g., add notes) a customer service record when responding to customer service requests in person, over the web, or by phone.	SDD-18
BOC-11-03-04-005	Customer service records shall be created for actions associated with both anonymous and registered transit accounts and shall be linked to a specific customer account whenever possible.	SDD-18

Req #	Requirement	Assigned CDRL
BOC-11-03-04-006	The CRM System shall support the classification of customer service records by type and severity for reporting purposes, using pre-defined selections and custom text fields.	SDD-18

11.3.5 CRM Customer Account

Req #	Requirement	Assigned CDRL
BOC-11-03-05-001	All customers shall have the option of registering a transit account or remaining anonymous.	SDD-18
BOC-11-03-05-002	A registered transit account shall be associated with an individual and/or institutional customer account maintained within the CRM System customer database with no restrictions to the number of transit accounts that can be associated with institutional accounts. The number of transit accounts associated to an individual customer account shall be configurable by SEPTA.	SDD-18
BOC-11-03-05-003	Customer data maintained in an institutional Customer Account shall include at a minimum: (1) Institutional name; (2) partner profile details (e.g., relationship lead and accounting counter-parties, and contact information); (3) institution address; (4) phone number; (5) e-mail address; (6) administrator name; (7) administrator password; (8) security questions and answers; (9) authorized users; and (10) all configuration parameters governing the institution's participation in a special fare program. The determination of mandatory and optional data required shall be configurable.	SDD-18
BOC-11-03-05-004	Individual and institutional customers shall have the option of providing a payment method to be stored by the CRM System and available for future one-time purchases or for the recurring loading of value. A customer shall be able to store multiple funding sources.	SDD-18
BOC-11-03-05-005	For specific fare media (e.g., employee cards), the business rules may prohibit registration or loading of specific fare products (i.e., stored value or special passes or fares).	SDD-18
BOC-11-03-05-006	Customer data maintained in an individual customer account shall include at a minimum: (1) Name; (2) Address; (3) Phone number; (4) E-mail address; (5) Username; (6) Password; (7) IVR System PIN; and (8) Security questions and answers.	SDD-18

Req #	Requirement	Assigned CDRL
BOC-11-03-05-007	The CRM System shall allow a customer account to be created without associating (e.g., registering) a transit account, the system shall also allow multiple transit accounts to be registered to the same customer account for consolidated transit account management through all customer service channels.	SDD-18
BOC-11-03-05-008	Transit accounts shall be able to be associated with both individual and institutional customer accounts and shall be able to be registered to both an individual and institutional customer at the same time.	SDD-18
BOC-11-03-05-009	The CRM System shall allow an individual transit account to be associated with multiple customer accounts and provide different levels of functionality and access to the transit account (e.g., primary account holder, secondary account holder). Features and functions allowed by the customer account shall be determined and approved by SEPTA during Design Review.	SDD-18
BOC-11-03-05-010	Individual transit accounts shall be able to store an authenticated flag or identifier (e.g., those used with external concession authentication services). This flag shall enable a customer account to access privileged products based on the results of an external authentication process that is then captured within the customer transit account.	SDD-18
BOC-11-03-05-011	The CRM Tool shall display cardholder records (e.g., printed name, reduced fare eligibility, DOB, and photo) stored securely in the transit account.	SDD-18

11.4 System Monitoring and Management Application (SMMA)

The System Monitoring and Management Application (SMMA) is a tool that provides a comprehensive overview of the health of the AFC System and associated hardware. The SMMA provides real-time back-office AFC System and device level monitoring through an application(s) or web-based GUI. The SMMA must support multiple user groups that can be tailored to the needs of SEPTA, with configurable views and dashboards to support day-to-day operations. Automated alerts and notifications shall be pushed to specific individuals or groups defined by SEPTA to maximize efficiency in responding to issues during operations.

A common issue with most device monitoring solutions is that the monitoring application often falsely reports issues while vehicles are parked in the yard or being serviced by maintenance. The inability to intelligently determine if devices are most likely having issues, or just not currently in service can be mitigated if multiple data sources are used. As fare systems become more deeply integrated with other Intelligent Transportation System (ITS) solutions such as the CAD/AVL, paratransit scheduling, real-time

arrival, or enterprise solutions that track this type of data, the SMMA can also improve the accurate in reporting or determining device issues.

The requirements in this section not only describe the functionality requested for system monitoring but also the possibility of improving the data provided by leveraging existing ITS Systems at SEPTA.

11.4.1 SMMA General Requirements

Req #	Requirement	Assigned CDRL
BOC-11-04-01-001	The Contractor shall deploy an SMMA that enables the central monitoring and management of all Contractor-provided devices, applications, and third-party integrations with the AFC System.	SDD-19
BOC-11-04-01-002	The SMMA shall provide real-time performance and status monitoring for all devices, back-office systems, and network nodes using the Contractor-provided device management API.	SDD-19
BOC-11-04-01-003	The SMMA shall include a dedicated application or web-based tool that provides access to all monitoring and management functions and provides all information in a clear, organized dashboard using color graphics and text.	SDD-19
BOC-11-04-01-004	The SMMA tool shall be accessible remotely using any modern desktop or mobile web browser, using a mobile-responsive design. Access shall be restricted such that only approved devices operating on SEPTA's network shall be allowed to access the SMMA tool. User login to the SMMA shall include MFA.	SDD-19
BOC-11-04-01-005	The SMMA dashboard shall include a system map that can be drilled down into by location to view and control the status of system components. The system map shall be dynamically updated when devices or systems are added and removed, and configurable to allow editing of device groups, locations, and location names as the system expands.	SDD-19
BOC-11-04-01-006	The SMMA shall store and provide historical performance and status monitoring statistics for all devices, back-office systems, and network nodes for a period of not less than [seven (7) years]. This data shall, at a minimum, be available via on-demand reports. Report design and reported metrics shall be determined and approved by SEPTA in Design Review.	SDD-19

11.4.2 SMMA Device and System Monitoring

Req #	Requirement	Assigned CDRL
BOC-11-04-02-001	The SMMA shall monitor the operational status and performance of all devices and their components provided by the Contractor for the AFC System.	SDD-19
BOC-11-04-02-002	The SMMA shall display device attributes, including but not limited to device type, device ID, location, status, events, alarms, software version(s), and the last update date/time stamp of local lists.	SDD-19
BOC-11-04-02-003	The SMMA shall include the operational status of devices (e.g., in-service, out of service, degraded mode, no communications, parked at the garage, pulled for maintenance, etc.), maintenance alarms associated with individual device modules, and revenue alerts (e.g., vault almost full/full and low stock/out of stock), as described in the equipment sections of these requirements.	SDD-19
BOC-11-04-02-004	For devices installed on vehicles, the SMMA shall use an alternate data source (e.g., GTFS RealTime, CAD/AVL dispatching data, manifest data, etc.) to automatically differentiate between devices that are not communicating, or experiencing issues while in revenue service from devices that are parked at a garage, decommissioned, or in maintenance.	SDD-19
BOC-11-04-02-005	The SMMA shall monitor and display in real-time the status of all back-office systems (i.e., virtualized servers), subsystems, applications, databases, and processes. Details of which processes shall be monitored shall be provided during Design Review.	SDD-19
BOC-11-04-02-006	Processor load, memory utilization, errors, and other system performance indicators shall be available in real-time to help prevent performance degradation and troubleshoot back-office issues. Alarm types and thresholds shall be able to be configured to allow for custom alerts.	SDD-19
BOC-11-04-02-007	The SMMA shall monitor all Contractor-provided API endpoints and support real-time dashboard reporting on API server load, response times, and errors.	SDD-19
BOC-11-04-02-008	Devices, systems, and network nodes that are not reporting status for any reason shall be easily identifiable, and the last known status and history shall be available.	SDD-19

Req #	Requirement	Assigned CDRL
BOC-11-04-02-009	The SMMA shall automatically generate alerts via e-mail and text message. The trigger, frequency, notification list (e.g., e-mail group, text message numbers) and cancellation of these alerts shall be configurable and approved by SEPTA.	SDD-19

11.4.3 SMMA Device Management

Req #	Requirement	Assigned CDRL
BOC-11-04-03-001	The SMMA shall support the real-time issuance of device commands, and device configuration, using the Contractor-provided device management API.	SDD-19
BOC-11-04-03-002	The SMMA shall support the issuance of device commands system-wide and by device type, location, and individual device. Details of the device commands, access, and security shall be defined and approved by SEPTA during Design Review.	SDD-19
BOC-11-04-03-003	Command sets shall vary by device but shall include configuration, maintenance, revenue, and customer service functions, as described in the equipment sections of these specifications. Commands shall be defined and approved by SEPTA during Design Review.	SDD-19
BOC-11-04-03-004	SMMA commands shall utilize an appropriate command protocol based on industry standard. The protocol chosen shall be supported by all devices and systems on a per device basis and take into account expected network traffic and potential for intermittent communications.	SDD-19
BOC-11-04-03-005	The SMMA shall support the setting and distribution of all configuration parameters stored locally at the devices, including positive and negative lists, as described in these specifications.	SDD-19

11.5 Financial Management System (FMS)

The Contractor shall deploy a Financial Management System (FMS) that maintains a general ledger of all financial activity within the AFC System, tracks receivables, and supports the settlement of funds between all participating agencies.

11.5.1 FMS General Requirements

Req #	Requirement	Assigned CDRL
BOC-11-05-01-001	The Contractor shall deploy a FMS that maintains a General Ledger (GL) of all financial activity generated and supported by the AFC System, ensures integrity in the end-to-end accounting of revenue (e.g., revenue generation, recognition, and apportionment), provides detailed tracking of receivables and payables, supports cash collections and deposit, automates key financial reconciliations, and facilitates the automated settlement of funds between system participants.	SDD-20
BOC-11-05-01-002	The FMS shall be built using well-established, industry-appropriate, COTS, enterprise-level financial management software. The FMS shall interface with other Contractor-designed software modules to provide the required functionality.	SDD-20
BOC-11-05-01-003	The FMS shall support the full auditing of all AFC System financial activity, including reconciliation of all accounts and end-to-end tracking of all financial transactions recorded.	SDD-20
BOC-11-05-01-004	The FMS shall include flexible APIs that enable the secure import and export of financial data to and from external systems. The Contractor shall make available to SEPTA all API specifications for FMS-supported APIs under the same ownership and/or licensing agreements as those for other Contractor-provided APIs.	SDD-20
BOC-11-05-01-005	The Contractor shall employ an expert, preferably a designated accountant with experience in the transportation industry, with the accounting and technical knowledge necessary to fully setup and configure the FMS based on accounting best practices and the specific design of the delivered AFC System.	SDD-20

11.5.2 FMS General Ledger (GL)

Req #	Requirement	Assigned CDRL
BOC-11-05-02-001	The FMS shall include a COTS GL module that shall be fully installed and configured by the Contractor to report on the basis of SEPTA's fiscal year for all accounts, including assets, liabilities, revenues and expenses.	SDD-20

Req #	Requirement	Assigned CDRL
BOC-11-05-02-002	The GL shall include accounts to track assets, liabilities, revenues, and expenses (e.g., cash, deferred revenue, earned revenue, receivables, payables, etc.), as necessary to support the accounting of transactions generated by the AFC System.	SDD-20
BOC-11-05-02-003	The GL account structure (i.e., chart of accounts) shall be defined with SEPTA during Design Review, and shall align with the account structure used in existing SEPTA financial systems, where applicable.	SDD-20
BOC-11-05-02-004	The Contractor shall be responsible for mapping each transaction type generated by the AFC System to appropriate GL journal entries (i.e., debit and credit accounts) to support automated categorization and summarization of transactions for posting to the FMS. The GL accounts and level of detail at which transactions are aggregated shall be subject to review during Design Review.	SDD-20
BOC-11-05-02-005	Journal entries shall be posted to the GL as transactions are generated, where appropriate, and no less than daily (after business hours). The timing of daily postings shall be defined and approved by SEPTA during Design Review.	SDD-20
BOC-11-05-02-006	SEPTA shall have the ability to generate manual GL postings to support corrections and adjustments. The GL shall provide controls that enable specific users to approve manual GL postings based on configured user access roles.	SDD-20
BOC-11-05-02-007	The FMS shall ensure that access to financial data and the ability to create entries in the GL shall be available to authorized users only. All financial actions performed by authorized users shall be logged with all user information captured for auditing purposes.	SDD-20

11.5.3 FMS Revenue Recording and Recognition

Req #	Requirement	Assigned CDRL
BOC-11-05-03-001	The FMS shall support the recording of fare revenue using accrual-based accounting, where revenue is recorded as deferred (i.e., unearned) when generated (e.g., at the sale of fare products) and recognized in a manner that reflects the time and value for which associated services are provided to a customer.	SDD-20

Req #	Requirement	Assigned CDRL
BOC-11-05-03-002	Revenue recognition processes shall be automated and configurable at the fare product-level, based on a variety of time and usage parameters, including: (1) Recognition at product sale; (2) Recognition at product first use; (3) Recognition at product expiry (4) Recognition per use (i.e., for e-purse and trip-based products); and (5) Periodic recognition over product validity period (daily or monthly).	SDD-20
BOC-11-05-03-003	The FMS shall support ongoing reconciliation of the Stored Value deferred revenue (i.e., liability) GL account balance to the total of the transit account balances maintained within the AFC System at any point in time.	SDD-20

11.5.4 FMS Cash Receipts and Reconciliation

Req #	Requirement	Assigned CDRL
BOC-11-05-04-001	The GL shall track expected cash receipts for all sales channels (e.g., website and devices). Cash-In-Transit accounts shall track expected cash receipts down to the individual device-level, and for each individual bankcard (credit/debit) transactions processed through the PSP.	SDD-20
BOC-11-05-04-002	The FMS shall support the automated reconciliation of settled bank card transactions using PSP-provided settlement files and bank statements, and clearing of Cash-In-Transit balances associated with transactions successfully reconciled. The reconciliation process shall flag all exceptions, including (1) Record count (e.g., duplicate and missing transactions) discrepancies; (2) Transactions amount discrepancies, chargebacks; and (3) Transactions that fail to settle over a configured period of time. The FMS shall allow authorized users to review, confirm, and resolve reconciliation exceptions.	SDD-20
BOC-11-05-04-003	The FMS shall track expected cash receipts for all sales channels where cash must be collected, counted, and deposited (e.g., FVMs and customer service locations). The FMS shall generate Cash-In-Transit entries at the device-, location-, or shift-level, based on revenue service and shift start/end events generated by the devices.	SDD-20

Req #	Requirement	Assigned CDRL
BOC-11-05-04-004	The FMS shall use imported data from SEPTA's cash processing equipment to support the automated reconciliation of collected cash against expected cash receipts (at the device-, location-, or shift-level), and clearing of Cash-In-Transit balances associated with receipts successfully reconciled. The reconciliation process shall flag all exceptions, including count shortages and overages. The FMS shall allow authorized users to review, confirm, and resolve reconciliation exceptions.	SDD-20
BOC-11-05-04-005	The FMS shall support both automated and manual handling of reconciliation exceptions. Automated handling of exceptions resulting from non-payment, including notification of bank card chargebacks, shall support the automated generation of system transactions (e.g., sales reversals) necessary to adjust transit account balances, remove fare products from accounts, block fare payment credentials, and write-off uncollectable balances. Adjustment types to be used for manual exception handling shall be defined during Design Review.	SDD-20

11.5.5 FMS Accounts Receivable (AR)

Req #	Requirement	Assigned CDRL
BOC-11-05-05-001	The FMS shall include a COTS Accounts Receivable (AR) module that shall be fully installed and configured by the Contractor, and shall support the creation and management of receivables within the GL.	SDD-20
BOC-11-05-05-002	The AR module shall track receivables for prepaid and post-bill fare media and product sales initiated through the CRM System and institutional website in support of bulk sales and special fare programs.	SDD-20
BOC-11-05-05-003	The AR module shall support the establishment of AR accounts for individual customers and business partners (e.g., transit agencies, retailers, partner organizations, etc.), which can be dynamically generated based upon billing source entry, event, or transaction type.	SDD-20
BOC-11-05-05-004	The AR module shall support the automatic generation of invoices and monthly statements for invoiced (e.g., institutional) customers, detailing all account activity. The AR module shall support the consolidation of multiple AR accounts on a single customer statement.	SDD-20

Req #	Requirement	Assigned CDRL
BOC-11-05-05-005	The AR module shall support the ability to record billing items (e.g., fare media and products) by line item in order to identify unique accounting classification codes.	SDD-20
BOC-11-05-05-006	The AR module shall support the aging of receivables and an automated, fully auditable write-off process to be defined during Design Review.	SDD-20
BOC-11-05-05-007	The AR module shall support the setting of configurable credit limits for accounts, and the automated generation of credit holds and the disabling of order privileges within the AFC System when the credit limit is reached.	SDD-20
BOC-11-05-05-008	The AR module shall support the automatic generation of interest charges for accounts that are past due and generate dunning (e.g., collection) letters for overdue receivables when accounts become delinquent.	SDD-20
BOC-11-05-05-009	The AR module shall support the application of payments (full and partial), credit memos, and adjustments against AR accounts. The process shall support batch entry of receipts and lockbox functionality.	SDD-20
BOC-11-05-05-010	The AR module shall provide the ability for external systems to securely query account activity (e.g., billing, collection, and adjustments) by customer and receivable to support the display of invoice, account, and payment status in the CRM System and on the institutional website.	SDD-20

11.5.6 FMS Accounts Payable (AP)

Req #	Requirement	Assigned CDRL
BOC-11-05-06-001	The FMS shall include a COTS Accounts Payable (AP) module that shall be fully installed and configured by the Contractor, and shall support the creation and management of payables within the GL.	SDD-20
BOC-11-05-06-002	The AP module shall support the automatic generation of payables for participating SEPTA partners, based on AFC System transactions performed by, or otherwise impacting the settlement positions of, those agencies.	SDD-20

Req #	Requirement	Assigned CDRL
BOC-11-05-06-003	The AP module shall support the electronic intake of invoices, and automated matching to purchase orders, issued by partner organizations, such as retail sale partners and other third-party sales outlets.	SDD-20
BOC-11-05-06-004	The AP module support the automatic generation of payables for individual and bulk refunds for fare media and fare products, issued through customer service (i.e., CRM) or the sales channel generating the original sale. Contractor-provided reports shall provide detailed information on all refunds and adjustments issued by SEPTA.	SDD-20
BOC-11-05-06-005	The AP module shall enable authorized users to review and approve payables before any corresponding payment is performed.	SDD-20
BOC-11-05-06-006	The AP module shall support automated settlement of open invoices when payments are posted.	SDD-20

11.5.7 FMS Revenue Apportionment and Settlement

Req #	Requirement	Assigned CDRL
BOC-11-05-07-001	The FMS shall support the configuration and execution of revenue apportionment calculations necessary to determine the settlement positions of various parties, including SEPTA, transit agency partners, and partner organizations, supporting financial activity within the AFC System. Calculated settlement positions may be positive or negative, and shall include the application of fees, commissions, and accrued interest, as necessary.	SDD-20
BOC-11-05-07-002	The FMS shall automatically apportion revenue to participating SEPTA partners based on configurable revenue apportionment rules to be defined whenever a SEPTA partner is added. Apportionment of revenue shall be based on fare value sold and used at SEPTA partner locations and for SEPTA partner services, and may include the application of apportionment formulas based on fixed (e.g., percentage-based) and dynamic (e.g., usage-based) values.	SDD-20
BOC-11-05-07-003	The FMS shall perform automated settlement of revenues (i.e., transfer of funds), based on the settlement positions calculated by the system, at a frequency configured by SEPTA (up to daily).	SDD-20

Req #	Requirement	Assigned CDRL
BOC-11-05-07-004	The FMS shall enable authorized users to review and approve calculated settlement positions before the corresponding settlement is performed. The FMS shall enable SEPTA to perform manual settlement, if desired.	SDD-20

11.5.8 FMS Financial Data and Reporting

Req #	Requirement	Assigned CDRL
BOC-11-05-08-001	The FMS shall produce standard accounting reports that accurately capture deferred and recognized revenue, and expected and cleared cash receipts, in both summary and detail formats. The accounting reports shall enable validation of calculated settlement positions, system reconciliations, and automated journal entries, along with supporting other SEPTA financial controls.	SDD-20
BOC-11-05-08-002	The FMS shall produce a Revenue Allocation report to support National Transit Database supported by FTA (NTD) reporting that allocates recognizes passenger revenue by fare product with a breakout by division and mode, listing associated base, transfer, and total ridership counts.	SDD-20
BOC-11-05-08-003	The AR module shall provide standard AR reports, including receivables aging reports (with “as-of date” functionality), individual customer and institutional partner transaction reports, and individual customer and institutional partner AR account listing reports.	SDD-20
BOC-11-05-08-004	The AP module shall provide standard AP reports, including Contractor payables aging reports, Contractor transaction reports, and Contractor AP account listing reports.	SDD-20
BOC-11-05-08-005	The FMS shall make automated journal entries in the enterprise financial systems operated by SEPTA and transit agency partners (INFOR) using APIs supported by those systems. Details of the electronic interfaces and the journal entries to be posted in the enterprise financial systems shall be finalized during design review.	SDD-20
BOC-11-05-08-006	The FMS shall store and provide access to historical financial data for a configurable period on no less than [seven (7) years]. No FMS data shall be removed or destroyed without approval by SEPTA.	SDD-20

11.6 Media Inventory Management System (MIMS)

The Contractor shall deploy a Media Inventory Management System (MIMS) that maintains a full inventory of all fare media procured and issued by SEPTA.

Req #	Requirement	Assigned CDRL
BOC-11-06-001	The MIMS shall be capable of maintaining full inventory of all EU and LU fare media procured and issued by SEPTA. Data representing the inventory details of all fare media processed by the AFC System shall be available as a data extract and a report for consumption by SEPTA.	SDD-21
BOC-11-06-002	The MIMS shall maintain the inventory of all serialized fare media (i.e., EU and LU smartcards) as it is held by SEPTA, retailers, and third-party distributors, and eventually issued to customers.	SDD-21
BOC-11-06-003	The MIMS shall maintain all data required to track batch, order, location, and shipping details for all EU and LU fare media. The final data fields used for inventory management and packaging design of fare media shall be determined and approved during Design Review.	SDD-21
BOC-11-06-004	The MIMS shall be capable of tracking fare media from delivery of the fare media by the manufacturer through customer issuance, including all movements from bulk storage facilities to SEPTA's inventory locations (e.g., fulfillment center), crew remittance office, and finally individual sale locations (e.g., individual FVM, sales office CST, or retail store). All tracking data shall inform all relevant inventory reports and shall populate the appropriate database entries in real-time.	SDD-21
BOC-11-06-005	The AFC System shall facilitate the bulk issuance of EU and LU media by identifying appropriate batch IDs and serial number ranges for fulfilling orders placed by SEPTA, institutions (e.g., via the institutional website), and third-parties.	SDD-21
BOC-11-06-006	The AFC System shall track the current and historical status of all media in inventory. Whenever a transaction causes a change in card status, the AFC System shall update all card records accordingly. A history of all updates shall be maintained to provide an audit trail.	SDD-21

Req #	Requirement	Assigned CDRL
BOC-11-06-007	On the bulk import of fare media from SEPTA's Fare Media Supplier(s), the AFC System shall automatically create corresponding transit accounts for each media introduced to the system. The AFC System shall support fare media statuses that reflect the multi-stage business processes where media is manufactured, shipped, received into storage inventory, withdrawn from inventory, and shipped to the end distributor or user. The transit account shall be set to an inactive status until sold or distributed by the system.	SDD-21
BOC-11-06-008	On the individual or bulk sale of EU and LU media, the MIMS shall automatically update the status of the media to reflect the removal from inventory.	SDD-21

11.7 Data Warehouse

The Contractor shall deploy a data warehouse that serves as a repository for all AFC System-generated data. The central back-office database and all other supporting databases (e.g., customer and financial databases) shall feed the data warehouse. The data warehouse shall be the source for data analytics and reporting.

Req #	Requirement	Assigned CDRL
BOC-11-07-001	The data warehouse shall be built using an enterprise-class ODBC-compliant relational database scaled to [200%] of the anticipated transaction volumes. The data warehouse shall utilize the most recent version of Oracle Database, MS SQL Server, or SEPTA-approved equivalent.	SDD-22
BOC-11-07-002	The data warehouse shall store all transaction data generated by the AFC System. At a minimum, the data warehouse shall collect data from the following systems: (1) Account-Based Transaction Processor (ATP); (2) Customer Relationship Management (CRM) System, (3) System Monitoring and Management Application (SMMA); (4) Media Inventory Management System (MIMS); and (5) Financial Management System (FMS).	SDD-22

Req #	Requirement	Assigned CDRL
BOC-11-07-003	Data captured in the data warehouse shall include at a minimum: (1) Fare media and product sale transactions from the ATP, (2) Fare payment transactions from the ATP,; (3) Fare inspection transactions from the ATP; (4) Adjustment, refund, reversal, and balance transfer transactions from the ATP; (5) Customer service records from the CRM system; (6) Device events and alarms from the SMMA; (7) Back-office events and alarms from the SMMA; (8) Device audit register data; (9) Fare media inventory data from the MIMS; (10) Financial data and accounting entries from the FMS; (11) Ridership data from all internal and integrated system components; and (12) Other analytics data to support fraud detection/prevention.	SDD-22
BOC-11-07-004	The data warehouse shall be capable of storing all data fields and records captured by any of the AFC System APIs used by internal system components and external third-party integrations. Any data fields captured or generated by the back-office shall be stored in the data warehouse on request by SEPTA.	SDD-22
BOC-11-07-005	The data warehouse shall not store any customer PII or sensitive payment data, and shall instead provide the capability to tokenize these data elements and/or links to such data elements, in order to anonymize transaction records, while maintaining the links between anonymized data (e.g., transit and customer accounts). The Contractor shall perform periodic audits to ensure sensitive data is omitted from the data warehouse.	SDD-22
BOC-11-07-006	Data received from the various AFC Systems shall be maintained in the data warehouse at the individual event, record, or transaction level. Normalization and de-normalization for purposes of improving database efficiency shall be performed by the Contractor.	SDD-22
BOC-11-07-007	All data shall be transmitted to the data warehouse in real-time or on a configurable frequency that can set depending on the source, and never less than daily.	SDD-22
BOC-11-07-008	The data warehouse shall provide a secure user interface capable of querying the database directly for use by authorized SEPTA users only. Role-based access rules shall be implemented to enable the segmentation of certain data types to specific users as determined by SEPTA.	SDD-22

Req #	Requirement	Assigned CDRL
BOC-11-07-009	All data in the data warehouse shall be accessible using standard SQL query tools. All data shall be retrievable as standard Unicode or binary data. The data warehouse shall be capable of scheduled exports to external data sources (e.g., Google big query, AWS, etc.) in the data format required using secure ports and transmission protocols.	SDD-22
BOC-11-07-010	The data warehouse shall provide online access to detailed transaction information for the life of the AFC System. The Contractor shall propose an allocation of storage resource sufficient to store no less than [10 years] of detailed transaction information. If additional storage is required in the future, SEPTA shall be able to purchase additional storage through the BOA.	SDD-22
BOC-11-07-011	The Contractor shall provide tools to enable SEPTA to archive data, and to purge old or unwanted data from the data warehouse. Purging shall be an administrative function that shall permanently delete data over a specified date range or based on other criteria.	SDD-22
BOC-11-07-012	The Contractor shall provide a preliminary design specification for the data warehouse at Design Review, including at a minimum: (1) Descriptions of all data to be stored; (2) Data fields with type and length; (3) Total amount of data storage available and any data compression schemes; (4) Communications protocols being used; (5) Timing for the transmission of data to the data warehouse; (6) Test procedures to ensure that all required data is being captured and that all required capabilities are present; and (7) Data warehouse operating procedures. The final design specification for the data warehouse, including the complete data dictionary and schema, shall be delivered [120 days] prior to the start of SIT.	SDD-22
BOC-11-07-013	All AFC Systems and interfaces requiring access to real-time data, including the ATP, CRM System, SMMA, FMS, and websites shall capture data from the source systems directly. The data warehouse shall not be used to support any production systems, or for any purpose other than data analytics, reporting, and the export of data to external systems.	SDD-22

Req #	Requirement	Assigned CDRL
BOC-11-07-014	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 processes used to capture data from the source systems. The data dictionary and schema for the data warehouse shall include definition of all static and/or lookup values used within the database, and shall be maintained by the Contractor to reflect any changes throughout the term of the SMA.	SDD-22

11.8 Reporting System

The Contractor shall deploy a reporting system that provides an interface to run pre-defined and custom reports. The primary data source for the reporting system shall be the data warehouse, although other sources of data may be utilized depending on the reporting need.

Req #	Requirement	Assigned CDRL
BOC-11-08-001	The Contractor shall deploy a COTS, web-based reporting system such as Tableau, Power BI or an existing SEPTA reporting tool, that interfaces with the data warehouse, and other systems as necessary, for the generation of canned and custom reports.	SDD-23
BOC-11-08-002	Standard reports shall include: (1) Ridership reports; (2) Sales reports; (3) Customer service reports; (4) Financial reconciliation reports; (5) Financial settlement reports; (6) Exception reports; (7) Credit/debit payment failure reports; (8) Missing transaction reports; (9) Refund reports; (10) Fare adjustment reports; (11) Goodwill gesture reports; (12) Fraud detection reports; (13) Inspection reports; (14) Inventory reports; and (15) System availability reports. All reports shall include detail to the lowest level and allow data filtering.	SDD-23
BOC-11-08-003	The Contractor shall provide [30 canned reports], to be defined and developed with the SEPTA during Design Review and throughout the BOA.	SDD-23
BOC-11-08-004	The web-based reporting system shall allow SEPTA to design, run, and save custom reports or data visualization reports (e.g., dashboards) using the query design tool. Custom report queries shall be able to access all data within the data warehouse. The reports shall be shareable across authorized users.	SDD-23

Req #	Requirement	Assigned CDRL
BOC-11-08-005	Reports shall be run and viewed through a web interface and exported in several formats, including Adobe Acrobat, MS Excel, MS Word, CSV, SQL, and Unicode text. All file formats shall include the same data and general layout where possible. Data files (e.g., Excel and CSV) shall be generated such that data can be extracted without formatting and can be imported into third-party tools without manipulation.	SDD-23
BOC-11-08-006	The reporting system shall allow all reports to be configured to run immediately and on a scheduled basis through the web interface, and automatically delivered to one or multiple e-mail addresses, or delivered to another specified location target (e.g., SharePoint, SFTP, AWS bucket, etc.). Report deliveries may be scheduled on a daily, weekly, or monthly basis and in any of the available file formats.	SDD-23
BOC-11-08-007	The reporting system shall support data analytics to be defined by SEPTA during Design Review.	SDD-23
BOC-11-08-008	The reporting system shall generate web-based dashboards using Tableau, Power BI or an existing SEPTA reporting tool to display real-time system usage statistics and real-time system performance against required system performance metrics.	SDD-23
BOC-11-08-009	The reporting system web interface shall be mobile-optimized and support all modern desktop and mobile browsers, including Edge, Firefox, Safari, Chrome, and Opera. All transmissions of customer data or payment data, including username, password, and any customer PII, shall be TLS-encrypted (TLS v1.2 or higher) via the HTTPS protocol.	SDD-23
BOC-11-08-010	The Contractor shall enable multi-factor user authentication to the reporting system web interface. The ability to create and run reports shall be configurable by user type. User accounts shall be set up with custom access levels that define which reports can be viewed, and what data can be queried for custom reports.	SDD-23
BOC-11-08-011	The Contractor shall provide unrestricted and unfettered access to all data in the AFC System to SEPTA. Data shall not be overwritten anywhere in the system without maintaining a historical record of any such data.	SDD-23

11.9 Virtual Credential Management System (VCMS)

The Virtual Credential Management System (VCMS) maintains the lifecycle of all virtual credentials associated to transit accounts and mobile devices. The VCMS interfaces with external systems to orchestrate the workflows necessary to provision virtual credentials into mobile environments.

11.9.1 General Requirements

Req #	Requirement	Assigned CDRL
BOC-11-09-01-001	The Contractor shall deploy a VCMS that maintains the lifecycle and status of all virtual fare payment credentials issued by the AFC System. Virtual fare payment credentials are digital media, such as mobile wallet credentials and 2D barcodes, that provide access to corresponding transit accounts in the ATP.	SDD-24
BOC-11-09-01-002	The VCMS shall facilitate the activation of all virtual fare payment credentials generated by the AFC System. The business rules to activate a credential shall be defined by SEPTA, and shall include activation on the sale of virtual fare media, on the first use of virtual fare media, and on request by customers following the receipt of virtual fare media.	SDD-24
BOC-11-09-01-003	The VCMS shall facilitate the replacement and deactivation of virtual fare payment credentials. The deactivation status, reason code, and user performing the deactivation shall be stored by the VCMS for all credentials.	SDD-24
BOC-11-09-01-004	The VCMS shall facilitate the temporary and permanent blocking and unblocking of virtual fare payment credentials. The block status, reason code, and user performing the block shall be stored by the VCMS for all credentials. The VCMS shall be capable of configuring access levels to authorize blocking and unblocking actions based on user group.	SDD-24
BOC-11-09-01-005	The VCMS shall facilitate the expiration of virtual credentials on a specified date or time duration. The expiration shall be reconfigurable by authorized channels and users to support reissuance of transit access and employee cards.	SDD-24
BOC-11-09-01-006	The VCMS shall provide the data and workflows required to maintain the lifecycle of all virtual fare payment credentials in the AFC System. The status of all credentials shall be available in real-time.	SDD-24

11.9.2 Mobile Wallet

Req #	Requirement	Assigned CDRL
BOC-11-09-02-001	The VCMS shall enable the creation and provisioning of secure, mobile wallet, fare payment credentials into the Apple Wallet, Google Wallet, and Samsung Wallet. All mobile smartphones, tablets, and wearables that support NFC-based mobile wallets shall be capable of hosting a SEPTA mobile wallet credential. The Contractor shall work with SEPTA to determine the integration approach during Design Review.	SDD-24
BOC-11-09-02-002	The VCMS shall enable the conversion of physical fare payment credentials into mobile wallet credentials. The transit account shall be automatically associated with the converted mobile wallet credential, and the physical credential shall be automatically deactivated and permanently unlinked from the transit account. All data associated with physical-to-mobile-wallet conversion shall be captured and stored in the VCMS.	SDD-24
BOC-11-09-02-003	The VCMS shall provide the necessary interfaces for the AFC System to initiate the provisioning of mobile wallet credentials from the SEPTA mobile application and directly from the respective mobile wallet user interface, including Apple Wallet and Google Wallet.	SDD-24
BOC-11-09-02-004	The VCMS shall provide the necessary interfaces and services to provide all API responses and notifications required by the third-party mobile wallet systems to purchase fare products, update the user interface, and maintain the lifecycle of the mobile wallet credential on each mobile device.	SDD-24
BOC-11-09-02-005	The VCMS shall integrate with Trusted Service Manager (TSM) services to facilitate access to the secure element and/or secure memory of mobile wallet devices. All communications between the AFC System and third-party systems shall be secured using strong encryption, as defined by NIST.	SDD-24
BOC-11-09-02-006	The AFC System shall impose a configurable fee to enable both the creation of mobile wallet credentials and the physical-to-mobile-wallet conversion. The fee shall be configurable based on the provisioning method and concession/fare type and shall be defined by SEPTA.	SDD-24

Req #	Requirement	Assigned CDRL
BOC-11-09-02-007	The VCMS shall facilitate and track the transfer of mobile wallet credentials between mobile devices. The limit to the number of transfers available per credential shall be configurable. The number of transfers performed per credential and transfer history shall be available for fraud mitigation purposes. All data associated with mobile-wallet transfers shall be captured and stored in the VCMS.	SDD-24
BOC-11-09-02-008	The VCMS shall store all available mobile device information associated with the mobile wallet credential for troubleshooting and support purposes. Stored mobile device data shall be fully compliant with SEPTA policies and regulations for the handling of customer PII.	SDD-24
BOC-11-09-02-009	The VCMS shall support configurable business rules to disable approved functions available to mobile wallet credentials. For example, a mobile wallet credential may be prohibited from being transferred to another mobile device due to a negative transit account balance. These rules shall be defined and approved by SEPTA during Design Review.	SDD-24
BOC-11-09-02-010	The VCMS shall satisfy and fulfill all applicable mobile wallet requirements and use cases imposed by each mobile wallet provider to enable the full functionality of mobile wallet credentials.	SDD-24
BOC-11-09-02-011	The VCMS shall generate and maintain all necessary unique and secondary identifiers to associate all mobile wallet credentials with the accounts and records in all integrated mobile wallet systems. The identifier mapping design shall provide detailed reporting and financial accounting for usages and costs associated with each mobile wallet credential.	SDD-24

11.9.3 Barcode Ticketing

Req #	Requirement	Assigned CDRL
BOC-11-09-03-001	The VCMS shall enable the creation and provisioning of physical (e.g., paper) and mobile barcode tickets. All centrally maintained data required to populate the barcode format shall be provided by the VCMS.	SDD-24

Req #	Requirement	Assigned CDRL
BOC-11-09-03-002	The VCMS shall enable fraud mitigation and security techniques supported by barcode ticketing providers, including asymmetric and dynamic encryption. Barcode ticketing security shall be regularly assessed for vulnerabilities and improvements.	SDD-24
BOC-11-09-03-003	The VCMS shall provide functionality to protect barcode tickets from unauthorized access, modification, or duplication. Validation checks to ensure cloned barcodes are denied shall be performed.	SDD-24
BOC-11-09-03-004	The VCMS shall enable and track the transfer of mobile barcode tickets between mobile devices. The limit to the number of transfers available per ticket shall be configurable. The number of transfers performed per ticket and transfer history shall be available for fraud mitigation purposes. All data associated with barcode ticket transfers shall be available to SEPTA and securely stored in the VCMS.	SDD-24
BOC-11-09-03-005	The VCMS shall store and encrypt all available mobile device information associated with the mobile barcode ticket for troubleshooting and support purposes. Stored mobile device data shall be fully compliant with SEPTA policies and regulations for the handling of customer PII.	SDD-24

11.10 Required Submittals

CDRL ID	Contractor Deliverable	Due
SDD-16	Back-Office Software Design Specification	Design Review
SDD-17	Account-Based Transaction Processor (ATP) Design	Design Review
SDD-18	Customer Relationship Management (CRM) System Design	Design Review
SDD-19	System Monitoring and Management Application (SMMA) Design	Design Review
SDD-20	Financial Management System (FMS) Design	Design Review
SDD-21	Media Inventory Management System (MIMS) Design	Design Review
SDD-22	Data Warehouse Design	Design Review
SDD-23	Reporting System Design	Design Review

CDRL ID	Contractor Deliverable	Due
SDD-24	Virtual Credential Management System (VCMS) Design	Design Review

12. Customer Application Requirements

The Contractor shall provide customer facing applications, including customer and institutional websites, an account management and fare payment mobile application, and IVR System. This section describes the frontend customer applications and provides an overview of the end user features and functions available through the applications. By partnering with an experienced UX/UI design firm to guide all frontend applications and user interfaces, the Contractor's solution shall provide a cohesive customer experience for all customer-facing applications and equipment (including FVMs, validation screens, websites, mobile applications and IVR Systems).

12.1 Common Customer Application Design

12.1.1 Design Criteria

Req #	Requirement	Assigned CDRL
CAR-12-01-01-001	The Contractor shall provide all interfaces between the websites, IVR, mobile application, and back-office systems (e.g., ATP and customer database) using the Contractor-provided APIs.	As applicable
CAR-12-01-01-002	The Contractor shall contract with UX/UI design firm(s) that have experience developing user-friendly UI/UX, for eCommerce, websites, and mobile applications. The UX/UI design firm(s) shall assist the Contractor with designing all customer-facing interfaces including the fare payment and account management mobile application, customer and institutional websites, and FVMs.	As applicable
CAR-12-01-01-003	The websites and mobile applications shall be built using the latest design and eCommerce best practices, including modern website best practices. The development tools and design for the website shall be subject to SEPTA review and approval during Design Review. The website shall use responsive design optimized for desktops, mobile applications, and tablets.	As applicable
CAR-12-01-01-004	All transmissions of customer data, including username, password, and any customer PII, shall be TLS-encrypted (TLS v1.2 or higher) via the HTTPS protocol.	As applicable

Req #	Requirement	Assigned CDRL
CAR-12-01-01-005	The websites and mobile applications shall be designed and tested for cross-platform compatibility (as applicable), including but not limited to: (1) Platforms: Windows, Apple, Linux; (2) Browsers: Microsoft Edge, Safari, Chrome, Firefox, and Opera; and (3) Mobile App OS: Android and iOS.	As applicable
CAR-12-01-01-006	The Contractor's design firm(s) shall work closely with SEPTA to develop an approved user interface design. SEPTA shall play a critical role in the website and mobile application design and testing throughout the implementation. The Contractor's design firm(s) shall develop a complete set of user stories for SEPTA's review and approval during the Design Review based on SEPTA's input.	As applicable
CAR-12-01-01-007	The Contractor shall provide detailed screen flows depicting "snapshots" of each screen layout arranged as a logical flow chart followed by interactive screen flows that use a collaborative interface design tool (e.g., Figma, InVision, etc.) for SEPTA's review and approval during Design Review. The flows shall depict all web and app screens as configured for revenue service.	As applicable
CAR-12-01-01-008	The websites and mobile application shall be compliant with all applicable ADA regulations, and follow the latest version of the WCAG, currently WCAG 2.2. [Note: WCAG 2.2 is expected to be released in early 2023.]	As applicable
CAR-12-01-01-009	Customer-facing interfaces (e.g., websites, mobile applications, FVMs, and IVR Systems) shall be provided in multiple languages, including English and up to [five (5) other languages] identified by SEPTA during Design Review. The Contractor shall provide all voice recordings in each language for systems as appropriate (e.g., FVMs, IVR).	As applicable
CAR-12-01-01-010	All website content and design elements shall be able to be modified by SEPTA. The Contractor shall provide a robust Content Management System (CMS) to perform website updates for both consumer and institutional websites, which includes text, images, animations, and videos.	As applicable
CAR-12-01-01-011	The Contractor shall be responsible for all website updates and security patches throughout the term of the BOA. The Contractor shall also perform security testing after each change.	As applicable

12.1.2 Payment Processing

Req #	Requirement	Assigned CDRL
CAR-12-01-02-001	The websites and mobile application shall accept credit cards, debit cards, Apple Pay, Google Pay, Samsung Pay, and other online payment options for payment during fare media and product sales as well as setting up autoloading. These systems shall 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.	As applicable
CAR-12-01-02-002	The mobile application and websites shall support the ability to quickly add bank cards to pay for mobile application purchases or add a funding source to a registered customer account. This includes the ability to add a bank card using the mobile phone's camera to autofill bank card information for mobile application purchases and autofill bank card information from a password manager or web browser.	As applicable
CAR-12-01-02-003	The websites and mobile application shall support split payments where up to [three (3) payment methods], including multiple bank cards and stored value can be used to complete payment for a single sale.	As applicable
CAR-12-01-02-004	All payments initiated via the websites and mobile application shall be accepted using eCommerce best practices and processed in a manner that is compliant with the latest approved PCI standards at all times throughout the life of the Contract. The Contractor shall provide evidence to SEPTA and third-party auditors that demonstrate PCI compliance upon request throughout the duration of the Project. All payment data shall be encrypted for transmission using the latest applicable PCI standards.	As applicable
CAR-12-01-02-005	The websites and mobile application shall support AVS performed by the payment processor for bank card payments in a configurable manner that allows the AVS feature to be turned on or off by SEPTA and accommodates acceptance of both U.S. and non-U.S. issued cards.	As applicable
CAR-12-01-02-006	The websites and mobile application shall prompt users when a payment is declined and allow entry of an alternate funding source. Failed payments shall be recorded in a separate payment exception file (with denial code).	As applicable
CAR-12-01-02-007	If a payment authorization is not completed within a configurable time-period or is interrupted, the websites and mobile application shall cancel the transaction and notify the customer. Any canceled transactions shall be recorded.	As applicable

Req #	Requirement	Assigned CDRL
CAR-12-01-02-008	Users shall be e-mailed a receipt for all successfully completed sales, including the fulfillment of an autoloading. Users shall have the option of opting-out of e-mail notifications via a customer-facing website and mobile application interface and shall allow separate configuration (on or off) of each e-mail notification type. The Contractor shall host and maintain the e-mail system.	As applicable

12.2 Customer Website (Option)

The Contractor shall subcontract to a professional website design and development firm to deliver a customer 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.

12.2.1 General Requirements

Req #	Requirement	Assigned CDRL
CAR-12-02-01-001	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.	SDD-25

Req #	Requirement	Assigned CDRL
CAR-12-02-01-002	The customer website shall allow customers to perform the following functions, at a minimum: (1) Purchase new fare media; (2) Create a new customer account; (3) View and manage account settings and customer profile; (4) Register an EU card (e.g., transit account); (5) Purchase fare products (e.g., stored value and passes); (6) Pay and purchase services supported by special fare programs offered by SEPTA (e.g., parking, bike share, and tourist transportation); (7) Add a funding source; (8) Set up, modify, and cancel autoload of stored value and passes; (9) View transit account balance and status information; (10) View and download sales, usage, and adjustment transaction history; (11) Initiate a customer service request (e.g., refund request); (12) Report a card lost or stolen; (13) Request an opt-out refund (e.g., close transit account); (14) Support balance transfers; (15) Support card replacements; (16) Provide a retail network enrollment form that notifies a SEPTA administrator via e-mail of the retail lead; (17) Provide a home page designed and focused on marketing and education on how to use the AFC System; (18) Support live chat with SEPTA Customer Service; (19) Support for FAQs including short videos (e.g., embedded YouTube videos) designed by SEPTA; and (20) Support for social logins (e.g., Facebook, Twitter, Google, etc.). Final customer website functions shall be determined and approved by SEPTA during Design Review.	SDD-25

12.2.2 Fare Media Purchase and Registration

Req #	Requirement	Assigned CDRL
CAR-12-02-02-001	The customer website shall allow the ordering and purchase of SEPTA issued 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, based on direction from SEPTA during Design Review.	SDD-25
CAR-12-02-02-002	The customer website shall allow the creation of a new customer account. During creation of a customer account, the website shall capture all customer registration data, including the credentials (e.g., username, password, and IVR PIN) used to access the website and IVR account management functions. All customer account data shall be stored securely in the customer database.	SDD-25

Req #	Requirement	Assigned CDRL
CAR-12-02-02-003	During the creation of a new customer account, the customer website shall provide the ability to register previously issued EU fare media. Fare media (e.g., transit account) registration shall not be required to create a customer account.	SDD-25
CAR-12-02-02-004	Registered customers shall be required to login to the website using MFA. The type of MFA for the login shall be determined during design review.	SDD-25
CAR-12-02-02-005	The customer website shall support password creation with configurable security requirements, including and not limited to minimum password length, required use of letters/numbers/symbols, and use of forced password reset after a configurable time-period or on-demand. All security requirements should be configurable by SEPTA.	SDD-25
CAR-12-02-02-006	Registered customers shall have the ability to view and modify registration data at any point in time. Password and PIN data shall be masked when presented on the customer website.	SDD-25
CAR-12-02-02-007	The customer website shall support the registration of multiple EU cards (e.g., transit accounts) under a single customer account. Registered customers shall be able to add new cards when logged into the customer website. Customers shall assign each card nickname, which shall be stored in the transit account and used to differentiate cards registered to the same customer.	SDD-25

12.2.3 Fare Product Purchases

Req #	Requirement	Assigned CDRL
CAR-12-02-03-001	Registered and unregistered customers shall be able to initiate a load of value (e.g., stored value and passes) via the customer website using a credit card or debit card. The customer website shall 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.	SDD-25
CAR-12-02-03-002	The customer website shall support online payment options (e.g., PayPal, Amazon pat, etc.) and mobile wallet payments such as Google Pay, Apple Pay, and Samsung Pay as funding sources.	SDD-25

Req #	Requirement	Assigned CDRL
CAR-12-02-03-003	Registered customers shall have the ability to save and modify funding sources, including credit cards, debit cards, and bank accounts for one-off purchases and autoloading payments. Funding source information shall be stored securely within the customer database in a tokenized form.	SDD-25
CAR-12-02-03-004	Registered customers shall be able to enable, disable, and modify the autoloading of stored value and passes. As part of the autoloading setup process, the customer shall select the stored value amount or pass to be loaded and the type of autoloading (e.g., threshold or periodic). Autoloading setup shall require a funding source to be added or selected.	SDD-25
CAR-12-02-03-005	During autoloading setup, the customer shall 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 shall be attempted. If payment authorization is not received, the autoloading shall be automatically disabled.	SDD-25
CAR-12-02-03-006	For one-off purchases and autoloading, the customer website shall provide customers an option to split payment between a minimum of [two (2) funding sources].	SDD-25

12.2.4 Account Status and Transaction History

Req #	Requirement	Assigned CDRL
CAR-12-02-04-001	Registered and unregistered customers shall be able to use the customer 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 fare media ID).	SDD-25
CAR-12-02-04-002	Transit account balance information shall 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.	SDD-25
CAR-12-02-04-003	Registered customers shall be able to view no less than [18 months] of prior transaction history, showing all sales, usage, and adjustment transactions. The transaction history shall be viewable and sortable on the customer website, and able to be downloaded in PDF and Excel formats.	SDD-25

12.2.5 Customer Service

Req #	Requirement	Assigned CDRL
CAR-12-02-05-001	The customer website shall include general information on the use of the Key 2.0 Fare Payment System, including a Frequently Asked Questions (FAQ) section, information on where to purchase fare media and value, terms and conditions, privacy policy, and general program information and updates.	SDD-25
CAR-12-02-05-002	Registered customers shall have the option of initiating a customer service request via the website. This action shall automatically generate a request and work item within the CRM System and assign the request to the appropriate customer service staff.	SDD-25
CAR-12-02-05-003	The customer website shall allow registered customers to report a card lost or stolen. This action shall immediately result in the associated fare media being blocked from further use. The customer shall 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 shall be able to be charged to a payment card or stored value.	SDD-25
CAR-12-02-05-004	The customer website shall allow registered customers to close a transit account and request an opt-out refund. This action shall immediately result in the associated fare media being blocked from further use. The operational policies governing the issuance of a refund shall be defined during Design Review.	SDD-25
CAR-12-02-05-005	The customer website shall allow registered customers to complete a card replacement online for unused, non-personalized cards. For the unused, new card (transit account), a card replacement shall be supported ensuring all previous transaction and trip history, stored value and/or product information, and any other account settings or details (e.g., autoloading, permits, institutional ID) is saved to the new card (transit account), while blocking the card (transit account) that is being replaced.	SDD-25

Req #	Requirement	Assigned CDRL
CAR-12-02-05-006	The customer website shall allow registered customers to complete a card replacement online for used, non-personalized cards. If the new card and the card being replaced both contain any transaction history (e.g., fare capping, stored value, and/or partially used products) a card replacement wizard with easy-to-answer questions for the user to confirm their desired outcome (e.g., transfer balance, transfer product(s), name new card) shall be presented. The result of the replacement process shall provide a summary of essential information remaining on the replaced card (e.g., fare capping accumulation, transaction and trip history shall remain on blocked card). The data elements, information provided, and user flow for this card replacement feature shall be determined during Design Review.	SDD-25
CAR-12-02-05-007	The customer website shall include web links to SEPTA websites with schedules, fares, and other general transit information.	SDD-25

12.2.6 Special Fare Program Purchase

Req #	Requirement	Assigned CDRL
CAR-12-02-06-001	The customer website shall support Special Fare Programs if the SEPTA fare payment credential is registered to a participating Institution.	SDD-25
CAR-12-02-06-002	The customer website enrollment process shall include security measures to mitigate or prevent brute force attacks attempting to “guess” the unique identifier for Institutional participants. All attempts shall be logged in the AFC back-office for security and fraud reporting purposes, with number of attempts and type of event (e.g., number of times user name is attempted, device attempts) triggering fraud reporting to be defined by SEPTA during Design Review.	SDD-25
CAR-12-02-06-003	The customer website shall present all configurable fare products and applicable discounts allowing the customer to select and purchase their fare.	SDD-25
CAR-12-02-06-004	Once a fare product is selected, the customer website shall summarize the following information at a minimum: (1) Product name; (2) Product validity date(s); (3) Purchase restrictions (e.g., fare policy); (4) Retail product price; (5) Discount (e.g., subsidized discount in percent (%) and dollar values (\$); and (6) Balance due.	SDD-25

Req #	Requirement	Assigned CDRL
CAR-12-02-06-005	The customer website shall support the payment from the participant, using: (1) Stored funding source; (2) New credit/debit card; (3) Mobile wallet payments (e.g., Google Pay, Apple Pay, Samsung Pay); or (4) Stored value.	SDD-25
CAR-12-02-06-006	All fare-pass transactions processed through the special program shall be recorded in the transaction history of the customer account (i.e., consumer) and institutional account.	SDD-25
CAR-12-02-06-007	The customer website shall support select SEPTA fare payment credentials registered to a participating institution to purchase a fare product without registration to a customer account. The website shall support payment using a new credit/debit card.	SDD-25

12.3 Institutional Website (Option)

The institutional website supports Institutions, employers, and community organizations to administer their transit benefit for their participants. The institutional website shall allow administrators at SEPTA to create and administer these programs. Administrators at institutions shall have access-defined permissions to perform transit account management, order fare media, and load value (i.e., product and stored value).

The Contractor shall subcontract to a professional website design and development firm to 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.

12.3.1 General Requirements

Req #	Requirement	Assigned CDRL
CAR-12-03-01-001	The Contractor shall subcontract with a web design firm or developer with extensive experience developing e-commerce or retail websites to support the design and development of the institutional website.	SDD-26
CAR-12-03-01-002	The Contractor shall deploy an institutional website that allows employers, schools, social service agencies, and other institutions to: (1) order fare media; (2) load value (e.g., stored value and passes); and (3) administer transit accounts on behalf of participants in special fare programs.	SDD-26

Req #	Requirement	Assigned CDRL
CAR-12-03-01-003	The institutional website shall support superuser access to allow Administrators at SEPTA to administer and perform all functions for all institutional accounts.	SDD-26
CAR-12-03-01-004	The institutional website shall support the following functions for administrators at SEPTA at a minimum: (1) Register a new institution (e.g., create a new institutional customer account); (2) Manage program type (e.g., business, non-profit); (3) Manage fare products for purchase (e.g., product and stored value); (4) Manage invoicing and payment terms; (5) Manage and support multiple administrative logins per institution, with configurable permission levels; (6) Search for institutions, transit accounts and participants; (7) Manage contract price and contract term; (8) Generate registration codes for participants that can be sent by text, SMS and e-mail to allow registration of physical or virtual fare media; (9) Provide a home page designed and focused on marketing and education on how to use the electronic fare system; (10) Support SEPTA Customer Service replying to live chat requests; (11) Enable SEPTA Program notifications and messages to be sent to Institution customers; (12) Support for FAQs including short videos (e.g., embedded YouTube videos) designed by SEPTA; and (13) Superuser access enabling full read/write access to any institutional account. Final institutional website functions shall be determined during Design Review.	SDD-26
CAR-12-03-01-005	The institutional website shall support the following functions for Administrators at Institutions at a minimum: (1) Manage transit accounts (i.e., payment credentials, fare media, mobile application virtual media); (2) Load value (e.g., stored value and passes) to participants' transit accounts; (3) Shopping cart; (4) Make a payment; (5) Manage participant data; (6) Manage groups; (7) Search for institution(s), transit accounts and participants; (8) Perform bulk orders (e.g., administer transit account and orders); (9) Perform bulk transfer to another institutional account; (10) View order history, invoices, and payment status; (11) Generate e-mail receipts based on the transactions processed (e.g., bulk loads completed, fare products sold, participants added) configurable by frequency (e.g., end of day, immediately, each hour); (12) Manage institution profile (e.g., stored payment methods, multiple shipping addresses); (13) Manage account administration (e.g., Organization user roles and admins, Institution account settings); and (14) Support live chat with SEPTA Customer Service.	SDD-26

Req #	Requirement	Assigned CDRL
CAR-12-03-01-006	Final institutional website functions to support administrators at SEPTA and Institutions shall include but is not limited to the following: (1) Add participants (e.g., transit accounts) to an institutional customer account; (2) Delete participants (e.g., transit accounts) from an institutional customer account; (3) Modify participants (e.g., transit accounts) from an institutional customer account; (4) Reset password; (5) Block participants' transit accounts (i.e. fare media) and/or use of loaded value; (6) Bulk order EU and LU media with a user-friendly interface and seamless import of participant data; (7) Bulk load fare products and stored value; (8) Send automated, configurable reminders to institutions and/or participants within a configurable time period prior to a product's expiration (e.g., X-days prior to a monthly pass expiring); and (9) Support registration code and association of transit account to Institutional account. The final institutional functions shall be determined and approved by SEPTA during Design Review.	SDD-26
CAR-12-03-01-007	The institutional website shall support single and multiple functions or transactions using a bulk process (e.g., load value, load products, order, status change) through an upload of a formatted (e.g., CSV) file. The bulk process shall be supported for all Institutional website functions. The file format, error validation and upload process shall be determined during Design Review. The file format shall support a minimum of [200,000 rows] of records.	SDD-26
CAR-12-03-01-008	The institutional website shall provide a file interface to automatically process bulk files submitted by administrations at select institutions. The process shall support the following functions at a minimum: (1) Specified file repository (e.g., (e.g., SFTP)); (2) Support handling of various file types; (3) Perform file integrity and file name validation; (4) Perform error handling for all events and records; (5) Automatically process records based on the identified transit accounts and record type (e.g., new, deactivate, change); (6) Support a configurable schedule (e.g., every [six (6) hours], nightly); (7) Support a minimum of [200,000 rows] of records per file; (8) Perform administrator (e.g., submitter) notification; and (9) Post an output/result file of bulk file processed. The automated bulk processing functions shall be determined during Design Review and approved by SEPTA.	SDD-26
CAR-12-03-01-009	The institutional website shall support different transit account ownership and administration roles and responsibilities. For example, full ownership of the transit account, Load Value only ownership, or no association to the institutional account. The administration roles and responsibilities for transit account ownership shall be determined during Design Review and user story development.	SDD-26

Req #	Requirement	Assigned CDRL
CAR-12-03-01-010	The institutional website shall provide administrators at institutions the capability to view a dashboard and summary level reports on their organization's activities including: (1) Usage by product and Travel Wallet; (2) Number of cards with activity by mode (transit and rail); and (3) Number of cards with [zero (0) trips]. Final dashboard and report capabilities shall be determined by SEPTA during Design Review. Administrators at institutions shall not be able to see individuals' transactions (e.g., transit history).	SDD-26
CAR-12-03-01-011	The institutional website shall support the capability for the creation of a hierarchy of institutional accounts with parent-child relationships.	SDD-26
CAR-12-03-01-012	The institutional website design, features, media fulfillment, product, and stored value loads shall support physical EU and LU media, including barcodes and mobile application media.	SDD-26
CAR-12-03-01-013	The institutional website shall provide a streamlined, modern, clean, and simple design. The navigation and website menu shall be intuitive and provide users with tooltips to aid in navigation when users hover over icons, menu options or hotspots.	SDD-26

12.3.2 Registration

Req #	Requirement	Assigned CDRL
CAR-12-03-02-001	Prior to using the institutional website, institutions shall need to be approved by an administrator at SEPTA and registered through the creation of an institutional customer account. The institutional website shall support an Institution Application and Enrollment Form. The form design and function shall be determined and approved by SEPTA during Design Review.	SDD-26
CAR-12-03-02-002	Administrators at SEPTA shall use either the institutional website or CRM System to register an institution and configure all parameters governing the institution's participation in a special fare program.	SDD-26
CAR-12-03-02-003	Account registration shall capture all institutional customer registration data, including the credentials (e.g., username, password) and MFA used by an administrator at the Institution to access institutional website functions. The type of MFA for the login shall be determined during Design Review.	SDD-26

Req #	Requirement	Assigned CDRL
CAR-12-03-02-004	Following registration, an administrator at the institution shall receive a welcome e-mail and be able to login to the institutional website using their registered e-mail to perform all configured functions. The administrator at the institution shall have the ability to opt-in/opt-out for all SEPTA marketing e-mail messaging as part of the welcome e-mail.	SDD-26
CAR-12-03-02-005	All data associated with institutional customer accounts shall be stored securely in the customer database.	SDD-26
CAR-12-03-02-006	The Contractor shall develop a full set of user stories during Design Review based on SEPTA input and approval.	SDD-26

12.3.3 Adding and Deleting Participants

Req #	Requirement	Assigned CDRL
CAR-12-03-03-001	Administrators at institutions shall be able to add participants (e.g., transit accounts) to their institutional customer account individually using a payment credential ID, registration code provided by the institution administrator, and through a bulk order process using an imported file in a SEPTA approved format.	SDD-26
CAR-12-03-03-002	When adding participants, the institution shall be able to provide card personalization information (e.g., employee name or identifier) that uniquely identifies the participant in possession of the associated fare media. If personalization information is provided, it shall 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.	SDD-26
CAR-12-03-03-003	Registered and unregistered customers with existing fare media shall be able to be added to an institutional customer account as participants., and this shall be configurable by SEPTA.	SDD-26
CAR-12-03-03-004	Administrators at institutions shall be able to delete participants from their institutional customer account, individually by selection, and through a bulk process using an uploaded file in the SEPTA approved format. The bulk process shall support files and data that may or may not be in sequential order.	SDD-26

12.3.4 Placing Orders

Req #	Requirement	Assigned CDRL
CAR-12-03-04-001	Administrators at institutions shall be able to initiate the loading of value (e.g., stored value and passes) to participants' transit accounts individually by selection, and through a bulk process using an imported file in the SEPTA approved format.	SDD-26
CAR-12-03-04-002	The institutional website shall allow administrators at Institutions to configure fare product parameters (e.g., time of day, number of rides allowed) as part of the fare product(s) loaded to the participant transit account.	SDD-26
CAR-12-03-04-003	When adding value to participant accounts, institutional administrators shall be able to select from the available fare products configured for their account and choose whether to initiate a one-time or recurring load (e.g., autoload), on an individual participant basis. The period for recurring loads shall be defined in the institutional customer account configuration.	SDD-26
CAR-12-03-04-004	If their account is configured to allow it, institutional administrators shall be able to place bulk orders for EU and LU fare media to be delivered by mail. Bulk sales shall include fare media where the associated transit accounts are pre-loaded with a fare product or stored value.	SDD-26
CAR-12-03-04-005	When fulfilling a bulk fare media order, the AFCS System shall automatically generate a bulk order file pre-populated with the fare media IDs to support the addition of participants by the institution.	SDD-26
CAR-12-03-04-006	The institutional website shall have the ability to track the status and cancel orders before fulfillment.	SDD-26

12.3.5 Payment

Req #	Requirement	Assigned CDRL
CAR-12-03-05-001	Payment terms for institutional customers shall be configured as part of the institutional customer account setup. SEPTA shall 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.	SDD-26

Req #	Requirement	Assigned CDRL
CAR-12-03-05-002	For institutions where prepayment is required, the institutions shall be required to provide a funding source in the form of a credit card or debit card, Electronic Funds Transfer (EFT) or Automated Clearing House (ACH) payment. Funding source information shall be stored securely within the customer database in a tokenized form. The AFC System shall support credit/debit card payment limits, by institutional account, that are configurable by SEPTA.	SDD-26
CAR-12-03-05-003	The institutional website shall support split payments for institutional accounts with the following forms: (1) Credit or debit card; (2) ACH; (3) EFT; (4) Invoice; and (5) Check or Cash on delivery (e.g., pick up at SEPTA Transit Office).	SDD-26
CAR-12-03-05-004	The institutional website shall support PayPal and mobile wallet payments such as Google Pay, Apple Pay, and Samsung Pay as funding sources.	SDD-26
CAR-12-03-05-005	For institutional orders where invoicing is configured, an invoice shall automatically be generated by the FMS, posted to the institutional website in downloadable format (e.g., PDF), and sent electronically to the institution.	SDD-26
CAR-12-03-05-006	The FMS shall track all receivables for institutional customers in the AR module. SEPTA shall be able to configure credit limits, including pre-pay and rolling balance for AR customer accounts. The system shall support the automatic disabling of order privileges within the institutional website when the credit limit is reached.	SDD-26
CAR-12-03-05-007	Administrators at institutions shall be able to view current payment status (e.g., balance due and due date) and at least [18 months] of invoices, and order and payment history, via the institutional website. The invoices, orders, and payment history shall be viewable and sortable on the institutional website, and able to be downloaded in PDF and Excel formats.	SDD-26
CAR-12-03-05-008	The institutional website shall support the administration of transit benefits programs by employers and third-party administrators. Institutions shall be required to indicate whether the load value is being funded using pre-tax dollars. Stored value and fare products purchased using any pre-tax dollars shall be identified as such and segregated within the transit account to ensure compliance with all applicable IRS regulations.	SDD-26

12.4 Fare Payment and Account Management Mobile Application (Option)

12.4.1 Mobile Application General Requirements

Req #	Requirement	Assigned CDRL
CAR-12-04-01-001	The Contractor shall develop and maintain a mobile customer account management application for Android and iOS. The application shall be publicly available (e.g., Apple App Store, Google Play, etc.) to download.	SDD-27
CAR-12-04-01-002	The mobile application shall be developed for the latest versions of OS for Android and iOS. The Contractor shall also support future OS version updates, patches, and security updates for the duration of the Contract.	SDD-27
CAR-12-04-01-003	The Contractor shall support previous versions of the OS for Android and iOS devices that represent a minimum of [95%] of all U.S. users for each OS as determined through Google Analytics (Android) and Apple Analytics (iOS).	SDD-27
CAR-12-04-01-004	The Contractor shall provide a customer mobile application that allows users to perform similar functions available from the customer website for a unified "look and feel" across the customer website and mobile applications. The mobile application shall use Contractor-provided APIs to connect to the back-office for account functionality unless previously agreed between the mobile application developer and SEPTA.	SDD-27
CAR-12-04-01-005	The customer mobile application shall include enhanced functionality, including the ability to create and use electronic or digital fare media from the user's mobile device to pay by interacting with the Contractor-provided validator.	SDD-27
CAR-12-04-01-006	The AFC System shall be the system of record for media and account actions (purchases, registration, usage, etc.) performed in the mobile application.	SDD-27
CAR-12-04-01-007	The mobile application shall support English and up to [five (5) different foreign languages], localized to the Philadelphia area. Languages shall be determined during Design Review.	SDD-27
CAR-12-04-01-008	The mobile application shall generate and provide mobile application usage analytics including, and not limited to: (1) Quantitative analytics – user actions, usage trends; (2) Audience segmentation; (3) User paths; (4) Uninstall tracking; (5) Crash and event reporting; and (6) Real-time alerts.	SDD-27

Req #	Requirement	Assigned CDRL
CAR-12-04-01-009	The mobile application shall include links to SEPTA websites with schedules, fares, and other general transit information.	SDD-27
CAR-12-04-01-010	The mobile application shall include general information on the 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.	SDD-27
CAR-12-04-01-011	The mobile application shall employ a user interface that is based on industry-accepted user interface design standards and graphic design best practices to assist in the development of the application layout and interaction. All text, graphics, and logos within the app are subject to approval during Design Review.	SDD-27
CAR-12-04-01-012	The mobile application shall support the ability to leverage biometrics (e.g., facial recognition, fingerprint, etc.) to facilitate easy checkout when paying with online payment options and mobile wallet payments such as Google Pay, Apple Pay, and Samsung Pay as payment and funding sources.	SDD-27

12.4.2 Mobile Application User Interface

Req #	Requirement	Assigned CDRL
CAR-12-04-02-001	The mobile application shall 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 the development of the application layout and interaction. All text, graphics, and logos within the application are subject to approval during Design Review.	SDD-27

Req #	Requirement	Assigned CDRL
CAR-12-04-02-002	The mobile application shall allow customers to perform the following functions, at a minimum: (1) Create, view, and manage customer account profile data; (2) Sign in/out of customer account; (3) Order, purchase and provision new fare media; (4) Add and remove fare media (e.g., transit account) to the customer account; (5) Manage fare media (e.g., report media as lost/stolen, pause/enable media); (6) Purchase fare products (e.g., stored value and passes); (7) View transit account balance and pass information; (8) View transaction history, including sales, usage and other activities for transit accounts and customer accounts; (9) View fare capping information; (10) Perform balance transfers between transit accounts; (11) Add, remove, and manage up to [three (3) funding sources]; (12) Set up, manage, modify, and cancel autoload of stored value and passes; (13) Initiate a customer service request (e.g., refund request, media replacement); (14) Request an opt-out refund (e.g., close transit account); and (15) Support for FAQs including short videos (e.g., embedded YouTube videos) designed and provided by SEPTA. Final customer functions shall be determined during Design Review.	SDD-27
CAR-12-04-02-003	The mobile application shall allow customers to opt into automated push notifications regarding their registered transit account(s) and customer account. Notifications may include: (1) Usage; (2) Payment loads/autoload; (3) Low balance, service alerts; (4) Transfer time remaining; (5) Tare caps reached; (6) Account password change notification; and (7) Account access/changes. Each notification shall be independently configurable allowing users to enable and disable specific notifications and the ability to quickly turn all notifications on and off. The final list of notifications shall be determined during Design Review.	SDD-27
CAR-12-04-02-004	The mobile application shall include a user-friendly snapshot of different fare caps reached with graphical and text displaying amount of cap, amount spent to date, and amount remaining to cap, and the ability to view fare capping details for all accumulators in use.	SDD-27
CAR-12-04-02-005	The mobile application shall allow customers to sort and arrange the display order for registered media if the customer has multiple media registered to their account. Customers shall be able to quickly see and navigate all transit accounts associated to the customer account.	SDD-27
CAR-12-04-02-006	The mobile application shall include links to SEPTA websites with schedules, fares, and other general transit information.	SDD-27

Req #	Requirement	Assigned CDRL
CAR-12-04-02-007	The mobile application shall support password security best practices set by the back-office, including but not limited to minimum password length, required use of letters, numbers, symbols, automatic log-out, multi-factor authentication, support for text message and e-mail, and forced password reset after a configurable time-period or on-demand. Final password security requirements shall be determined during Design Review.	SDD-27
CAR-12-04-02-008	The mobile application shall support password reset best practices, including but not limited to multi-factor authentication, including support for text message and e-mail. Changing an account password via the mobile application shall log out the user on all previous logins using the old password.	SDD-27
CAR-12-04-02-009	The mobile application shall support social logins (e.g., Facebook and Google account) and biometric (e.g., fingerprint, face recognition) login as an option to a password. Any security audits or requirements to support social logins shall be the responsibility of the Contractor for the life of the Contract.	SDD-27
CAR-12-04-02-010	The mobile application shall support persistent login. The duration of the login shall be configurable. The persistent login shall automatically expire on all devices logged into the customer account when the customer account password is changed in the AFC back-office.	SDD-27
CAR-12-04-02-011	The mobile application shall support the enrollment of a participant in an institutional program. Participants shall be able to enter their unique identifier (e.g., e-mail, code, or other unique identifiers determined during Design Review) that enable access to the participant's travel benefits and unique products and passes for that institutional program.	SDD-27
CAR-12-04-02-012	The mobile application enrollment process shall include security measures to mitigate or prevent brute force attacks attempting to guess the unique identifier for Institutional participants. All attempts shall be logged in the AFC back-office for security and fraud reporting purposes.	SDD-27
CAR-12-04-02-013	Within the mobile application, institutional participants shall be able to: (1) Link their existing customer account to an institutional program; (2) Associate their virtual fare media to the institutional program; and (3) Transition physical fare media distributed by the institution to virtual fare media via the mobile application.	SDD-27

Req #	Requirement	Assigned CDRL
CAR-12-04-02-014	Within the mobile application, Customers shall be able to generate a secure barcode to purchase stored value and products with cash at a retail store.	SDD-27

12.4.3 Registered and Unregistered Users

Req #	Requirement	Assigned CDRL
CAR-12-04-03-001	The mobile application shall allow customers to create a customer account that exists in the Contractor back-office. The required steps and process to create a customer account shall be similar to the customer website. Successfully created accounts via the mobile application shall be immediately available to login via other Contractor-provided customer-facing applications (e.g., website, IVR).	SDD-27
CAR-12-04-03-002	Registered customers shall be able to sign in and access their account from either the mobile application, Contractor-provided IVR, or website, regardless of where the account was created (e.g., accounts created via the mobile application shall be accessible via the Contractor provided website and vice versa).	SDD-27
CAR-12-04-03-003	Registered users shall have the ability to make modifications to their customer account including: (1) Updating all information related to the customer account profile (e.g., PIN, name, addresses, passwords); (2) Enable/disable notifications and biometric logins supported by the mobile device; (3) Adding/removing card (e.g., transit accounts) to the account; (4) Adding, removing, updating stored funding sources; (5) Linking/unlinking social media platforms (i.e., Twitter, Facebook, Instagram, Google, etc.); (6) Creating, resolving, or updating customer service requests; (7) Ordering and viewing status for fare media purchases; (8) Purchasing fare (e.g., stored value, products) for cards/transit account (including cards registered and not registered to the customer account); and (9) Access customer services tools (e.g., FAQs, transit information, how-to's, etc.).	SDD-27

Req #	Requirement	Assigned CDRL
CAR-12-04-03-004	Registered customers shall have the ability to add unregistered cards to their customer account by entering a valid combination of the fare media ID and credential (e.g., security code) to unlock detailed information and actions regarding the transit account. This shall include at a minimum: (1) Viewing transit account balance (e.g., stored value balance, rider type, fare capping status, passes associated with the transit account); (2) Viewing pass product status (e.g., active/inactive) and remaining validity period (e.g., expiration date or number of rides remaining); (3) Viewing up to [18 months] of detailed transit/usage data and purchase activities related to the transit account (e.g., purchases/loads, autoload settings, tap/usage history, blocking/unblocking cards, etc.) Details for card usage shall be determined during Design Review; (4) Add, remove, and edit the card/account nickname (or descriptive name); (5) Purchase fare products; (6) Block/unblock cards; (7) Perform balance transfers; (8) Order replacement cards; and (9) Convert physical card to digital fare media.	SDD-27
CAR-12-04-03-005	The mobile application shall allow customers to sort and arrange the display order for registered media if the customer has multiple media registered to their account. Customers shall be able to quickly see and navigate all transit accounts associated to the customer account.	SDD-27
CAR-12-04-03-006	The mobile application shall manage different levels of registration (e.g., full access, limited access, etc.) and features/functions based on permissions determined during Design Review. This may include requiring authorization from the full access registered user to register a card to the limited access user, limited ability to only see transactions completed by the limited access user, load-only capabilities, ability to remove/unregister card, etc.	SDD-27
CAR-12-04-03-007	Registered customers shall have the ability to add, manage/update (e.g., update expiration date or billing address), and remove stored funding sources including credit cards, debit cards and mobile wallets (e.g., Apple Pay, Google Pay, Samsung Pay) from the mobile application. Customers with more than one stored funding source in the back-office can set and manage the primary/backup funding source. Funding source information shall be stored securely within the back-office in a tokenized form.	SDD-27

Req #	Requirement	Assigned CDRL
CAR-12-04-03-008	Registered customers shall be able to use stored funding sources to set up autoloading(s). Autoloads may be set for [one (1) or multiple cards] registered to the customer account and may consist of multiple passes/product autoloading(s) set per card. For example, a single registered card may include both a stored value and pass product autoloading on the same card.	SDD-27
CAR-12-04-03-009	Registered customers shall be able to enable, disable, and modify the autoloading of stored value and passes. As part of the autoloading setup process, the customer shall select the stored value amount or pass to be loaded and the type of autoloading (e.g., threshold or periodic). Autoloading setup shall require a funding source to be added or selected.	SDD-27
CAR-12-04-03-010	During autoloading setup, the customer shall 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 shall be attempted. If payment authorization is not received, the autoloading shall be automatically disabled.	SDD-27
CAR-12-04-03-011	Registered customers shall be able to initiate a load of value (e.g., passes and stored value) via the mobile application using stored value from any fare media registered to the same account.	SDD-27
CAR-12-04-03-012	The mobile application shall support balance transfers between transit accounts registered to the same customer account.	SDD-27
CAR-12-04-03-013	The mobile application shall allow both signed-in (registered) and guest (unregistered) users to access the mobile application. Specific features and functions shall be limited based on if the user is signed in or exploring the application as a guest.	SDD-27
CAR-12-04-03-014	Registered and unregistered customers shall be able to initiate a load of value (e.g., stored value and passes) via the mobile application using a credit card and debit card, including support for split payments. Loading value shall not require the funding source to be saved to an account.	SDD-27
CAR-12-04-03-015	Guest users (e.g., unregistered users or users that have not successfully signed in) shall have the ability to: (1) View limited card data (to be determined during Design Review) for cards that are not registered or linked to a customer account; (2) Purchase fares for any card (registered/unregistered) with appropriate card information; (3) Order/purchase new fare media; (4) Access customer service tools and create a customer service request; and (5) Create a customer account and link unregistered card/transit account.	SDD-27

Req #	Requirement	Assigned CDRL
CAR-12-04-03-016	Registered and unregistered customers shall be able to use the mobile application to view transit account balance (e.g., stored value and pass) and status (e.g., rider classification, active or blocked) information by entering a fare media ID.	SDD-27
CAR-12-04-03-017	Unregistered customers shall be able to use the mobile application to view transit account balance (e.g., stored value and pass) and status (e.g., rider classification, active or blocked) information by entering a valid combination of the fare media ID and credential (e.g., security code).	SDD-27
CAR-12-04-03-018	Transit account balance information for unregistered accounts shall 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.	SDD-27
CAR-12-04-03-019	To view information regarding fare media registered to a customer account, users shall be required to sign into the customer account associated to the registered fare media to access (view or manage) any data. Guest users shall not be able to view information regarding the transit account or customer account for fare media registered to a customer account.	SDD-27
CAR-12-04-03-020	All customers shall have the option of initiating a customer service request via the mobile application. This action shall automatically generate a request within the CRM System and assign the request to the appropriate customer service staff.	SDD-27
CAR-12-04-03-021	The mobile application shall allow customers to report a card lost or stolen. This action shall immediately result in the associated fare media being blocked from further use. The customer shall 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 shall be able to be charged.	SDD-27
CAR-12-04-03-022	The mobile application shall allow registered customers to close a transit account and request an opt-out refund. This action shall immediately result in the associated fare media being blocked from further use. The operational policies governing the issuance of a refund shall be defined during Design Review.	SDD-27

Req #	Requirement	Assigned CDRL
CAR-12-04-03-023	The mobile application shall allow customers to purchase multiple products and value for multiple transit accounts (e.g., cards) in a single transaction. Separate transactions shall not be necessary for a user to load funds or products to multiple transit accounts.	SDD-27

12.4.4 Digital Fare Media

Req #	Requirement	Assigned CDRL
CAR-12-04-04-001	The mobile application developer shall support both in-App and in-Wallet purchasing and issuing digital, closed-loop card that resides in the mobile device wallet (e.g., Google Wallet, Apple Wallet, Samsung Wallet) by registered customers. Where in-App means provisioning and purchasing is initiated in the mobile application, and in-Wallet means the provisioning and purchasing is initiated in the mobile device wallet. The digital fare media shall interact with the Contractor-provided validators to tap and pay for transit service. Support for unregistered customers is required but may be removed during Design Review.	SDD-27
CAR-12-04-04-002	Digital fare media shall be available for all SEPTA fare categories. For fare categories that require verification, the app shall require a unique SEPTA-provided verification code for the verified customer.	SDD-27
CAR-12-04-04-003	All digital fare media shall include a unique system identifier visible to the customer, in addition to the customer assigned nickname to help identify the correct card if multiple digital cards are stored on the mobile device/app. Digital fare media shall be managed similarly as physical fare media.	SDD-27
CAR-12-04-04-004	The mobile application shall provide users with the ability to provision new digital fare media from within the mobile application. If the user is logged in, the new digital fare media shall automatically be associated with the customer account the mobile application is logged into. If the user is not logged in, the mobile application shall prompt the user to create a customer account.	SDD-27

Req #	Requirement	Assigned CDRL
CAR-12-04-04-005	The mobile application shall allow users to convert physical cards associated with personalization data (e.g., senior, reduced fare, CCT, institutional programs, etc.) to digital fare media from within the mobile application. SEPTA shall determine which fare categories and card types are allowed to be converted to digital fare media during Design Review. SEPTA may determine that only some (e.g., senior, full fare, etc.) or all fare categories may be converted. The Contractor provided back-office shall enforce the ability to convert fare media based on established agency policies.	SDD-27
CAR-12-04-04-006	The mobile application shall allow customers to convert physical fare media into digital fare media. All products, value, and usage history from the physical fare media shall be automatically associated to the new digital credential. The physical fare media shall be immediately blocked from further use. For Google phones, conversion shall be able to be performed by tapping the physical card.	SDD-27
CAR-12-04-04-007	The mobile application shall have an intuitive interface that shall allow customers to migrate digital fare media between any device associated to the customer account (e.g., recover media from a device that was reset or replaced). Moving the fare media between devices shall be tracked and an accumulative counter for the total number of moves between devices shall be reported to the back-office, and readily available to SEPTA customer service staff for troubleshooting and fraud mitigation.	SDD-27
CAR-12-04-04-008	The mobile application shall provide users with the ability to provision new digital fare media to the mobile wallet from the Apple Pay and Google Pay Wallet. Virtual card fees paid to Apple/Google shall be invoiced directly to SEPTA as a pass-through expense. SEPTA shall not incur a markup of the provisioning fee or any involve for the administration of the virtual card.	SDD-27
CAR-12-04-04-009	The Contractor shall allow users to provision multiple virtual cards with varying fare categories to the same device. The mobile application shall support switching between the multiple provisioned cards for fare payment and inspection.	SDD-27
CAR-12-04-04-010	The Contractor shall allow digital fare media to migrate or transfer between devices (e.g., Apple device to Apple device; Android device to Android Device), including the ability to migrate or transfer digital media cross different OS platforms (e.g., Apple device to Android device and vice versa).	SDD-27

Req #	Requirement	Assigned CDRL
CAR-12-04-04-011	Migrating or transferring digital fare media between devices shall only require logging into the customer account the digital fare media is associated with and initiating the transfer from within the application. All value/products/attributes shall be automatically transferred to the migrated/transferred digital fare media provisioned to the device being used and digital fare media on the old device shall automatically be removed from the mobile wallet and blocked if necessary.	SDD-27
CAR-12-04-04-012	The Contractor shall allow digital fare media to migrate or transfer between an Apple Phone and Apple Watch using the native Apple applications.	SDD-27
CAR-12-04-04-013	The Contractor shall allow digital fare media to migrate or transfer between an Android phone and an Android watch capable of supporting the virtual credential using the native Android applications.	SDD-27
CAR-12-04-04-014	The mobile application shall support customer account security verification during conversion or transfers for all registered fare media using multi-factor authentication.	SDD-27
CAR-12-04-04-015	Once the digital media has been moved to a new device, the media on the old device shall be removed, or otherwise prevented from further use. If the digital fare media is moved more than a SEPTA-determined threshold (e.g., [two (2) moves per week]) the mobile application shall have the ability to take automated action to temporarily prevent the digital fare media from being moved unless overridden by customer service, or the threshold automatically resets.	SDD-27
CAR-12-04-04-016	The mobile application Contractor shall provide customer friendly messaging for all responses from the back-office. This includes, customer friendly transaction details, stop and station names, retail store names, error messaging, and other information received from the AFC Contractor-provided APIs. Customer-friendly messages shall be approved by SEPTA during Design Review.	SDD-27
CAR-12-04-04-017	The digital fare media shall be able to be inspected using the Contractor Fare Inspection solution. Security measures shall be included to support fare inspection and shall be finalized during Design Review.	SDD-27
CAR-12-04-04-018	The digital fare media shall allow data to be written to the media during the media tap on the Contractor-provided validation devices. (e.g., fare payment validator, handheld units, Turnstile Readers, and ADA Faregates, etc.).	SDD-27

Req #	Requirement	Assigned CDRL
CAR-12-04-04-019	The mobile application shall provide the back-office with information regarding the device model the digital fare media is loaded to (e.g. Apple Watch, Apple Phone, Apple iPad, Android Watch, Android phone, etc.). The mobile application shall also include the phone number (if applicable) of the device that the media is loaded to.	SDD-27
CAR-12-04-04-020	Digital fare media in the mobile wallet shall display basic transit account data on the card face (e.g., transfer times remaining, stored value balance, capping status, available passes, and personalized data such as customer name).	SDD-27
CAR-12-04-04-021	The digital fare media card face shall display the unique FPAN and/or card nickname to ensure multiple cards in the wallet are uniquely identifiable.	SDD-27
CAR-12-04-04-022	Customers shall be able to load value to digital fare media via the retail network (e.g., transit stores, 7-11, grocery stores), vending machines, website, IVR, and mobile application, which shall require an in-application barcode.	SDD-27
CAR-12-04-04-023	The Contractor shall design support for offline functionality (e.g., device experiences network interruptions during provisioning and purchasing transactions) and shall provide meaningful messaging and restore the progress made for the transaction in the back-office (if a process is interrupted) once network connectivity is restored.	SDD-27
CAR-12-04-04-024	The mobile application shall automatically check or turn on NFC when the digital fare media is in the wallet (specific to Android).	SDD-27

12.4.5 Reporting

Req #	Requirement	Assigned CDRL
CAR-12-04-05-001	The Contractor shall deploy a web-based reporting system to provide mobile application usage, Key Performance Indicators (KPI), and mobile application error and crash reports.	SDD-27

Req #	Requirement	Assigned CDRL
CAR-12-04-05-002	Canned or predefined reports shall include, and are not limited to: (1) System performance reports (KPI); (2) Error reports, application crashes and API response timing; (3) Usage reports including daily/monthly active users/sessions and user engagement; (4) Event Tracking (e.g., completed customer registrations, QR code generations, etc.); and (5) Monthly downloads, installs, uninstalls, app store rating and common themes used in application store reviews, etc.	SDD-27

12.5 Interactive Voice Response (IVR) System

12.5.1 General Requirements

Req #	Requirement	Assigned CDRL
CAR-12-05-01-001	The Contractor shall setup and deploy an IVR System that provides customers a self-service interface to obtain up-to-date transit and customer account information, and perform account management functions, over the phone. The IVR System shall connect with the back-office using the Contractor-provided APIs.	SDD-28
CAR-12-05-01-002	The IVR System shall integrate with the call center phone system. The call center shall be hosted and operated by SEPTA or an external Contractor.	SDD-28
CAR-12-05-01-003	The IVR System shall support touch-tone entry and voice recognition to access all IVR functions. The IVR speech recognition engine shall not have a limit to the number of words it can recognize.	SDD-28
CAR-12-05-01-004	The IVR System shall support the use of teletype writing (TTY) and TTS devices used by the hearing impaired.	SDD-28
CAR-12-05-01-005	The IVR System shall support English and up to [five (5) other languages] to be identified by SEPTA during Design Review.	SDD-28
CAR-12-05-01-006	The IVR System shall support the transfer of customers to and from the Contractor call center and SEPTA phone systems used for general customer support.	SDD-28
CAR-12-05-01-007	The IVR System shall be fully configurable by authorized SEPTA personnel, including the IVR script, functions available to customers, and handoffs to and from external systems.	SDD-28

Req #	Requirement	Assigned CDRL
CAR-12-05-01-008	The IVR System shall be subject to SEPTA review and approval at Design Review.	SDD-28

12.5.2 IVR Functions

Req #	Requirement	Assigned CDRL
CAR-12-05-02-001	The IVR System shall allow customers to perform the following functions at a minimum: (1) Obtain transit account balance and status information; (2) Obtain sales, usage, and adjustment transaction history; (3) Purchase fare products (e.g., stored value and passes) using a funding source already associated with the account; (4) Set up, modify, and cancel autoload of stored value and passes for already existing funding sources; and (5) Report a card lost or stolen. Final IVR System functions shall be determined and approved by SEPTA during Design Review.	SDD-28
CAR-12-05-02-002	The IVR System shall have an introduction that shall be configurable by SEPTA and shall provide customer notifications and answers to common customer questions.	SDD-28
CAR-12-05-02-003	Unregistered customers shall be able to use the IVR System to obtain transit account balance (e.g., stored value and pass) and status (e.g., rider classification, active or blocked) information by entering a fare payment credential ID and security code.	SDD-28
CAR-12-05-02-004	If a fare payment credential is registered to a customer account, the caller shall be required to enter the IVR PIN set during customer account registration to access account information other than balance and status, and obtain access to account management functions.	SDD-28
CAR-12-05-02-005	Following the successful entry of an IVR PIN, the IVR System shall present registered customers with an option to access their transaction history. Transaction history selection shall provide customers with details of the most recent transactions performed (e.g., sales, usage, and adjustments) and include an option to hear more. The number of recent transactions provided to customers (e.g., the last [five (5) transactions]) shall be configurable.	SDD-28

Req #	Requirement	Assigned CDRL
CAR-12-05-02-006	Registered customers shall be able to initiate a load of value (e.g., stored value and passes) via the IVR System using a saved funding source. The IVR System shall support the selection of pass products and pre-defined stored value amounts, and entry of custom stored value amounts, subject to configurable minimum and maximum limits.	SDD-28
CAR-12-05-02-007	Registered customers shall be able to enable, disable, and modify the autoload of stored value and passes via the IVR System. As part of the autoload setup process, the customer shall select the stored value amount or pass to be loaded and the type of autoload (e.g., threshold or periodic). Autoload setup shall require the use of a saved funding source.	SDD-28
CAR-12-05-02-008	Registered customers shall be able to report a card lost or stolen via the IVR System. This action shall immediately result in the associated fare media being blocked from further use. The customer shall 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 shall be able to be charged.	SDD-28
CAR-12-05-02-009	The IVR System shall provide an option to reach a live representative at any point of the call during call center operating hours. When a customer is transferred to a customer service agent, all relevant data entered through the IVR System (e.g., fare payment credential ID and customer account data) shall be auto-populated within the CRM Tool used by the call center agent. Callers that want to transfer to a live representative when the call center is closed shall be informed and provided with alternative options.	SDD-28
CAR-12-05-02-010	The IVR System shall provide the capability for customers to leave a message after hours when the call center is closed and support the ability for the customer to review their recorded message prior to submitting it. The IVR System shall support the retrieval of customer recorded messages. The format and process of retrieval shall be determined and approved by SEPTA during Design Review.	SDD-28

12.6 Required Submittals

CDRL ID	Contractor Deliverable	Due
SDD-25	Customer Website Design	Design Review
SDD-26	Institutional Website Design	Design Review

SDD-27	Fare Payment and Account Management Mobile Application Design	Design Review
SDD-28	Interactive Voice Response (IVR) Design	Design Review

13. Retail Network (Option)

This section describes the retail network and provides an overview of the extensive network of retail locations throughout the service area that distributes fare media and enables customer to add stored value easily and securely to their AFC transit accounts.

13.1 General Retail Network Technical Capabilities

Req #	Requirement	Assigned CDRL
RTL-13-01-001	The Retail Service Provider shall, at a minimum, implement and maintain an extensive network of retail locations throughout the SEPTA service area that distributes fare media and enables customers to add value easily and securely to their transit accounts.	SDD-29
RTL-13-01-002	The retail network shall enable AFC System fare media (i.e., smart card) sales.	SDD-29
RTL-13-01-003	The sale of AFC System fare media by a retail merchant shall initiate the activation of the card and automatic creation of a transit account within the AFC System.	SDD-29
RTL-13-01-004	The Contractor shall enable the adding of value to AFC System transit accounts based on card's printed number or encoded account number.	SDD-29
RTL-13-01-005	SEPTA shall be the issuer of record for all AFC System fare media sold and distributed through the retail network.	SDD-29
RTL-13-01-006	As part of Design Review, the Contractor shall develop and submit a Retail Network Design and Interface document that provides a detailed description of the Contractor's systems and infrastructure. The Retail Network Design and Interface document shall identify components of the Contractor's AFC System that currently exist and components that are being developed.	SDD-29
RTL-13-01-007	The Contractor shall support integration with [four (4) environments]: (1) Development; (2) Test; (3); Pre-production; and (4) Production. Connectivity and appropriate use of these environments shall continue throughout the terms of the Contract.	SDD-29

Req #	Requirement	Assigned CDRL
RTL-13-01-008	The Contractor shall backup critical systems at regular intervals, as approved by SEPTA with frequency determined by SEPTA during Design Review.	SDD-29
RTL-13-01-009	The Contractor shall support, and demonstrate to SEPTA, an automated software deployment mechanism to ensure that environments and deployments are consistent and correct.	SDD-29
RTL-13-01-010	The Contractor shall support a software audit process to ensure that deployments are consistent and correct.	SDD-29
RTL-13-01-011	The Contractor shall provide a secure out-of-band health check endpoint used to determine system health (typically over the internet).	SDD-29
RTL-13-01-012	The Contractor shall monitor the health of their API connections using API calls provided by the AFC System Contractor.	SDD-29
RTL-13-01-013	The Contractor shall collect and provide the AFC System team with statistics regarding successful and unsuccessful API calls (errors) throughout the terms of the Contract in a manner and frequency as agreed to by SEPTA.	SDD-29
RTL-13-01-014	The Contractor's AFC System shall not have a single point of failure and shall deploy and operate redundant services and network connections.	SDD-29
RTL-13-01-015	The Contractor shall coordinate with SEPTA before releasing any related software or performing any activities that may affect service.	SDD-29
RTL-13-01-016	The Contractor shall use current, actively maintained, and supported (by the OS provider) server operating systems.	SDD-29

13.2 Coverage Plan

Req #	Requirement	Assigned CDRL
RTL-13-02-001	SEPTA reserves the right to direct the Contractor to perform targeted retail contractor recruitment.	SDD-29
RTL-13-02-002	The Contractor shall notify SEPTA before a new merchant is added to the retail network.	SDD-29

Req #	Requirement	Assigned CDRL
RTL-13-02-003	The Contractor shall enroll as many of existing Legacy Key Card third-party retailers as possible into their network.	SDD-29
RTL-13-02-004	The Contractor shall enroll and maintain a minimum of [1,000 retail stores] within SEPTA's service area.	SDD-29
RTL-13-02-005	The Contractor shall establish and maintain through the life of the Contract, a retail merchant network that meets or exceeds the coverage commitments established in the Retail Network Coverage Plan. If a store has no sales activity within a calendar month, the Contractor shall contact the retailer to verify the retailer has adequate fare media inventory and staff is knowledgeable to perform a stored value reload.	SDD-29
RTL-13-02-006	The Contractor shall ensure all initial retail merchants are fully tested and deployed in the production environment before SEPTA begins to distribute EU Fare Media for use with the AFC System.	SDD-29
RTL-13-02-007	The Contractor shall work with SEPTA to identify the geographic and service coverage targets for the initial retail merchants, with written approval from SEPTA's PM, or designated representative.	SDD-29
RTL-13-02-008	The Contractor may request replacement or removal of underperforming retail merchants with a [30 day] advanced notice to SEPTA. Written approval from SEPTA's PM, or a designated representative, is required before making the requested change.	SDD-29
RTL-13-02-009	SEPTA may request replacement or removal of underperforming retail merchants. The Contractor shall find a replacement for the underperforming retail merchant within [30 days] of SEPTA's request. Acceptance of the replacement shall be at SEPTA's discretion.	SDD-29
RTL-13-02-010	The Contractor shall notify SEPTA of any involuntary changes in the network of participating retail merchants (such as a store closure) as soon as possible after becoming aware of such change.	SDD-29
RTL-13-02-011	The Retail Network Coverage Plan shall describe systems and processes that allow new retail merchants to be onboarded easily throughout the life of the Project, including an enrollment form to become a retailer.	SDD-29
RTL-13-02-012	The Contractor shall provide SEPTA with a data file of retail merchants for use on SEPTA's website. The Contractor shall review and provide an updated list at least monthly to SEPTA, or as the Contractor is notified of changes (whichever comes first).	SDD-29

Req #	Requirement	Assigned CDRL
RTL-13-02-013	The data file must include merchant name, address, phone number, sale type (sales and load location/load only location), modes of payment accepted, and latitude/longitude for each participating merchant location. The data file shall be formatted in such a way that retail merchants that have been added or removed are easily identified.	SDD-29
RTL-13-02-014	The Contractor shall provide a retail coverage map that displays retail merchant locations organized by sale and load location/load only location. Ideally, this would be able to overlay on a transit map to show proximity to SEPTA stops and Title VI locations. Map shall include retailer name, address, and phone number.	SDD-29

13.3 Service Provider Network

13.3.1 Integrated Retailers

Req #	Requirement	Assigned CDRL
RTL-13-03-01-001	Retail network merchants utilizing a POS System that is integrated with the Contractor's system shall support AFC System fare media sales, wherever possible, and the loading of stored value.	SDD-29
RTL-13-03-01-002	The integrated system workflow shall be similar to that supporting the sale and loading of gift card sales and similar products, and with as few steps as possible, to reduce merchant training needs.	SDD-29
RTL-13-03-01-003	The time and level of effort required by the merchant to perform a fare media sale and load on the integrated system solution shall be similar to a card sale and account load of a traditional gift card.	SDD-29
RTL-13-03-01-004	Where possible, sales of fare media and stored value shall have separate line items within the same POS transaction if a customer chooses to purchase fare media and load stored value in the same transaction.	SDD-29
RTL-13-03-01-005	The Contractor's integrated network of POS terminals shall seamlessly capture and submit the AFC System card number/transit account identifier via magstripe or barcode on the retail packaging and/or AFC System card.	SDD-29

13.3.2 Non-Integrated Retailers

Req #	Requirement	Assigned CDRL
RTL-13-03-02-001	The Contractor shall supply a web-based portal/interface to support AFC System sales at locations where POS integration is not possible.	SDD-29
RTL-13-03-02-002	Non-integrated retail network merchants that utilize the web-interface to interact with the Contractor's system shall support AFC System fare media sales and the loading of stored value.	SDD-29
RTL-13-03-02-003	The non-integrated system workflow shall be streamlined and similar to that supporting the sale and loading of gift cards, and similar products to reduce merchant training requirements.	SDD-29
RTL-13-03-02-004	The process required by the merchant to perform an AFC System fare media sale and/or stored value sale for both the integrated and non-integrated solutions shall have a very similar level of effort.	SDD-29
RTL-13-03-02-005	Where possible, sales of fare media and stored value shall have separate line items within the same POS transaction if a customer chooses to purchase fare media and load stored value in the same transaction.	SDD-29
RTL-13-03-02-006	The Contractor's web-based portal/interface shall seamlessly capture and submit the AFC System Card number/transit account identifier via magstripe or barcode on the retail packaging and/or AFC System card.	SDD-29
RTL-13-03-02-007	The Contractor shall supply non-integrated retail merchants with information about equipment options that support the sale of both fare media and/or stored value via the web-based portal/interface.	SDD-29

13.4 Fare Media

13.4.1 Physical Fare Media Specifications

Req #	Requirement	Assigned CDRL
RTL-13-04-01-001	Fare media available for purchase through the retail network shall be limited to EU closed-loop AFC System smart cards.	SDD-29

Req #	Requirement	Assigned CDRL
RTL-13-04-01-002	The AFC System fare media shall be an ISO 14443 compliant contactless smart card that also contains a magstripe and/or barcode, as required by the Contractor to support media sales and loading of the account value in the retail environment.	SDD-29
RTL-13-04-01-003	The Contractor shall supply SEPTA with Royalty-Free licenses for use of the format and data content of the magstripe and/or barcode used in the retail environment as part of Design Review.	SDD-29
RTL-13-04-01-004	The Contractor shall work with SEPTA, fare media Supplier/card Contractor, and subcontractor to develop specifications for EU fare media including all information necessary to load stored value in retail.	SDD-29
RTL-13-04-01-005	The Contractor shall work with SEPTA, fare media Supplier/card Contractor, and subcontractor to develop specifications for the retail packaging such as the barcode and/or magstripe, and any other elements required to support the sale of a card and stored value load.	SDD-29

13.4.2 Virtual Fare Media Specifications

Req #	Requirement	Assigned CDRL
RTL-13-04-02-001	Retail Service Provider shall support stored value loads to fare media via a mobile application barcode/QR code presented by the customer.	SDD-29

13.4.3 Media Procurement and Management

Req #	Requirement	Assigned CDRL
RTL-13-04-03-001	The Contractor shall work with SEPTA to design AFC System fare media graphics, text, and packaging before SEPTA proceeds with the procurement of packaged fare media. Packaging and fare media graphics design shall utilize artwork and graphics provided by SEPTA, formulation of text for both fare media and packaging shall incorporate input from SEPTA, and both graphics and text shall be subject to SEPTA's approval.	SDD-29

Req #	Requirement	Assigned CDRL
RTL-13-04-03-002	The Contractor shall manage AFC System fare media inventory to ensure the availability of AFC System media at all participating retail network locations. The Contractor shall provide the appropriate forecasting, monitoring, and reporting to ensure no inventory shortages occur.	SDD-29
RTL-13-04-03-003	The Contractor shall work with the fare media supplier and SEPTA to ensure timely provisioning of AFC System media to support the retail system implementation.	SDD-29
RTL-13-04-03-004	The funds for all retail fare media orders placed with the fare media supplier by the merchant/Contractor shall be paid to SEPTA within [three (3) banking days] of the card sale settlement.	SDD-29
RTL-13-04-03-005	The Contractor shall fulfill fare media orders placed by retailers within [five (5) business days] of order placement.	SDD-29
RTL-13-04-03-006	SEPTA reserves the right to acquire a sequence of Issuer Identification Numbers (IIN) that could be used as an AFC System card ID.	SDD-29
RTL-13-04-03-007	The Contractor shall assist SEPTA and the fare media supplier as needed concerning retail-specific fare media and package requirements.	SDD-29
RTL-13-04-03-008	The Contractor shall be responsible for retail network fare media inventory management including unsold/lost/damaged/misplaced.	SDD-29
RTL-13-04-03-009	The Contractor shall be responsible for the costs associated with distribution and shipment of fare media from the fare media supplier to the Contractor's warehouse and/or all retail merchant locations.	SDD-29

13.5 Transaction Processing

Req #	Requirement	Assigned CDRL
RTL-13-05-001	The Contractor shall utilize APIs to enable communication between the Contractor's network and the AFC System back-office.	SDD-29
RTL-13-05-002	The Contractor's network shall include both integrated and non-integrated retailers and utilize the same API for interfacing with the AFC System back-office.	SDD-29

Req #	Requirement	Assigned CDRL
RTL-13-05-003	The retail network shall support the following transaction types: (1) AFC System fare media sales; and (2) AFC System stored value loads and reloads (new and existing accounts).	SDD-29
RTL-13-05-004	Fare media sale transactions may involve the collection of card fees from the customer. The card fee amount shall be configurable and shall be established by SEPTA.	SDD-29
RTL-13-05-005	The retail network shall support the sale of fare media and loading of stored value in a single transaction, if desired by SEPTA.	SDD-29
RTL-13-05-006	The minimum transaction value for stored value loads shall be configurable and consistent at all stores. SEPTA shall work with the Contractor to establish a minimum load value.	SDD-29
RTL-13-05-007	Stored value load transactions shall require the collection of funds for the amount of the load.	SDD-29
RTL-13-05-008	The AFC System shall serve as the system of record for fare media and account status. Fare media sale and stored value load transactions shall be communicated to/from the AFC System 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 AFC System back-office.	SDD-29
RTL-13-05-009	The retail network shall allow a merchant to reverse a transaction before full authorization of the transaction with the AFC System (e.g., loss of communication between the retail network and AFC System). Retail network transaction reversals shall result in no charge to the customer or SEPTA. Approval and issuance of AFC System refunds shall be the responsibility of SEPTA.	SDD-29
RTL-13-05-010	Every AFC System transaction performed at a retail merchant location shall generate a customer receipt documenting the details of the transaction. Where possible, the customer shall be provided the option of receiving a printed, texted, or e-mailed receipt.	SDD-29

Req #	Requirement	Assigned CDRL
RTL-13-05-011	Fare media sales and add value receipt design and data elements shall be defined in conjunction with SEPTA during the design process. Receipt data element may include the following: (1) Date and time; (2) Merchant name; (3) Merchant location (city and state); (4) Merchant ID; (5) Form of payment (cash, credit/debit card, etc.); (6) Truncated credit card # (if applicable); (7) Payment card brand (e.g., Visa, if applicable); (8) Authorization number (if applicable); (9) Value-added; (10) Transit account beginning balance; (11) Transit account ending balance; (12) Account type (Adult, other); and (13) Truncated card serial number of all fare media purchased.	SDD-29

13.6 Financial Requirements

13.6.1 Payment

Req #	Requirement	Assigned CDRL
RTL-13-06-01-001	All retail merchants in the Contractor's retail network shall accept cash (at a minimum) as a form of payment for AFC System fare media sales and stored value load transactions.	SDD-29
RTL-13-06-01-002	All credit/debit transactions shall be processed utilizing the Contractor's or retail merchant's payment gateway.	SDD-29
RTL-13-06-01-003	All fees for payment processing, including interchange and acquirer fees, shall be borne by the Contractor or retail merchants. No fees shall be assessed to SEPTA or the customers for the use of cash, credit/debit cards, or checks.	SDD-29

13.6.2 Funds Settlement

Req #	Requirement	Assigned CDRL
RTL-13-06-02-001	The Contractor shall guarantee daily payment of funds to SEPTA for all completed AFC System fare media sales and stored value load transactions performed via the retail network.	SDD-29
RTL-13-06-02-002	The Contractor and its partners shall settle funds to SEPTA in either gross or net funds.	SDD-29

Req #	Requirement	Assigned CDRL
RTL-13-06-02-003	The Contractor shall comply with all local, state, and federal regulatory licensing requirements.	SDD-29
RTL-13-06-02-004	Fare media sales revenue and stored value funds collected through the retail network shall be electronically transferred to a SEPTA-specified bank account via wire transfer or ACH. Other forms of funds transfer are not permitted unless approved by SEPTA.	SDD-29
RTL-13-06-02-005	The Contractor shall settle funds to SEPTA-designated bank account(s) as frequently as possible, and no later than [one (1) week] after the sales transaction.	SDD-29

13.6.3 Fees

Req #	Requirement	Assigned CDRL
RTL-13-06-03-001	The Contractor and its network of retail merchants shall not assess customer fees of any kind for the sale of AFC System fare media or stored value, other than those required or approved by SEPTA and permitted by law.	SDD-29
RTL-13-06-03-002	The Contractor compensation for AFC System retail network services shall be limited to the following: (1) Card Fee: service fee applied to AFC System card sales. This fee shall be the difference between the card cost to SEPTA and the agreed-upon sale price for an AFC System card; (2) Transit account Stored Value Load Commission: service fee applied to the total amount of stored value loaded to customer AFC System accounts. This fee shall be calculated based on the commission percentage agreed and approved by SEPTA. The actual fee amount shall be calculated on the actual amount loaded; (3) AFC System Integration: non-recurring price for the integration of the Contractor's system with the AFC System furnished by the Contractor; and (4) System Design: non-recurring price for any necessary design activities associated with the design of the Contractor's retail network solution for AFC System.	SDD-29
RTL-13-06-03-003	SEPTA shall notify the Contractor at least [90 days] in advance of any change to the card fee and shall work with the Contractor to establish implementation policies and procedures.	SDD-29

13.7 Data Reporting

Req #	Requirement	Assigned CDRL
RTL-13-07-001	The transaction data shall be fully compliant with SEPTA policies for the handling of customer PII.	SDD-29
RTL-13-07-002	For sales that occur within the retail network, the Contractor's system shall be used to support the sale of fare media and loading of stored value to capture and route transaction data to the AFC System back-office.	SDD-29
RTL-13-07-003	Transaction data elements shall be defined by the Contractor during Design Review. Transaction data elements shall include at a minimum: (1) Card/Account type; (2) Unique card identifier; (3) Transit account number; (4) Date and time of the transaction; (5) Transaction value; (6) Merchant Name; (7) Merchant Location; and (8) Receipt Reference Number and/or Transaction ID.	SDD-29
RTL-13-07-004	Additional transaction data elements desired by SEPTA include: (1) Transaction type; (2) Method of Payment; (3) Beginning transit account Balance; (4) Ending transit account Balance; and (5) Merchant ID.	SDD-29
RTL-13-07-005	Transaction data and information shall be consistent between retail locations, whether the retailer is integrated or non-integrated (using the Contractor's web-based portal).	SDD-29
RTL-13-07-006	Transaction data stored by the retail network shall be transmitted to or available for download by SEPTA daily. Transaction data shall be financially auditable and provided in a format to be defined during Design Review.	SDD-29
RTL-13-07-007	The Contractor shall maintain, and provide SEPTA with, a list of all active retail locations, including retail merchant name, date of activation, address, Geographic Information System (GIS) coordinates, phone number, company URL, Sale/Load location, and Form of Payment accepted. This retail location data file shall be provided in a format to be defined by SEPTA during Design Review.	SDD-29
RTL-13-07-008	The retail locations data file containing the list of active retail locations shall be transmitted to, or available for download by SEPTA, daily.	SDD-29

Req #	Requirement	Assigned CDRL
RTL-13-07-009	The Contractor shall work with SEPTA to develop a set of canned operational reports generated by their AFC System, including but not limited to: (1) Sales reports (itemized and summary); and (2) Financial settlement reports (itemized and summary). Final report formats are subject to approval by SEPTA.	SDD-29
RTL-13-07-010	The Contractor shall work with SEPTA to develop a set of canned operational reports generated by their AFC System, including but not limited to: (1) Media inventory reports including sold and unsold media by individual retail store location; and (2) Active retail locations, including store name, date of activation, address, GIS coordinates, phone number, sale/load location, and form of payment accepted.	SDD-29
RTL-13-07-011	A financial settlement report must include a column showing the exact settlement amount to SEPTA by each retail network and commission paid/owed.	SDD-29
RTL-13-07-012	Inventory reports shall include the following information by location at a minimum: (1) Fare media stock (Contractor central warehouse inventory and merchant warehouse inventory); (2) Fare media type (e.g., Adult); (3) Serial number ranges issued; (4) Fare media ordered and to be fulfilled by the card manufacturer (including date order was placed and estimated time of delivery); and (5) Delivery dates to retail locations.	SDD-29
RTL-13-07-013	Reports shall be available in PDF, CSV, and Excel formats.	SDD-29
RTL-13-07-014	The Contractor shall provide a web-based reporting tool for SEPTA to use in accessing reports as needed.	SDD-29
RTL-13-07-015	The web-based reporting tool shall enable SEPTA staff to specify date ranges for the generation of the canned reports.	SDD-29

13.8 Marketing

Req #	Requirement	Assigned CDRL
RTL-13-08-001	The Contractor shall provide SEPTA with advance notification of, and obtain written approval for, any Contractor or retail network merchant-initiated AFC System outreach, advertising, and/or marketing campaigns.	SDD-29
RTL-13-08-002	The Contractor shall work with SEPTA to design AFC System marketing, packaging, and signage materials for use at retail network merchant locations. Marketing and signage materials shall utilize artwork and graphics provided by SEPTA and be subject to SEPTA review and approval. Any changes to the marketing and signage materials must be reviewed and approved by SEPTA before use.	SDD-29
RTL-13-08-003	The Contractor shall distribute SEPTA-approved marketing and signage materials to retail network merchants for placement in merchant facilities.	SDD-29
RTL-13-08-004	The Contractor shall ensure that signage and marketing materials are appropriately installed, prominently displayed, and maintained at all retail network merchant locations.	SDD-29

13.9 Required Submittals

CDRL ID	Contractor Deliverable	Due
SDD-29	Retail Network Plan	Design Review

14. System Integration Requirements

The Contractor-provided AFC System shall integrate with several existing and future systems as the AFC System is deployed over the four (4) Phases of this Project. By leveraging the Contractor's APIs, applications and systems shall integrate with the Contractor-provided solution(s) and back-office to provide a complete AFC System with a cohesive look and feel for all end users. This includes both Contractor-provided as well as potential third-party solutions. The Contractor is responsible for providing integration support and functionality for all elements of the complete AFC System such as:

- Paratransit services (CCT) for client/media management, payment, and reporting
- Onboard mobile routers for real-time communications
- CAD/AVL for Single Sign-On (SSO) support and required driver/route/stop/location information related to tap data

- Farebox to display tap results and information (customer display) and operator override functionality
- The ability to use existing SEPTA Turnstiles for fare payment and access
- Parking services to allow users to manage or pay for parking using AFC products
- Cash counting solutions (e.g., money/cash room financial reconciliation)
- All solutions that are options to the Contract and may be delivered by a third-party (e.g., mobile application, websites, retail network)

14.1 General Requirements

Req #	Requirement	Assigned CDRL
SI-14-01-001	The Contractor shall provide all necessary cabling and equipment to support the integration between the AFC System and existing systems as determined by the configuration of each bus type, station, and platform.	SDD-30
SI-14-01-002	Detailed ICDs shall be provided for all system integrations. The ICDs shall include detailed message formats and contents, procedures, interfaces, and transport protocols.	SDD-30
SI-14-01-003	The Contractor shall partner with third-party contractors and be fully responsible for the required integrations described in these sections, including all labor, hardware, and software costs incurred by all parties to successfully integrate the systems. Any licensing costs necessary to support the integrations shall be included in the Contractor's cost proposal.	SDD-30
SI-14-01-004	Where possible, the Contractor shall use APIs to communicate and integrate with existing and future AFC Systems. This may include the Contractor-provided APIs developed as part of this Project, or existing third-party APIs provided by third-party contractors, to provide the integrated functionality included in this SOS.	SDD-30
SI-14-01-005	Integration support shall include: (1) Technical support for third-party providers in the use of all Contractor-provided APIs as needed throughout the integration process; (2) Implementation of any API changes required as a direct result of the integrations, including any API testing and release activities performed by the Contractor; (3) Technical support throughout API certification testing conducted for each of the specified integrations; and (4) Technical support throughout SIT for validating the operation of the features and functions in a fully integrated environment.	SDD-30

Req #	Requirement	Assigned CDRL
SI-14-01-006	Any API changes made as a direct result of the integrations shall be reflected and published in the associated API documentation. API versioning shall be used wherever possible to minimize disruption to unaffected and ongoing integrations.	SDD-30
SI-14-01-007	All onboard bus integrations shall conform to open communication standards, including (1) EIA-232/422; (2) RS-435; (3) J1708/1587; (4) 10/100 Base-T wired Ethernet; (5) Bluetooth; and (6) USB. The communication interface to be used shall be determined during the Design Review and must ensure adequate support for all integrated capabilities.	SDD-30

14.2 Customized Community Transportation (CCT) Integration

Req #	Requirement	Assigned CDRL
SI-14-02-001	The AFC System shall integrate with the region's demand responsive service, CCT Connect, to allow CCT riders to pay for rides with the new AFC fare media. CCT includes ADA Paratransit service, a shared-ride program for senior citizens, and on-demand services. As part of the integration, the AFC System shall include the drop-off and pick-up information in addition to the date and time for dissemination across the customer-facing (e.g., websites, mobile applications, IVR) and customer support (e.g., CRM, CST) applications. All CCT rides using the AFC System for fare payment shall be associated with the booking/trip ID in the CCT rider's transit account associated with the fare media.	SDD-30
SI-14-02-002	The AFC System shall integrate with the CCT scheduling software manifest to associate all FPV taps with the unique CCT booking/Trip ID associated to the CCT passenger(s).	SDD-30
SI-14-02-003	In some situations, a ride must be provided to the CCT rider regardless of the validation result. For example, rides that are part of the first leg of a trip (Leg A) can be denied for insufficient fares, however subsequent legs of the trip (e.g., Leg B, the return trip) must be provided regardless of insufficient fares. In these specific use cases, the fare system shall charge the transit account (e.g., allow the account balance to go negative).	SDD-30

Req #	Requirement	Assigned CDRL
SI-14-02-004	The AFC System shall associate information from the CCT System with the transit account. CCT information may include: (1) Trip details such as date/time of the pickup and drop-off; (2) Unique CCT Trip ID/booking number; (3) Route; (4) Run; (5) Vehicle ID; (6) Drop-off and pick up location details; (7) Fare payment amount; and (8) Fare payment details (e.g., out of service area, free transfer to fixed route, etc.).	SDD-30
SI-14-02-005	The AFC System shall allow CCT customers to pay for multiple riders as scheduled in the CCT scheduling software. For example, a CCT customer may book a ride for [two (2) paying customers], or [one (1) paying customer] and a qualified personal care attendant. When the ride is performed the AFC System shall automatically deduct the correct payment from the transit account based on the business rules (e.g., Attendants ride free, yet are included in the CCT scheduling software to manage seat availability, Guests/Companions are required to pay the full CCT payment).	SDD-30
SI-14-02-006	The AFC System shall integrate with the CCT scheduling software to provide limited customer support within the CCT scheduling system. At a minimum, this includes: (1) The ability to block and unblock fare media for CCT rides only (e.g., the customer is no longer allowed for CCT rides due to a suspension or term of eligibility expires), but is still allowed to use fare media on fixed route; (2) Manage fare payment details (e.g., adjust the number of riders); (3) Manage and resolve CCT fare disputes; and (4) View and manage transit account balances and applicable fare products.	SDD-30
SI-14-02-007	Integration with the CCT scheduling and dispatching solution shall provide AFC fare payment and reconciliation reports for CCT rides (including sponsored rides). This shall include the ability to post pay to resolve a “no pay” situation or allow a sponsor to pay for all sponsored rides within a configurable timeframe (e.g., weekly, monthly, quarterly, etc.).	SDD-30
SI-14-02-008	CCT trips and rides differ from fixed route rides such that during post-processing (e.g., at the end of the month) rides may be “unperformed” and “reperformed” to correct data elements that may not have been accurate at the time of the ride. The AFC System shall support the ability to update CCT customer transit accounts based on corrections made after a ride has been taken. This shall also include the ability to adjust the payment (e.g., credit or debit) based on the business rules associated with the updated ride.	SDD-30

Req #	Requirement	Assigned CDRL
SI-14-02-009	The AFC System shall automatically update the transit account or fare media associated with a CCT customer based on the unique CCT trip/booking ID. Any changes made within the AFC System or CCT System (e.g., card replacement) shall be automatically synchronized across both systems. For example, if a CCT customer replaces a card, the new card shall be automatically reflected in the CCT System during booking and payment. If a CCT customer's eligibility expires, the AFC System shall no longer allow the transit account to purchase CCT rides or products.	SDD-30

14.3 CAD/AVL Integration

Req #	Requirement	Assigned CDRL
SI-14-03-001	The Contractor shall be responsible for the integration of the AFC System equipment installed onboard fixed route buses with the existing Motorola/Conduent CAD/AVL System installed on SEPTA vehicles for single sign-on and route/stop information.	SDD-30
SI-14-03-002	The integration shall support single sign-on/off through the FPV. Ideally, the AFC System shall allow bus operators to tap their badge on the FPV to facilitate sign-on through the integrated CAD/AVL System. If the bus is not logged into a route, a default route/stop shall be used.	SDD-30
SI-14-03-003	The AFC System shall capture the following login and routing data from the CAD/AVL System, at a minimum: (1) Operator ID; (2) Pattern; (3) Block; (4) Route; (5) Run; and (6) Direction; and (7) GTFS trip ID.	SDD-30
SI-14-03-004	Login and routing data shall be captured at login to the CAD/AVL System and upon any change. Capture of this data shall serve as the bus operator login to the AFC System.	SDD-30
SI-14-03-005	The login and routing data captured from the CAD/AVL System shall be appended to every fare transaction generated by the FPV.	SDD-30
SI-14-03-006	The FPV shall capture geo-location data generated by the CAD/AVL System, including at a minimum: (1) Raw GPS coordinates; and (2) Stop ID/name.	SDD-30

Req #	Requirement	Assigned CDRL
SI-14-03-007	Geolocation information shall be captured for each fare transaction generated by the FPV. If customers validate fares after a bus leaves the stop, the AFC System shall associate transactions to the last known stop until the next stop is reached (e.g., triggered by door opening).	SDD-30
SI-14-03-008	The geo-location data shall be appended to every fare transaction generated by the FPV. The FPV may also include an embedded GPS receiver, and append locally captured GPS coordinate data to each transaction.	SDD-30

14.4 Farebox Integration

Req #	Requirement	Assigned CDRL
SI-14-04-001	The Contractor shall integrate with the existing fixed route Genfare GFI FastFare Operator display to provide real-time tap results to the bus operator.	SDD-30
SI-14-04-002	Fare payment results transmitted from the FPV to the FastFare Operator display shall include: (1) Validation results; (2) Fare amount charged; (3) Fare balance remaining; (4) Fare product used; (5) Rider class; (6) Transfer time remaining; (7) Low balance warning (threshold to be configurable); (8) Time-based pass expiration warning (threshold to be configurable); (9) Card/account status (e.g. blocked and reason); (10) Boarding door (for vehicles with front and rear door FPVs); and (11) The operator may be shown additional fare payment details that are not shown to the customer. While not all information may be required or feasible to display on the farebox operator display, the AFC System shall include the ability to send this data at a minimum.	SDD-30
SI-14-04-003	The integration with the FastFare Operator display shall support operator input used to initiate a multi-rider payment (i.e., passback) override, which shall allow a single payment credential to be accepted an additional time(s) for the payment of multiple fares. The multi-rider payment override shall need to be selected prior to each additional payment (i.e., after the first) made using the same payment credential.	SDD-30

14.5 Turnstile Integration

Req #	Requirement	Assigned CDRL
SI-14-05-001	The Contractor shall integrate all existing SEPTA Turnstiles into the AFC System (i.e., Turnstile Integration) by replacing all existing fare media interface equipment with Contractor-supplied equipment (e.g., smartcard readers and barcode readers) to enable full fare validation functionality and device management. SEPTA shall provide any available interface specifications, design documentation, and test equipment to enable the Turnstile Integration. All plans and designs to retrofit the existing Turnstiles with new equipment and software components shall be subject to SEPTA's review and approval.	SDD-30
SI-14-05-002	The Contractor shall be responsible for subcontracting with the existing Turnstile Faregate provider, Klein Access Design, as necessary to deliver the fully-functional Turnstile Integration.	SDD-30
SI-14-05-003	The Turnstile Integration shall provide the following functionality: (1) Enable all existing modes of the Turnstiles; (2) Provide audio and visual feedback to customers; (3) Provide real-time, online fare validation in both the entry and exit directions; and (4) Generate, audit, and upload all fare transactions to maintain revenue assurance. The Contractor shall replicate all existing Turnstile behavior and/or propose functional improvements for review and approval by SEPTA.	SDD-30
SI-14-05-004	The Turnstile Integration shall accept all fare media types specified for the AFC System and shall generate the appropriate fare validation requests and transactions necessary to enable real-time transaction processing. The Turnstile Integration shall provide the functions necessary to support offline validations, including all approved risk mitigation techniques.	SDD-30
SI-14-05-005	The Turnstile Integration shall generate transaction records for each turnstile rotation, including rotations providing free entry admission, to provide accurate ridership counts of all entries and exits within the AFC System.	SDD-30
SI-14-05-006	The Turnstile Integration shall be capable of providing status events, alerts, and "heartbeats" from the Turnstiles to fully monitor each individual device via the SMMA.	SDD-30
SI-14-05-007	The Turnstile Integration shall be capable of providing device commands and configuration updates to the Turnstiles to remotely control and maintain each individual device via the SMMA.	SDD-30

Req #	Requirement	Assigned CDRL
SI-14-05-008	The Turnstile Integration shall interface with the SEPTA alarm panel and SAC to enable station-level monitoring and control of each individual device, including providing accurate capture of ridership counts from turnstile arm rotation.	SDD-30
SI-14-05-009	The Turnstile Integration shall be capable of multi-rider acceptance using a single fare payment credential by automatically overriding the passback timer for a credential when the corresponding passage is complete (e.g., a single turnstile rotation). The maximum number of accepted taps for a single fare payment credential shall be configurable.	SDD-30
SI-14-05-010	The Turnstile Integration shall use secure and hard-wired communications to transmit data between internal and external components. All network cabling and equipment necessary to complete the integration shall be provided by the Contractor.	SDD-30
SI-14-05-011	The Turnstile Integration shall interface with and utilize any existing alarm or emergency systems to enable control of each individual device.	SDD-30
SI-14-05-012	All relevant commissioning data necessary to maintain seamless operation of the Turnstiles in production (e.g., Device IDs, Station ID, etc.) shall be migrated to the AFC System as a prerequisite to BU of the Turnstiles.	SDD-30
SI-14-05-013	The Contractor shall provide all relevant technical specifications of the Turnstile Integration to SEPTA for review and approval. All such specifications shall include at a minimum: (1) Hardware drawings; (2) communications design; (3) Mounting details; (4) Software functional specifications; (5) ICDs; and (6) Installation details.	SDD-30

14.6 Parking Integration

Req #	Requirement	Assigned CDRL
SI-14-06-001	The Contractor shall be responsible for integrating with SEPTA's parking payment system using the Contractor-provided APIs.	SDD-30
SI-14-06-002	Parking integration shall enable customers to use funds, including pre-tax parking funds, stored within the AFC System to pay for parking at all locations, and through all payment channels, supported by SEPTA's parking payment system.	SDD-30

Req #	Requirement	Assigned CDRL
SI-14-06-003	Parking integration support shall include: (1) Technical support to the parking system provider in the use of all necessary Contractor-provided APIs, as needed throughout the integration process; (2) Implementation of any API changes required as a direct result of the specified integration, including any API testing and release activities performed by the Contractor; (3) Technical support throughout API certification testing; and (4) Technical support throughout SIT for validating operation of parking payment in a fully integrated environment.	SDD-30

14.7 Priced Options Integration

Req #	Requirement	Assigned CDRL
SI-14-07-001	If any priced option is determined to be provided through a separate procurement process (e.g., removed from this SOS) and delivered by a third-party, the Contractor shall still be responsible for supporting the integration of all third-party solution features and functions for all items included as a priced option in this SOS. This includes (1) FVMs; (2) Customer website; (3) Institutional website; (4) Fare payment and account management mobile application; and (5) Retail network.	SDD-30
SI-14-07-002	For all applications identified as a priced option within this SOS (i.e., FVM, Retail Network, Customer Website, Institutional Website, and fare payment/account management mobile application) that are removed from the Contractor's SOS, the Contractor shall be responsible for providing and incorporating customer service tools and services in the Contractor-provided CRM and CST Systems specific to the management, controls and customer support for the solutions provided by a third-party (e.g., retail network, fare payment and account management mobile application, customer and institutional websites).	SDD-30
SI-14-07-003	For all applications identified as an option within this SOS (i.e., FVM, Retail Network, Customer Website, Institutional Website, and fare payment/account management mobile application) that are removed from the Contractor's SOS, the Contractor shall be responsible for providing technical support to third-party vendors throughout the integration.	SDD-30

14.8 Cash Processing Equipment Integration

Req #	Requirement	Assigned CDRL
SI-14-08-001	The Contractor shall be responsible for integrating with SEPTA's cash processing equipment and associated software to import counted cash balances for all sales channels where cash is collected.	SDD-30
SI-14-08-002	The Contractor-provided FMS shall use imported cash processing data to support the automated reconciliation of collected cash against expected cash receipts for all sales channels (at the device-, location-, or shift-level).	SDD-30

14.9 Enterprise Financial System Integration

Req #	Requirement	Assigned CDRL
SI-14-09-001	The Contractor shall be responsible for integrating with the enterprise financial system operated by SEPTA (i.e., INFOR).	SDD-30
SI-14-09-002	The Contractor-provided FMS shall make automated journal entries in the enterprise financial system using APIs supported by that system. Details of the electronic interfaces and the journal entries to be posted in the enterprise financial system shall be finalized during Design Review.	SDD-30

14.10 Emergency Gate Integration

Req #	Requirement	Assigned CDRL
SI-14-10-001	The Contractor shall integrate with all existing SEPTA Emergency Gates on platforms and stations by interfacing with the available control and monitoring signals. The Emergency Gates are swing gates that enable emergency access to and egress from paid areas of stations without the need for valid fare media.	SDD-30
SI-14-10-002	The Contractor shall enable remote control of the Emergency Gates from the SMMA and the SAC, such that a command can be sent to release the locking mechanism of the Emergency Gate.	SDD-30

Req #	Requirement	Assigned CDRL
SI-14-10-003	The Contractor shall enable remote monitoring of the Emergency Gates from the SMMA and the SAC, such that the open and closed status of all Emergency Gates will be available in real-time. The SMMA and the SAC shall be capable of triggering an alarm if an Emergency Gate remains in the open status for a configurable threshold.	SDD-30
SI-14-10-004	The Contractor shall provide all relevant technical specifications of the Emergency Gate integration to SEPTA for review and approval. All such specifications shall include at a minimum: (1) Hardware drawings; (2) Communications design; (3) Software functional specifications; (4) ICDs; and (5) Installation details.	SDD-30

14.11 Partner Transit Agency Integrations

14.11.1 New Jersey Transit (NJT)

Req #	Requirement	Assigned CDRL
SI-14-11-01-001	The Contractor shall accept QR code-based fare media, in both paper and mobile formats, which is issued and sold by New Jersey Transit (NJT).	SDD-30
SI-14-11-01-002	The Contractor shall be provided detailed QR code specifications for the NJT fare media, and associated security features (e.g., cryptographic keys), which shall enable the Contractor-provided validation and inspection equipment to securely read and process such media.	SDD-30
SI-14-11-01-003	All information regarding the issued fare products shall be encoded within the QR code data, and the fare system shall accept these fare products based on business rules configured within the Contractor-provided system.	SDD-30
SI-14-11-01-004	The Contractor shall produce reports on the usage and acceptance of NJT fare media, which can be used for reconciliation and financial settlement between NJT and SEPTA.	SDD-30

14.11.2 Port Authority Transit Corporation (PATCO)

Req #	Requirement	Assigned CDRL
SI-14-11-02-001	The Contractor shall import daily “positive lists” of fare media (i.e., smartcard) UIDs for PATCO-issued media to be accepted within the SEPTA system.	SDD-30
SI-14-11-02-002	The positive lists shall be captured from a PATCO file drop service and imported into the Contractor’s system to enable the Contractor-provided validation equipment to read and process such media.	SDD-30
SI-14-11-02-003	The fare system shall accept PATCO fare media based on positive lists maintained in the back office and locally on validation devices, as well as business rules configured within the Contractor-provided system.	SDD-30
SI-14-11-02-004	The Contractor shall produce reports on the usage and acceptance of PATCO fare media, which can be used for reconciliation and financial settlement between PATCO and SEPTA.	SDD-30

14.11.3 Amtrak

Req #	Requirement	Assigned CDRL
SI-14-11-03-001	The Contractor shall integrate with the Amtrak reservation system, using a web service Message Queue (MQ), to access to Amtrak ticket data for barcoded tickets, in both paper and mobile formats, which are issued and sold by Amtrak. The interface with the Amtrak reservation system shall enable the capture of Amtrak ticket data in near real-time.	SDD-30
SI-14-11-03-002	The Contractor shall be provided detailed barcode specifications for the Amtrak fare media, which shall enable the Contractor-provided validation equipment to read and process such media. To validate Amtrak tickets, the system shall use the reservation and/or ticket number, number of passengers, allowed trips, ticket type, and expiration date.	SDD-30
SI-14-11-03-003	All information required for validation shall be encoded within the barcode data, and the fare system shall accept these fare products based on business rules configured within the Contractor-provided system.	SDD-30

Req #	Requirement	Assigned CDRL
SI-14-11-03-004	The Contractor shall produce reports on the usage and acceptance of Amtrak fare media, which can be used for reconciliation and financial settlement between Amtrak and SEPTA.	SDD-30

14.12 Required Submittals

CDRL ID	Contractor Deliverable	Due
SDD-30	System Integration Design (recommended each integration is included as a separate appendix for sharing with third-parties.)	Design Review

15. Design Review Requirements

The purpose of the Design Review is to create a collaborative environment between the Contractor's and SEPTA's technical teams. The outcome of the design process is a well-designed solution with comprehensive design documents that SEPTA and required third-parties can use to interface and integrate with the Contractor-provided AFC System. The requirements describe an iterative waterfall process (e.g., Hybrid Agile-Waterfall) with frequent opportunities for collaboration through technical breakout sessions that culminate in formal Design Review workshops between the Contractor, SEPTA, and required third-parties. The intent of the iterative Design Review is to leverage an agile-like philosophy for specific elements of the Project (e.g., website design) where the agile methodology may be a better alternative, yet still allow the more traditional (e.g., hardware) components to utilize waterfall methodology.

15.1 General Requirements

Req #	Requirement	Assigned CDRL
DR-15-01-001	The Contractor shall conduct and collaborate with SEPTA, and any third-party, in an iterative design process that includes formal Design Reviews to evaluate the overall design as it relates to the technical, functional, programmatic adequacy, and ability to meet the AFC System requirements.	SDD-31

Req #	Requirement	Assigned CDRL
DR-15-01-002	All Design Reviews shall consist of the following minimum activities: (1) Review and discussion of design topics that may cause schedule variances or delays; (2) Review and approval of detailed design documentation package(s); (3) Maintain a Master Issues List (MIL) to track design review issues, comments, and decisions; (4) Targeted technical working sessions as needed to clarify system requirements or SEPTA comments; (5) Iterative design sessions with SEPTA and applicable end-users to design and develop the functionality and UX/UI for all applications and systems that shall be used by internal and external end-users; (6) Contractor demonstrations (where possible) of similar systems currently in operations for other clients to illustrate the overall design of the system and provide context for CDRLs; and (7) Design review workshops where the Contractor explains the design of the system, review comments related to design, identifies gaps or information required from SEPTA, and reviews traceability with the applicable requirements. Where possible, issues shall be resolved during Design Review meetings with SEPTA determining the appropriate action to close an issue and require the Contractor to resubmit documents. Other design review activities may be requested by SEPTA throughout AFC System Design.	SDD-31
DR-15-01-003	The Contractor shall coordinate Design Review sessions with SEPTA and applicable third-parties. While iterative system design may occur remotely, some design sessions shall occur in Philadelphia with the Contractor's PM, technical lead, and all relevant technical staff attending in person. The specific location shall be identified by SEPTA, and video conference shall be available for remote participation where permitted.	SDD-31
DR-15-01-004	The Contractor shall submit a Design Review Plan for SEPTA review and approval within [60 calendar days] of NTP. The Design Review Plan shall be comprehensive of all [four (4) Project Phases] and describe the Contractor's scope and methodology for design review. The Design Review Plan shall also provide a high-level schedule as it relates to Conceptual Design Review (CDR), Preliminary Design Review (PDR), and Final Design Review (FDR) and include a list of all CDRL documents that shall be submitted (or updated and resubmitted) for CDR, PDR, and FDR. The Design Review Plan shall address how the Contractor shall meet the Design Review Requirements and include internal business processes for design and development that are used by the Contractor.	SDD-31

Req #	Requirement	Assigned CDRL
DR-15-01-005	The Design Review Plan shall identify which system components and applications can be presented either through demonstrations of existing solutions or detailed screen flows to SEPTA prior to the submission of Design Review deliverables.	SDD-31
DR-15-01-006	All applicable CDRLs shall be submitted in a searchable electronic format (e.g., PDF, Word) that shall be shared via SEPTA's document control system, SharePoint.	SDD-31
DR-15-01-007	SEPTA shall have up to [45 calendar days] to review and provide comments on the Design Review documents. The Contractor shall work with SEPTA on a mutually-agreed alternative timeline if the Contractor prefers to organize required CDRLs into smaller, partial Design Review packages during Design Review.	SDD-31
DR-15-01-008	The Contractor shall use a SEPTA-provided tool, SharePoint, to receive, respond and manage Design Review comments (e.g., the MIL).	SDD-31
DR-15-01-009	For all GUI designs and screen mockups, the Contractor shall provide design reviewers with access to the Contractor-provided UI design tool designed for collaboration (e.g., Figma, InVision, Sketch, etc.) for SEPTA review and commenting. At a minimum, this includes all customer-facing applications and systems that the customer shall interact with, all customer service tools used to sell and support customer requests and issues, and all mobile applications for both customers and internal staff (e.g., inspection, validation, etc.).	SDD-31
DR-15-01-010	The Contractor shall provide a written response to SEPTA comments in SharePoint at least [14 calendar days] prior to the start of the Design Review workshop.	SDD-31
DR-15-01-011	The Contractor shall resubmit relevant CDRLs to address all comments and feedback on the design review packages throughout the design review process until SEPTA provides Final Approval of the AFC System with production specifications and drawings ready for release for the Project.	SDD-31

Req #	Requirement	Assigned CDRL
DR-15-01-012	The design review documents shall be approved upon SEPTA's determination that there are no critical open issues remaining in the MIL for the design phase. If resubmittal of all or part of the design review package is required, the Contractor shall provide the revised documents for SEPTA to review and approve. Any resubmitted documents shall be provided to SEPTA within [14 calendar days] once notification to the Contractor is provided regarding the resubmission of any documentation.	SDD-31

15.2 Conceptual Design Review (CDR)

The objectives of Conceptual Design Review (CDR) is to acquaint SEPTA with the Contractor's intended AFC System design for the project's current phase, resolve any open items related to external system interfaces, and provide the basis for proceeding with the current project Preliminary Design Review (PDR).

Req #	Requirement	Assigned CDRL
DR-15-02-001	CDR shall establish a high-level overall design of the AFC System. This includes integrations with third-parties, general hardware and software design, overall system architecture, and identifying key information that the Contractor requires from SEPTA or third-parties to enter into subsequent detailed design discussions. CDR shall establish the structure of the Contractor's management team and the scope of any subcontractors for the Project. The Contractor shall provide all documentation from the list of submittals.	SDD-31

Req #	Requirement	Assigned CDRL
DR-15-02-002	CDR documentation shall address the following: (1) Provide preliminary specifications for all equipment described in these specifications; (2) Provide narrative descriptions of the major systems and subsystems proposed by the Contractor; (3) Provide system block diagrams identifying all interfaces between system components, including external systems that shall not be provided by the Contractor but shall interface with the system; (4) Describe the responsibilities and schedule for completion of detailed system interface definitions; (5) Provide a software conceptual design, including software block diagrams for key system components; (6) Confirm the Contractor's understanding of the intended operations and maintenance environment; (7) Identify key information and decisions required from the SEPTA; (8) Provide a preliminary list of user stories for systems that interface with end-users, including internal and external end-users; and (9) Provide high-level user-interface flows and GUI mockups for customer-facing applications and touch-points (e.g., websites, mobile application, fare vending screens, fare payment validator screens, etc.), customer service and support applications and tools (e.g., CRM, CSW, IVR, etc.), internal mobile applications, and any other application with a user-interface that shall be customized, configured, or developed as part of this Project.	SDD-31

15.3 Preliminary Design Review (PDR)

The objective of Preliminary Design Review (PDR) is to review the progress of the AFC System design and evaluate compliance of the completed design and work in progress with the requirements of this SOS. The Contractor is encouraged to categorize PDR information into logical topics for organized review and discussion.

Req #	Requirement	Assigned CDRL
DR-15-03-001	PDR shall represent approximately [75%] completion of the total technical and operational AFC System design of the Project. PDR shall establish a detailed understanding of how the Contractor's solution is designed to meet the Contract requirements and identify unresolved critical technical issues. The Contractor shall provide all documentation listed as required for PDR from the list of submittals.	SDD-31

Req #	Requirement	Assigned CDRL
DR-15-03-002	PDR documentation shall be substantially detailed to include the following items at a minimum: (1) Detailed hardware and software specifications for all Contractor-supplied devices, including power diagrams, functional block diagrams, mounting arrangements, and installation methods; (2) Detailed software flow charts for all back-office systems; (3) 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; (4) Detailed interface and communication specifications for all internal and external system interfaces; (5) Detailed specifications for all configuration control systems; (6) Detailed specifications for access control systems supporting back-office operations; (7) Detailed descriptions of system backup and recovery procedures; (8) List of special tools and diagnostic test equipment needed for the maintenance of each Contractor-supplied device and system; (9) A substantially complete list of user stories shall be provided for any systems that interface with end-users, including internal and external end-users; and (10) Detailed user-interface flows and GUI mockups for customer-facing applications and touch-points (e.g., websites, mobile application, fare vending screens, fare payment validator screens, etc.), customer service and support applications and tools (e.g., CRM, CSW, IVR, etc.), internal mobile applications, and any other application with a user-interface that shall be customized, configured, or developed as part of this Project.	SDD-31

15.4 Final Design Review (FDR)

The objective of Final Design Review (FDR) is to finalize the detailed AFC System design that satisfies all of the requirements in these specifications.

Req #	Requirement	Assigned CDRL
DR-15-04-001	FDR shall represent [100%] completion of the detailed AFC System design with production specifications and drawings ready for release for the Project. Design documents shall be updated to a level of detail consistent with a completed design for this SOS. The Contractor shall provide all documentation listed as required for FDR from the list of submittals.	SDD-31

Req #	Requirement	Assigned CDRL
DR-15-04-002	FDR documentation shall be complete and detail the following items at a minimum: (1) Assembly drawings for all Contractor-supplied devices, down to the LLRU; (2) Electrical schematic drawings for all Contractor-supplied devices; (3) Preliminary “as-built” drawings and prototypes for all device mounting configurations; (4) Final system architecture drawings; (5) 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; (6) Detailed specifications for all APIs supporting frontend and back-office operations; (7) Detailed specifications for all system transaction formats; (8) Detailed descriptions of all message formats and data elements for device and system events and alarms; (9) ICD for all systems and subsystems; (10) 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); (11) Documentation of database programming features including, and not limited to, queries, query formats, triggers, jobs, functions, and procedures; (12) A complete list of user stories shall be provided for any systems that interface with end-users, including internal and external end-users; and (13) Completed user-interface flows and GUI mockups for customer-facing applications and touch-points (e.g., websites, mobile application, fare vending screens, fare payment validator screens, etc.), customer service and support applications and tools (e.g., CRM, CSW, IVR, etc.), internal mobile applications, and any other application with a user-interface that shall be customized, configured, or developed as part of this Project.	SDD-31
DR-15-04-003	FDR shall include a review of the spare parts required to support the AFC System. The Contractor and SEPTA shall jointly review the spare parts listed in the Contract and reallocate, delete, and add parts, as necessary.	SDD-31

15.5 Required Submittals

CDRL ID	Contractor Deliverable	Due
SDD-31	Design Review Plan	NTP+60 calendar days

16. Testing Requirements

The Contractor shall plan for, perform, monitor, and document all tests required to prove acceptable design and delivery of the AFC System, including all components and subsystems, and the integrated

system as a whole. The Contractor shall furnish system equipment that meets the criteria specified for all tests.

The Contractor shall begin no portion of any phase's system testing (Factory Testing, Integration Testing, or Acceptance Testing) unless all Design Reviews and testing prerequisites for the applicable phase have been successfully completed and approved in writing by SEPTA. If some elements of the system are rolled out prior to the phase's complete deployment, all testing stages shall be completed in their entirety for each segment of deployment.

The testing for each project phase shall be comprehensive including all testing (as applicable) across all phases. Such that regression testing and integration testing shall be performed at each phase of the project as deemed necessary. For example, introducing new equipment may require full integration testing of back-office systems and applications. And vice versa, where introducing new software or applications may require full integration testing of equipment and back-office systems. Complete testing at each project phase shall be determined collaboratively between SEPTA and the Contractor. The test stages are described in more detail in the following sections.

Exhibit 16-01 Testing Overview

Testing Stage	Test	Purpose	Condition for Commencement	Conditions for Completion	Project Phase
Factory Testing	1. First Article Configuration Inspection (FACI)	Inspect first production unit hardware configuration and quality prior to full production run	First piece of pre-production equipment produced (for each equipment type) for the Project Phase being tested	All equipment types deemed to meet applicable hardware configuration requirements in the technical specification for the Project Phase being tested	Phase 1, Phase 3, Phase 4
	2. Factory Acceptance Testing (FAT)	Test that SI-provided equipment and systems meet all human factors, environmental, and maintainability requirements prior to full production run	First piece of pre-production equipment passed FACI (for each equipment type) for the Project Phase being tested	All equipment types deemed to meet applicable human factors, environmental and maintainability requirements in the technical specification for the Project Phase being tested	
	3. Production Acceptance Test (PAT)	Confirm each piece of equipment is properly constructed and functional following production	1. All equipment types passed FAT for the Project Phase being tested 2. Equipment production run commenced for the Project Phase being tested	Production runs for all equipment completed and each piece of equipment passed PAT for the Project Phase being tested	
Integration Testing	4. Functional Unit Test (FUT)	Test full functionality of each system component individually in a lab environment prior to integration. As functionality is developed, FUT will include periodic system demonstrations for the MTA to witness.	1. Partial system development and functionality is ready for preliminary review and demonstration 2. Component-level software development completed for the Project Phase being tested 3. Production components installed and configured in the test lab for the Project Phase being tested	All functionality required in technical specification demonstrated for each system component, and all cycling test passed for the Project Phase being tested	All Project Phases
	5. System Integration Test (SIT)	Test all functionality of the integrated system, including possible regression testing for previous Project Phases' functionality in a lab environment	1. All system components passed FUT for the Project Phase being testing 2. Fully integrated system installed and configured in the test lab for the Project Phase being tested	All functionality required in technical specification demonstrated on fully integrated system in the test lab for the Project Phase being tested, including applicable regression tested functionality	
	6. Field Integration Test (FIT)	Install and test all functionality of the production system in the field, including possible regression testing for previous Project Phases' functionality	1. Integrated system passed SIT for the Project Phase being tested 2. Production back-office fully installed and configured for the Project Phase being tested 3. 10% of all equipment types installed in the production environment for the Project Phase being tested	All functionality required in technical specification demonstrated on a fully integrated system in the field for the Project Phase being tested including applicable regression tested functionality	
30-Day Settling Period					All Project
Acceptance Testing	7. Pilot	Test system functionality including possible regression testing for previous Project Phases' functionality with structured test and ad-hoc use of friendly users	1. Integrated system passed FIT for the Project Phase being tested 2. Completion of 30-day settling period for the Project Phase being tested 3. All equipment installed in the production environment for the Project Phase being tested	1. All transactions successfully processed throughout 90-day pilot run for the Project Phase being tested including all applicable regression tested functionality 2. Peak transaction volumes reached for stress testing for the Project Phase being tested including all applicable regression tested functionality 3. No major issues outstanding on the punch list for the Project Phase being tested including any issues found when testing applicable regression test functionality	All Project Phases
	8. Reliability, Maintainability, and Accuracy Testing (RMAT)	Test that system is operating in a reliable and accurate manner by inspecting and auditing the maintainability of all equipment	1. Pilot complete for the Project Phase being tested	System meets all performance requirements in the technical specification for three consecutive 30-day periods for the Project Phase being tested including all applicable regression tested performance requirements	
	9. System Acceptance Test (SAT)	Test that system fully meets all performance requirements including possible regression testing for previous Project Phases' performance requirements in the technical specification	1. Pilot complete for the Project Phase being tested	System meets all performance requirements in the technical specification for three consecutive 30-day periods for the Project Phase being tested including all applicable regression tested performance requirements	
	10. Final Acceptance			1. Fully installed production system passed SAT for all Project Phases 2. All documentation delivered and training conducted for all Project Phases 3. All requirements of the contract confirmed as met for all Project Phases	After all Project Phases have completed SAT

16.1 General Requirements

Req #	Requirement	Assigned CDRL
TEST-16-01-001	The Contractor shall test all hardware and software (e.g., system components and subsystems) individually and in integrated environments to ensure that they meet all technical, functional, and performance requirements in these requirements.	TEST-01
TEST-16-01-002	Testing shall incorporate all integration with existing SEPTA systems, and third-party integrations described in these requirements including any options in this SOS that are implemented as part of a separate procurement.	TEST-01
TEST-16-01-003	The Contractor shall provide all labor and materials required for system testing, including but not limited to closed-loop fare media, Visa, MasterCard, American Express, and Discover contactless bank cards (with a total of \$5,000 in Contractor-funded value loaded to contactless bank cards), mobile wallets, cash, and all support services and facilities required to stage, inspect and test all hardware and software supplied to meet the requirements.	TEST-01
TEST-16-01-004	All tests and inspections shall be performed and documented by the Contractor, unless otherwise agreed to by SEPTA.	TEST-01
TEST-16-01-005	SEPTA shall, at its discretion, assign staff or representatives to witness and augment all tests. This shall include providing additional use cases or ad-hoc tests to be added to the detailed test scripts provided by the Contractor. Successful completion of all testing shall be subject to SEPTA's approval based on test criteria mutually agreed to between the Contractor and SEPTA.	TEST-01
TEST-16-01-006	The Contractor shall test and verify that they can successfully utilize any SEPTA-provided networking equipment for deployment of the AFC System as designed.	TEST-01
TEST-16-01-007	The Contractor shall provide support and perform back-office validation for all tests and inspections performed by third-parties that involve integration with the system environments, integrations, applications, performance, features, and functions.	TEST-01
TEST-16-01-008	All inspection or test cases not passing shall be corrected and retested by the Contractor no longer than [14 calendar days] after the defect is identified. The defect categorization and timelines associated with each category shall be set per the agreed upon response timelines included in the approved inspection and test plan provided by the Contractor.	TEST-01

Req #	Requirement	Assigned CDRL
TEST-16-01-009	Prior to the start of formal testing for each phase of the project, the Contractor shall conduct internal “dry-run” reviews for all hardware and software components to identify and resolve any issues that arise before formal testing commences. Any and all hardware or software not passing inspection or test shall be replaced, or otherwise corrected by the Contractor and retested, at no additional cost to SEPTA.	TEST-01
TEST-16-01-010	For each phase of the project, the Contractor shall perform full financial reconciliation testing to demonstrate the financial integrity of the AFC System from tap to settlement and purchase to settlement, including all payment types (e.g., payment card, cash, check).	TEST-01
TEST-16-01-011	The Contractor shall coordinate testing with SEPTA and all third-party Contractors providing services or solutions for the AFC System. Coordination and support for third-party testing may include completion of tests specific to the account-based back-office, validation for interface integration, transaction generation, troubleshooting, and other similar requests as those Contractors and service providers complete their required testing. SEPTA shall be informed and updated of all third-party testing. Third-party testing shall not replace Contractor-required testing, unless approved by SEPTA.	TEST-01
TEST-16-01-012	For each phase of the project, the Contractor shall perform all applicable integration and regression testing to confirm that the operations of previous phases continue to function as required and meet the overall system requirements. Comprehensive testing plans, including required regression testing or retests, shall be determined collaboratively between SEPTA and the Contractor.	TEST-01

16.2 Testing Documentation

16.2.1 Inspection and Test Plan

Req #	Requirement	Assigned CDRL
TEST-16-02-01-001	The Contractor shall submit a draft Inspection and Test Plan for SEPTA review and approval during Design Review, and the final Inspection and Test Plan no less than [42 calendar days] prior to the start of formal testing.	TEST-01

Req #	Requirement	Assigned CDRL
TEST-16-02-01-002	The Inspection and Test Plan shall include the Contractor's approach to conducting testing for all AFC System component features, functions, use cases (including performance, usability, and accessibility testing) for the Contractor-provided solution across all phases. The Inspection and Test Plan shall include details on the tools and processes to completely test all delivered elements and the anticipated test stages (or testing support for solutions provided by other Contractors that integrate with the back-office) that shall be provided for each phase.	TEST-01
TEST-16-02-01-003	The Inspection and Test Plan shall include details on all required testing, system security analysis, and certification testing (as necessary) to be performed, including those performed under the Contractor's QA program.	TEST-01
TEST-16-02-01-004	The Inspection and Test Plan shall describe at a high-level the features, functions and components tested at each project phase.	TEST-01
TEST-16-02-01-005	The Inspection and Test Plan shall include the Contractor's approach for each test stage including: (1) First Article Configuration Inspection (FACI); (2) Factory Acceptance Test (FAT); (3) Production Acceptance Test (PAT); (4) Functional Unit Test (FUT); (5) System Integration Test (SIT); (6) Field Integration Test (FIT); and (7) Reliability, Maintainability, and Accuracy Testing (RMAT), and (8) System Acceptance Test (SAT). The Inspection and Test Plan shall clearly explain the reasoning for any test stage that shall not be performed across all phases of the project. The Inspection and Test Plan shall provide a high-level structure for any additional phases/sub phases needed.	TEST-01
TEST-16-02-01-006	The Inspection and Test Plan shall include a detailed schedule indicating the sequence of each test stage including the location, anticipated duration and Contractor-provided lead(s) for all test stages at each project phase.	TEST-01
TEST-16-02-01-007	The Inspection and Test Plan shall cover all inspections and tests to be performed for the solution provided by the Contractor and any subcontractors and suppliers including inspections and tests performed under the Contractor's QA program.	TEST-01

Req #	Requirement	Assigned CDRL
TEST-16-02-01-008	The Inspection and Test Plan shall describe the categorization of potential defects identified during testing. Each category shall include timelines to correct identified defects during each test stage (i.e., critical defects blocking other test phases shall be fixed in [24 hours to 48 hours] for SEPTA to review and approve. Response times associated with each category of defect shall be mutually agreed upon between SEPTA and the Contractor.	TEST-01
TEST-16-02-01-009	The Inspection and Test Plan shall identify any requirements the Contractor intends to meet by any means other than the testing process described in this SOS.	TEST-01
TEST-16-02-01-010	The Inspection and Test Plan shall include performance testing such as load, stress, endurance, boundary, limited condition, and spike testing that simulates peak ridership and transaction volumes over various time intervals. The Contractor shall work with SEPTA to provide adequate transaction volume projections as needed.	TEST-01
TEST-16-02-01-011	No inspections or tests shall be performed until the Contractor has received SEPTA's approval to proceed.	TEST-01

16.2.2 Inspection and Test Procedures

Req #	Requirement	Assigned CDRL
TEST-16-02-02-001	The Contractor shall prepare and submit to SEPTA a detailed procedure for each inspection and test to be performed. Test procedures shall include details for each test, including test setup instructions and preconditions, step-by-step instructions for performing the test, and expected results for each test to pass.	TEST-01
TEST-16-02-02-002	The detailed inspection and test procedures shall be submitted to SEPTA for review and approval at least [20 business days] prior to the test stage unless otherwise specified herein. Test procedures shall cover all use cases, features and functions for both correct (i.e., happy path) and incorrect (e.g., exceptions, negative, "unhappy") operations of the Contractor-provided solution.	TEST-01
TEST-16-02-02-003	During all witnessed testing, SEPTA or a SEPTA representative shall make the final determination if the test procedure passes or fails before the Contractor conducts the next test procedure.	TEST-01

Req #	Requirement	Assigned CDRL
TEST-16-02-02-004	The Contractor shall conduct no inspection or test until approval of the corresponding test procedure has been granted by SEPTA. A test readiness review shall be conducted prior to formal testing to ensure the Contractor is prepared for testing.	TEST-01
TEST-16-02-02-005	Detailed inspection and test procedures shall include mapping to the design documents and functional requirements related to the test. This mapping shall be present both in the testing documentation and a separately maintained Requirements Traceability Matrix.	TEST-01
TEST-16-02-02-006	A re-test shall 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 AFC System, if deemed necessary by SEPTA.	TEST-01
TEST-16-02-02-007	The Contractor shall deliver detailed inspection and test procedures for each test stage defined in these requirements including: (1) First Article Configuration Inspection (FACI) (2) Factory Acceptance Test (FAT); (3) Production Acceptance Test (PAT); (4) Functional Unit Test (FUT); (5) System Integration Test (SIT); (6) Field Integration Test (FIT); (7) Reliability, Maintainability, and Accuracy Testing (RMAT); and (8) System Acceptance Test (SAT). The Inspection and Test Plan shall clearly explain the reasoning for any test stage that shall not be performed across each project phase.	TEST-01

16.2.3 Inspection and Test Reports

Req #	Requirement	Assigned CDRL
TEST-16-02-03-001	The Contractor shall provide a written report with [14 calendar days] of testing and retesting that includes a copy of all data generated during the test, test result, any remediation necessary, and the remediation timeline resulting from testing.	TEST-01
TEST-16-02-03-002	Inspection and Test Reports shall include the detailed test procedures, from the associated test procedures, noting any exceptions to the stated test conditions, recording all relevant setup, configuration, and transaction information necessary to review and approve (e.g., fare media serial numbers and device IDs, transaction IDs), with each step marked as passed or failed.	TEST-01

Req #	Requirement	Assigned CDRL
TEST-16-02-03-003	Inspection and Test Reports shall 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 or regression testing results.	TEST-01
TEST-16-02-03-004	The Contractor shall submit all transaction data generated during testing in a format (e.g., Excel) that allows for simple storage and analysis by SEPTA.	TEST-01
TEST-16-02-03-005	Reports shall be submitted to SEPTA for review and approval within [14 calendar days] of the completion of any test.	TEST-01
TEST-16-02-03-006	No stage of testing shall be considered complete until the associated report is approved by SEPTA, and any retest or regression testing requested by SEPTA has been successfully completed.	TEST-01

16.2.4 Test Waivers

Req #	Requirement	Assigned CDRL
TEST-16-02-04-001	If the Contractor desires a waiver of testing, the Contractor shall submit required information for each applicable component or subsystem [30 calendar days] prior to the date of planned testing.	TEST-01
TEST-16-02-04-002	A request to waive testing shall include the following information: (1) List of the locations and quantities of previously installed equipment, including duration of revenue service; (2) Description of all relevant differences between the other installation locations those described in this specification; (3) Description of all relevant differences between the previously installed equipment and the components being provided to meet the requirements of these specifications; (4) Test results for all relevant tests that have been conducted on the equipment; (5) Reliability data for the equipment, as verifiable through the purchasers; (6) Proposed cost credit to the Contract for granting the waiver of testing; and (7) Rationale for waiving the testing. SEPTA may require that the request from the Contractor include which test(s) cannot be waived.	TEST-01
TEST-16-02-04-003	Based on the submitted data, SEPTA shall determine whether requirements for testing shall be waived.	TEST-01

Req #	Requirement	Assigned CDRL
TEST-16-02-04-004	Specific testing requirements for each system component shall be considered individually, and waivers shall be issued on an individual test and component basis; it is possible SEPTA may grant a full or partial waiver for certain tests while others shall still be required.	TEST-01
TEST-16-02-04-005	No waivers shall be granted for the integration or acceptance testing of the components of the AFC System.	TEST-01

16.3 SEPTA Test Facility

SEPTA shall identify and provide a secure facility in Philadelphia for the placement of a Contractor furnished test facility where SEPTA and the Contractor may test system hardware and software. SEPTA shall be responsible for providing and maintaining network communications to the test facility. The Contractor shall provide all maintenance support for the test facility equipment, systems, and interfaces through Final Acceptance, and maintain the test facility software configuration throughout the terms of the warranty and SMA.

Req #	Requirement	Assigned CDRL
TEST-16-03-001	The Contractor shall configure and install the test facility on SEPTA's property for both the Contractor and SEPTA to use for ongoing testing and troubleshooting. The Contractor shall provide and maintain all test equipment through Final Acceptance. The test facility shall be fully operational by the start of Integration Testing.	TEST-02
TEST-16-03-002	The Contractor shall configure the test facility equipment to allow devices and applications to switch between the different back-office environments (e.g., Test, Staging, Production, etc.) to reduce the number of dedicated devices/equipment needed within the test facility. Non-production components shall not be configured to connect to the Production environment. Switching between back-office environments shall be configured and clearly documented to allow SEPTA to switch between environments without Contractor support.	TEST-02
TEST-16-03-003	At each phase of the project, the Contractor shall add the required components delivered for that phase to the test facility. The Contractor shall update SEPTA test facility software as necessary to maintain a fully mirrored environment of Contractor test facility. The Contractor shall properly document, inventory, track and monitor all SEPTA test facility equipment.	TEST-02

Req #	Requirement	Assigned CDRL
TEST-16-03-004	The test facility shall include multiple (e.g., Test, Staging and Production) and separate back-office instances, including the account-based transaction processor, all specified support systems and bank interfaces, which fully replicates the functionality of production environment and associated production configurations (such as fares, commissions, business rules, etc.).	TEST-02
TEST-16-03-005	The test facility shall include every equipment type and configuration deployed within the AFC System, including any existing equipment (e.g., CAD/AVL System) that is integrated with the AFC System. SEPTA shall be responsible for providing and maintaining any test facility equipment that is not provided by the Contractor.	TEST-02
TEST-16-03-006	Formal testing for FUT, SIT, FIT, and SAT shall be conducted in Philadelphia, and all laboratory-based testing shall be conducted in SEPTA test facility.	TEST-02
TEST-16-03-007	SEPTA test facility shall 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.	TEST-02
TEST-16-03-008	The Contractor shall provide all special tools, software, documentation, and test and inspection equipment (including a maintenance Test Bench for field equipment) necessary for monitoring, troubleshooting, testing, repairing, and calibrating all devices and modules in SEPTA test facility down to the LLRU. This shall include the ability for SEPTA to access and interpret data logs.	TEST-02

16.4 Factory Testing

16.4.1 First Article Configuration Inspection (FACI)

The purpose of First Article Configuration Inspection (FACI) is to confirm that the first unit of each equipment type that is manufactured or procured by the Contractor meets the hardware configuration and quality requirements in these specifications. FACI shall be conducted at the Contractor's facilities.

Req #	Requirement	Assigned CDRL
TEST-16-04-01-001	The Contractor shall perform FACI testing for all manufactured hardware components for each applicable project phase. To pass FACI the Contractor shall also demonstrate compliance with all applicable industry codes and standards, environmental requirements, and applicable Common Design Requirements. Successful completion of FACI is a pre-requisite to move into FAT for all applicable phases of the project.	TEST-03
TEST-16-04-01-002	SEPTA shall be notified at least [30 calendar days] prior to the start of FACI, and at that time, shall deliver all data, including the latest drawings, specifications, quality documentation, and test procedures required for adequate inspection of the first article system components.	TEST-03
TEST-16-04-01-003	FACI shall take place at the point of assembly, after manufacture or procurement of the first production units for each of the system hardware components, or sub-component delivered by the Contractor to meet the Contract requirements.	TEST-03
TEST-16-04-01-004	FACI shall verify that the production units comply with the requirements, including design configuration and drawings as approved during FDR, or the latest revision thereof.	TEST-03
TEST-16-04-01-005	SEPTA shall have the right to inspect any and all of the units produced to date and set expectations for the quality of workmanship for the future production of components.	TEST-03
TEST-16-04-01-006	During FACI documentation of quality inspections performed at subcontractor facilities or of the Contractor quality inspections of components manufactured by others shall be available for SEPTA review.	TEST-03
TEST-16-04-01-007	No additional production units shall be manufactured or procured by the Contractor until FACI has been approved by SEPTA. However, the Contractor shall be allowed to produce as many devices for the FACI as required to conduct future test stages (e.g., FAT).	TEST-03

16.4.2 Factory Acceptance Test (FAT)

The purpose of the Factory Acceptance Test (FAT) is to demonstrate that the AFC System components to be furnished meet the human factors, environmental, and maintainability requirements contained in this specification. In the event that the Contractor has already conducted similar tests on identical or nearly identical equipment, SEPTA may, but is not obligated to, accept the results of those tests as satisfying some or all of the requirements in this section.

Req #	Requirement	Assigned CDRL
TEST-16-04-02-001	The Contractor shall conduct FAT for all AFC System components to verify that the manufacturing process has not degraded the quality or workmanship of the equipment. FAT shall be conducted at the Contractor's facility or at a subcontractor's facility designated by the Contractor. The Contractor shall provide all necessary supplies for FAT.	TEST-03
TEST-16-04-02-002	The Contractor shall prepare and submit FAT test procedures within [21 calendar days] following the completion of FCI for review and approval by SEPTA.	TEST-03
TEST-16-04-02-003	AFC System components to be tested in FAT may not be modified without the express consent of SEPTA. Once a particular series of tests begins on a particular unit, it shall be completed on that same unit.	TEST-03
TEST-16-04-02-004	SEPTA shall, at its discretion, assign staff or representatives to witness and/or periodically audit FAT progress.	TEST-03
TEST-16-04-02-005	FAT shall include equipment usability testing to demonstrate device compliance with the applicable Common Design Requirements, ADA compliance, usability, maintainability and serviceability, and fare equipment requirements.	TEST-03
TEST-16-04-02-006	FAT shall include performance and reliability testing to verify that the equipment meets the performance and reliability requirements.	TEST-03
TEST-16-04-02-007	The Contractor shall be responsible to maintain reports of all tests conducted throughout each FAT, showing each test conducted and the test results. The reports shall be submitted to SEPTA at the conclusion of FAT for review and approval by SEPTA.	TEST-03
TEST-16-04-02-008	Results not meeting specified requirements shall be fully documented and explained by the Contractor, and a corrective action plan, with a timeframe for corrective actions, shall be submitted.	TEST-03
TEST-16-04-02-009	Successful completion and SEPTA approval of FAT shall be a prerequisite for the manufacturing of the applicable phase's production system components.	TEST-03
TEST-16-04-02-010	SEPTA may delay the delivery of any system components until FAT procedures are successfully completed and approved.	TEST-03

Req #	Requirement	Assigned CDRL
TEST-16-04-02-011	If at any time after the FAT results have been approved and a design change is made, the performance of the modified system components, including hardware, software, and firmware, shall be demonstrated as conforming to this specification, and the test results shall be resubmitted for SEPTA approval.	TEST-03

16.4.3 Production Acceptance Test (PAT)

The purpose of the Production Acceptance Test (PAT) is to demonstrate that each piece of equipment manufactured or procured by the Contractor is operational and meets the design and quality requirements described in these specifications.

Req #	Requirement	Assigned CDRL
TEST-16-04-03-001	The Contractor and their subcontractors shall perform PAT on each system component at the point of manufacture as an integral part of their QA program prior to each shipment for each applicable project phase.	TEST-03
TEST-16-04-03-002	PAT shall verify that each unit is produced to at least the same quality level as the unit presented for in FACI and FAT.	TEST-03
TEST-16-04-03-003	The Contractor shall certify at PAT that all applicable system components contain the correct materials, are assembled properly, and function all in accordance with these specifications. Testing shall include validation against established performance metrics, and component level software meets the functional requirements.	TEST-03
TEST-16-04-03-004	At a minimum PAT shall test the following functions (as applicable): (1) General device operation and performance in all modes; (2) Data generation and transfer; (3) Alarms generation and transmittal; (4) User interface control and display; and (5) Quality of manufacturing (e.g., visual inspection of sharp edges, discoloration, bad welds).	TEST-03
TEST-16-04-03-005	The Contractor shall update PAT procedures used on previous projects based upon experience gained from subsequent testing and/or system component operation. Test procedures shall be expanded to focus on areas that prove to be, or have historically been, troublesome.	TEST-03
TEST-16-04-03-006	The Contractor shall be responsible for maintaining complete reports of all PATs that are performed. The reports shall note any failures, subsequent corrective measures, and retests.	TEST-03

Req #	Requirement	Assigned CDRL
TEST-16-04-03-007	All reports shall be submitted to SEPTA for review and approval within [seven (7) calendar days] of the completion of the phase's PAT testing.	TEST-03
TEST-16-04-03-008	SEPTA may choose to observe, participate in, conduct, or repeat testing on any item to confirm the validity of the Contractor's test procedures and results. SEPTA may also perform, at their discretion, ad-hoc tests to ensure the quality of the system components. The Contractor shall provide appropriate access to support ad-hoc testing if required.	TEST-03
TEST-16-04-03-009	Successful completion of PAT for all applicable equipment shall be a prerequisite for the installation of that equipment at SEPTA's test facility.	TEST-03

16.5 Integration Testing

16.5.1 Functional Unit Testing (FUT)

The purpose of Functional Unit Testing (FUT) is to demonstrate in a controlled laboratory environment that each of the system components and associated software furnished by the Contractor meets all functional requirements contained in these specifications prior to full AFC System integration.

Req #	Requirement	Assigned CDRL
TEST-16-05-01-001	The Contractor shall submit FUT test procedures to SEPTA for review and approval at least [60 calendar days] prior to the scheduled FUT.	TEST-04
TEST-16-05-01-002	The Contractor shall complete functional tests for all devices that demonstrate all base functions of the system components and to verify the proper performance and operation of the devices. The Contractor and SEPTA shall jointly develop the structure, timing, and pass/fail criteria of the functional FUT testing.	TEST-04
TEST-16-05-01-003	FUT that requires device interfaces with the back-office to perform the functional test may simulate the interfaces or back-office software if it is not ready to be tested.	TEST-04
TEST-16-05-01-004	All contactless media to be used in FUT shall be provided by the Contractor. The Contractor shall document, inventory, and track media usage during testing. Contactless media shall be the same or similar to those planned for revenue service.	TEST-04

Req #	Requirement	Assigned CDRL
TEST-16-05-01-005	The Contractor shall be responsible for maintaining complete reports of all tests performed throughout FUT, showing each test conducted and the test results.	TEST-04
TEST-16-05-01-006	Results not meeting specification requirements shall be fully documented and explained by the Contractor, and a plan for corrective action shall be submitted within [seven (7) calendar days].	TEST-04
TEST-16-05-01-007	If at any time after the FUT results have been approved a design change is made, the performance of the modified system components shall be demonstrated as conforming to these specifications and the test results shall be resubmitted for SEPTA approval.	TEST-04
TEST-16-05-01-008	After completing the device functional testing, the Contractor shall conduct device cycling tests, which shall consist of performing transactions using all media and transaction types.	TEST-04
TEST-16-05-01-009	Cycle testing shall be comprised of at least: (1) [8,000 transactions] each for bus validators/driver displays, FVM, (if option exercised), Turnstiles, and ADA Faregates; and (2) [4,000 transactions] each for CST, and handheld validation, inspection, and sales device..	TEST-04
TEST-16-05-01-010	Subsequent to the successful completion of FUT, the Contractor shall conduct a scaled-down cycling test under the environmental extremes per the respective equipment environmental requirements to demonstrate the capability of the device to operate successfully under these conditions.	TEST-04

16.5.2 System Integration Test (SIT)

When a project phase's FUT has been successfully completed, the Contractor shall conduct a System Integration Test (SIT) for the applicable phase. SIT shall confirm that when installed, the fully integrated AFC System shall perform, operate, and communicate as required in a controlled laboratory environment.

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 shall also test communications and data transmission over SEPTA and third-party networks, as required to complete the tests. With successful completion of each phase's SIT, all software and configuration files for the applicable phase shall be "frozen," and the Contractor shall make no changes without SEPTA's authorization.

Req #	Requirement	Assigned CDRL
TEST-16-05-02-001	The applicable project phase's FUT for all applicable components and systems must be completed and approved prior to the commencement of SIT.	TEST-04
TEST-16-05-02-002	Prior to any phase's SIT, the Contractor shall complete the setup of a SEPTA test facility, including the installation and configuration of all applicable 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 AFC System.	TEST-04
TEST-16-05-02-003	The Contractor shall submit detailed SIT test procedures for each phase to SEPTA for review and approval no later than [60 calendar days] prior to commencement of the applicable phase's SIT. A software installation plan and system configuration diagram for SEPTA test facility shall be submitted as part of the SIT procedures.	TEST-04
TEST-16-05-02-004	For each phase's SIT, the test system shall be provisioned with test data simulating the AFC System's operational databases under full operational load. Full operational load shall be defined in the applicable phase's SIT test procedure and approved by SEPTA prior to the commencement of SIT.	TEST-04
TEST-16-05-02-005	The Contractor shall conduct a series of detailed transactions and other operations that shall 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 SEPTA review and approval.	TEST-04
TEST-16-05-02-006	At a minimum, each phase's SIT shall include: (1) [10 days] of continuous testing of all system components, during which the components shall be operational [24 hours a day]; (2) A minimum of [500 transactions] at each system component type, including bus validators, driver displays, mobile data routers, FVMs, Turnstiles, ADA Faregates, Railroad platform validators, CSTs, handheld validation, inspection, and sales devices, testing all transaction types; (3) A minimum of [100 transactions] each performed through the CRM System, customer website, institutional website, and IVR System, testing all available functions; (4) All alarm and boundary conditions tested at a minimum of [50 times] each; (5) Applicable online and offline transactions; and (6) Phase 2 and Phase 3's SIT shall include applicable regression test cases that cover transactions tested in previous project phases.	TEST-04

Req #	Requirement	Assigned CDRL
TEST-16-05-02-007	Specifics of each phase's SIT testing shall be included in the SIT procedures to be reviewed and approved by SEPTA.	TEST-04
TEST-16-05-02-008	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 AFC Systems.	TEST-04
TEST-16-05-02-009	SIT shall demonstrate monitoring, configuration, and control of all field devices using the SMMA.	TEST-04
TEST-16-05-02-010	SIT shall include database accuracy testing, which shall demonstrate the accuracy between the Application Under Test (AUT) and the relational database in which application-generated data is stored. The testing should also demonstrate atomicity, consistency, isolation, and durability of the database.	TEST-04
TEST-16-05-02-011	Each phase's SIT shall include a full system audit and settlement test in the test system, which shall demonstrate the flow of all transactions through the AFC System with the appropriate reporting, accounting, and settlement calculations demonstrated.	TEST-04
TEST-16-05-02-012	SEPTA's test facility shall 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.	TEST-04
TEST-16-05-02-013	During SIT, all software modifications shall be reviewed, demonstrated, tested, and approved by SEPTA. The Contractor shall record version information for all software modules including the date and time the software was created, the size of each file, and version number.	TEST-04
TEST-16-05-02-014	The Contractor shall provide detailed test reports and "as-tested" software documentation, including software and firmware version history per device, at the conclusion of each phase's SIT for SEPTA review and approval.	TEST-04

16.5.3 Field Integration Test (FIT)

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 AFC System are exercised in what shall become the production environment. The FIT shall demonstrate that the AFC System is ready to enter the acceptance testing phase.

Req #	Requirement	Assigned CDRL
TEST-16-05-03-001	Installation of the applicable AFC System components at SEPTA's properties shall commence upon approval of the applicable phase's SIT. The entire production back-office and at least [10%] of the total install base for each type of equipment must be fully installed and configured prior to the commencement of the applicable phase's FIT.	TEST-04
TEST-16-05-03-002	The Contractor shall submit detailed FIT test procedures to SEPTA for review and approval no later than [60 calendar days] prior to commencement of the applicable phase's FIT. Pre-and post-installation checklists and test scripts shall be included for all installed equipment as part of the FIT procedures.	TEST-04
TEST-16-05-03-003	For each project phase's FIT, the production test system (e.g., testing system mirroring production) shall be provisioned with test data simulating the AFC System's operational databases under full operational load. Full operational load shall be defined in the FIT test procedure and approved by SEPTA prior to the commencement of FIT.	TEST-04
TEST-16-05-03-004	Similar to SIT, the Contractor shall conduct a series of detailed transactions and other operations in FIT that shall 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 shall be tested to ensure the operation of the components as specified, including interfaces with the back-office and integration with SEPTA systems. The Contractor shall maintain version control to ensure consistent software and firmware versions across devices.	TEST-04
TEST-16-05-03-005	At a minimum, each phase's FIT shall include: (1) [30 calendar days] of continuous testing of all system components, during which the components shall be operational [24 hours a day]; (2) A minimum of [500 transactions] at each system component type, including bus validators, driver displays, mobile data routers, FVMs, Turnstiles, ADA Faregates, platform validators, CSTs, and, mobile fare inspection devices, testing all transaction types; (3) A minimum of [100 transactions] each performed through the CRM System, customer website, institutional website, and IVR System, testing all available functions; (4) All alarm and boundary conditions tested at a minimum of [50 times] each; and (5) Phase 2 and Phase 3's FIT shall include applicable regression test cases that cover transactions tested in previous project phases.	TEST-04

Req #	Requirement	Assigned CDRL
TEST-16-05-03-006	Final transaction volumes and specifics of FIT testing shall be included in the applicable phase's FIT procedures to be reviewed and approved by SEPTA.	TEST-04
TEST-16-05-03-007	The applicable phase's FIT procedures shall identify and describe all necessary tests to verify proper installation and interfacing of the system components across all system facilities.	TEST-04
TEST-16-05-03-008	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 AFC Systems.	TEST-04
TEST-16-05-03-009	FIT shall demonstrate monitoring, configuration, and control of all field devices using the SMMA.	TEST-04
TEST-16-05-03-010	FIT shall include database accuracy testing, which shall demonstrate the accuracy between the AUT and the relational database in which application-generated data is stored. The testing should also demonstrate atomicity, consistency, insulation, and durability of the database.	TEST-04
TEST-16-05-03-011	FIT shall fully test all system redundancy measures and successfully demonstrate the execution of the disaster recovery plan. This shall include at a minimum: (1) Failover testing, in which the Contractor validates that each of the hosted back-office systems and system hardware/software components correctly fails over automatically to the remaining online back-office site or backup hardware/software component with no degradation of service under peak projected operating loads; (2) Fallback testing in which the Contractor validates the back-office systems successfully revert back to the primary site(s); and (3) Disaster recovery simulations in which the Contractor runs mock simulations with SEPTA staff to validate their Disaster Recovery Plan is adequate to handle a total system outage.	TEST-04
TEST-16-05-03-012	Each phase's FIT shall include a full system audit and settlement testing in production, which shall demonstrate the flow of all transactions through the system with the appropriate reporting, data elements, accounting, and settlement calculations demonstrated.	TEST-04
TEST-16-05-03-013	The AFC System shall 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.	TEST-04

Req #	Requirement	Assigned CDRL
TEST-16-05-03-014	SEPTA witnessing and participation shall be required for the successful completion of FIT, which may include additional test scripts provided by SEPTA to be undertaken by the Contractor.	TEST-04
TEST-16-05-03-015	The Contractor shall submit all FIT test reports to SEPTA for approval at the conclusion of each phase's FIT.	TEST-04
TEST-16-05-03-016	SEPTA may, at their sole discretion, conduct additional ad-hoc or unscripted testing during FIT. Ad-hoc or unscripted testing may include limited "friendly user" testing by SEPTA.	TEST-04
TEST-16-05-03-017	Installation of system devices may continue to occur during FIT. All devices must be installed and tested prior to the start of Acceptance Testing (e.g., Pilot) for each phase.	TEST-04

16.5.4 Usability and Accessibility Testing

Req #	Requirement	Assigned CDRL
TEST-16-05-04-001	The Contractor shall conduct Usability and Accessibility Testing with at least [five (5) public users] in the Philadelphia area for each customer-facing application (e.g., mobile, websites, IVR, etc.) and equipment (e.g., FVMs, FPVs, etc.). The Contractor shall be responsible for recruiting volunteers, requesting SEPTA's approval of the list of volunteers, and providing compensation to volunteers as an incentive to complete the testing. Usability and Accessibility Testing shall focus on key, or common functions that are mutually agreed to between SEPTA and the Contractor.	TEST-01
TEST-16-05-04-002	The Contractor shall perform Accessibility Testing with an accredited, third-party Accessibility Tester for public-facing equipment and applications (e.g., mobile application, websites, IVR, FVM, etc.).	TEST-01
TEST-16-05-04-003	Feedback from Usability and Accessibility Testing shall be documented for SEPTA to review. At SEPTA's discretion, the Contractor shall implement recommendations requested by SEPTA in response to the feedback.	TEST-01

16.6 Acceptance Testing

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

16.6.1 Pilot

Following the [30 day] settling period, SEPTA shall conduct a [90 day] Pilot for each project phase with one or more stages using a limited and controlled user population to exercise all AFC System functions, fare products, and policies. Pilot testing shall be planned with the Contractor and included as part of the Master Program Schedule.

Req #	Requirement	Assigned CDRL
TEST-16-06-01-001	At least [90 calendar days] prior to the scheduled start of the applicable phase's Pilot (e.g., Beneficial Use), the Contractor shall submit an acceptance test plan, developed jointly with SEPTA that includes the structure, timing, and measurement criteria for conducting and evaluating the Pilot. The Pilot may consist of up to [10,000 public users], at SEPTA's discretion.	TEST-05
TEST-16-06-01-002	Each phase's Pilot shall not commence until the applicable phase's FIT has been approved, and [100%] of the applicable field equipment has been installed.	TEST-06
TEST-16-06-01-003	For each implementation phase, the Pilot shall include a full system audit and settlement test in production, which shall demonstrate the flow of all transactions through the system with the appropriate reporting, accounting, and settlement calculations demonstrated. If test data must be purged from the production system prior to the start of the initial Phase 1 Pilot, the Contractor shall request SEPTA's approval prior to purging the data.	TEST-05
TEST-16-06-01-004	The Contractor shall commence reporting on all applicable system performance requirements at the start of each phase's Pilot.	TEST-05
TEST-16-06-01-005	Each phase's Pilot shall be designed to exercise all system functions, fare products, and policies in a phased approach. Successive phases shall not be undertaken until the previous phase has been completed successfully as determined by SEPTA.	TEST-05

Req #	Requirement	Assigned CDRL
TEST-16-06-01-006	Each successive phase's Pilot shall be designed to validate that system functions, fare products, and policies exercised in previously delivered phases still function as expected. Any defect/failure found related to previous functionality shall be recorded, and corrective actions taken prior to the completion of the Pilot.	TEST-05
TEST-16-06-01-007	The Contractor shall be responsible for supporting all elements of each Pilot, including, and not limited to, system and equipment maintenance, system monitoring, media distribution, funds settlement, reporting, and customer support.	TEST-05
TEST-16-06-01-008	Performance testing such as load, stress, endurance, and spike shall occur during each [90 day] Pilot and shall include at a minimum the successful processing of an equivalent of [22 days] of transactions at projected peak volumes. Transaction timings, transaction volumes, and how they shall be generated and measured shall be detailed in the acceptance test plan.	TEST-05
TEST-16-06-01-009	During each phase's Pilot period, SEPTA 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.	TEST-05
TEST-16-06-01-010	Each Pilot stage shall undergo analysis, review, and approval of data integrity and system performance by SEPTA before moving to the next Pilot stage. All issues shall be recorded, and corrective actions taken prior to the completion of the Pilot.	TEST-05
TEST-16-06-01-011	Each phase's Pilot duration shall be no longer than [90 days], but may be extended an additional [90 days] at SEPTA's discretion due to performance or issues that pose a financial, safety, or usability issue. When issues are resolved, the Pilot shall resume for a duration determined by SEPTA up to and including a full [90 day] period.	TEST-05

16.6.2 Reliability, Maintainability, and Accuracy Testing (RMAT)

The purpose of RMAT is to verify and validate the system is operating in reliable and accurate manner, by inspecting and auditing the maintainability during the RMAT period. RMAT shall begin after successful completion of the applicable Phase's Pilot, and shall run in parallel with each Phase of System Acceptance Test (SAT) for all installed equipment. This test shall be performed after all equipment, hardware, and software has been installed for the applicable Phase. Successful completion of RMAT must be obtained prior to SEPTA issuing written approval for the applicable Phase's System Acceptance Test (SAT).

Req #	Requirement	Assigned CDRL
TEST-16-06-02-001	RMAT shall begin after successfully completing the applicable Pilot Test, and with written approval by SEPTA. RMAT shall occur for a consecutive period of no less than [90 days]. Results from the RMAT period shall be reviewed and evaluated after the end of each [30 day] period. There shall be no less than [three (3) RMAT Review periods] conducted by the Contractor and SEPTA.	TEST-05
TEST-16-06-02-002	Following the completion of each [30 day] period, the first RMAT review period shall commence. The Contractor shall furnish SEPTA with RMAT test results, and all data collected during the previous period, no later than [14 calendar days] after the period completion for review.	TEST-05
TEST-16-06-02-003	The Contractor shall provide SEPTA with a draft list of test results, and data to be collected during RMAT across each phase of the Project for review and approval by SEPTA during Design Review and a finalized list specific to the project phase [42 calendar days] prior to the start of each RMAT.	TEST-05
TEST-16-06-02-004	The Contractor shall meet all System Performance and Device Reliability Requirements stated in Section 21 System Performance Requirements, Key Performance Indicators (KPI) of the AFC System.	TEST-05
TEST-16-06-02-005	The Contractor shall meet maintainability and a mean time to repair to not exceed [15 minutes], or as agreed between the Contractor and SEPTA all components and equipment. The mean time to repair is the combined time to complete the following actions: (1) Access the equipment or machine; (2) Identify the component and equipment failure; (3) Exchange the defective component or equipment; (4) Test the machine after repair is completed; and (5) Secure and place the machine back in service, if applicable.	TEST-05
TEST-16-06-02-006	The Contractor shall meet all System Performance and Accuracy Requirements stated in Section 21 System Performance Requirements, Key Performance Indicators (KPI) of the AFC System.	TEST-05

16.6.3 System Acceptance Test (SAT)

The start of System Acceptance Testing (SAT) for each phase shall designate the beginning of public launch for the phase's applicable system components. The achievement of the start of SAT shall be based upon the successful completion of the applicable phase's Pilot and is subject to written approval from SEPTA.

When a phase's Pilot has been deemed complete by SEPTA, the Contractor shall commence the applicable phase's SAT, which shall verify that the system and all provided equipment meet the AFC System performance requirements prior to Final Acceptance. If the Contractor is unable to successfully complete SAT in Phase 1 or Phase 2, SEPTA reserves the right to remove subsequent phases from the Contract.

Req #	Requirement	Assigned CDRL
TEST-16-06-03-001	Each phase's SAT shall commence upon the successful completion of the applicable phase's Pilot.	TEST-05
TEST-16-06-03-002	SAT shall be performed in the production environment with all applicable components, subsystems, and networks completely operational, online, and in revenue service.	TEST-05
TEST-16-06-03-003	The Contractor shall submit any revisions necessary to the acceptance test plan as a result of the Pilot at least [14 calendar days] prior to the commencement of the applicable phase's SAT for SEPTA review and approval.	TEST-05
TEST-16-06-03-004	Each phase's SAT shall be comprised of [three (3) consecutive 30 day periods] in which all system components (including those delivered in previous phases) must meet or exceed all performance requirements. The acceptance test plan shall describe in detail how the Contractor shall measure and report on each of the performance requirements throughout SAT.	TEST-05
TEST-16-06-03-005	The level of system use during each SAT shall be decided by SEPTA and included in the acceptance test plan and may range from a group of friendly users to unrestricted public use.	TEST-05
TEST-16-06-03-006	The Contractor shall be responsible for supporting all elements of SAT, including, and not limited to, system and equipment maintenance, media distribution, funds settlement, reporting, and customer support.	TEST-05
TEST-16-06-03-007	If the applicable performance requirements defined in these specifications are not attained during any one of the [30 day periods], the SAT shall be extended a minimum of [90 days] to allow for [three (3) consecutive 30 day periods] in which the requirements are met.	TEST-05
TEST-16-06-03-008	The Contractor shall identify and implement remedial action at no cost to SEPTA in the event that an applicable system component does not meet the specified performance requirements during SAT.	TEST-05

Req #	Requirement	Assigned CDRL
TEST-16-06-03-009	During each SAT, SEPTA 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 each [30 day period].	TEST-05
TEST-16-06-03-010	Periodically during each phase's SAT, SEPTA shall 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 events, alarms, and power outages.	TEST-05
TEST-16-06-03-011	Within [14 calendar days] following the completion of each phase's SAT, the Contractor shall provide all testing data, reports, and other testing information to SEPTA for review and approval.	TEST-06

16.6.4 Final Acceptance

Achievement of the Final Acceptance Milestone shall be based upon the successful completion of all the project phases' SAT and the delivery of all the Project's contractually required work, equipment, and documentation, and is subject to written approval from SEPTA. SEPTA shall issue a letter of acceptance upon approval of the Contractor's request for the Final Acceptance.

Req #	Requirement	Assigned CDRL
TEST-16-06-04-001	The Contractor shall submit a request for Final Acceptance upon completion of the last Project phase's SAT and determination that all Project work has been completed in accordance with the Project's specifications. The Contractor shall submit a completed Requirements Traceability Matrix with references that all requirements have been met.	TEST-05

Req #	Requirement	Assigned CDRL
TEST-16-06-04-002	Final Acceptance shall be contingent on satisfying all of the following conditions of the implementation. SEPTA shall grant Final Acceptance only when: (1) RMAT for all Project Phases has been successfully completed and approved by SEPTA; (2) SAT for all Project phases has been successfully completed and approved by SEPTA; (3) All system devices are delivered, installed, and operational; (4) All back-office systems and software are updated with the latest versions, including all required reports, are installed and fully-functional; (5) All websites are live and fully-functional; (6) All spare parts, devices, tools, and equipment have been delivered; (7) All initial batches of fare media have been delivered and accepted by SEPTA; (8) All Contract deliverables have been delivered to SEPTA and accepted; (9) All disaster recovery plans have been successfully demonstrated and approved by SEPTA; and (10) All training and manuals have been provided and accepted by SEPTA.	TEST-05
TEST-16-06-04-003	All Final resolutions to all identified issues (as classified by the Failure Review Board (FRB)) are fully implemented and accepted by SEPTA.	TEST-05
TEST-16-06-04-004	Once all of the Project's requirements have been met, the Contractor may submit a formal request for Final Acceptance. SEPTA shall respond to the request within [30 business days].	TEST-05

16.7 Required Submittals

CDRL ID	Contractor Deliverable	Due
TEST-01	System Testing Plan	Design Review
TEST-02	SEPTA Testing Facility Design	Design Review
TEST-03	FACI Test Procedures and Reports	30 days before testing
TEST-04	Integration Testing Inspection and Reports	60 days before testing
TEST-05	Acceptance Test Plan and RMAT Test Procedures	90 days before Pilot
TEST-06	System Acceptance Testing (SAT) and Reports	SAT+14 calendar days

17. Training Requirements

This section outlines expectations for training, including direct vs train the trainer. It includes comprehensive expectations for manuals and training materials, ongoing training over the life of the

Project and clear expectations on the level of detail that must be provided to all agency staff and/or agency representatives.

17.1 General Requirements

Req #	Requirement	Assigned CDRL
TRAIN-17-01-001	The Contractor shall provide a comprehensive training program and equipment to educate and train SEPTA personnel, SEPTA-representatives and third-party Contractors in all details of the payment system, enabling them to properly operate, service, and maintain the AFC System and each of its components throughout its useful life.	TRN-01
TRAIN-17-01-002	The Contractor shall provide a comprehensive training for each course outlined within the Training Courses requirements, with [one (1) full training] occurring for each phase. As subsequent project phases introduce new components and features, updated training and training materials shall be provided to reflect these new features. A round of training is not considered complete until written acceptance of the completed training has been provided from SEPTA to the Contractor.	TRN-01
TRAIN-17-01-003	The Contractor shall deliver a Training Plan for review and approval by SEPTA that describes the training courses delivered at each phase of the project and which courses shall occur in-person or virtually. The course curriculum shall include all instruction of all Contractor-provided systems and components delivered under the Contract.	TRN-01
TRAIN-17-01-004	The Contractor shall develop and deliver comprehensive train-the-trainer courses for SEPTA Training Instructors or the Contractor shall conduct training sessions directly to SEPTA-designated personnel to deliver AFC System training. The desired format shall be detailed in the Training Plan and approved by SEPTA.	TRN-01
TRAIN-17-01-005	The Contractor shall provide a training environment that is a replication of the production environment with sufficient accounts, transactions, and full functionality that mirrors production to conduct training and provide trainees with hands-on experience operating and maintaining the AFC System. The training environment shall be updated within [30 days] following any production updates. Any devices or tools necessary to conduct comprehensive training shall be provided by the Contractor.	TRN-01
TRAIN-17-01-006	The Contractor shall provide working devices and equipment, training fare media and payment credentials, manuals, and diagrams as instructional tools as part of the training program. The training units shall be powered by a standard [120V] AC power source.	TRN-01

Req #	Requirement	Assigned CDRL
TRAIN-17-01-007	The training program shall assume that SEPTA staff does not have knowledge of any AFC System features. However, the Contractor may assume that maintenance personnel have the basic skills pertinent to their crafts.	TRN-01
TRAIN-17-01-008	Course sizes shall be designed to assure that all trainees have some level of one-on-one training with equipment and software. When appropriate, training shall occur in the field or location of service.	TRN-01
TRAIN-17-01-009	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 and shall not impact or interrupt live data or revenue.	TRN-01
TRAIN-17-01-010	The Contractor shall record all training sessions for future use by SEPTA. All training session recordings and training materials shall be stored in SEPTA's knowledge repository.	TRN-01
TRAIN-17-01-011	All materials used in the training programs, such as training rigs, fare media, manuals, simulators, and drawings, shall become the property of SEPTA upon completion of the training.	TRN-01

17.2 Training Plan

Req #	Requirement	Assigned CDRL
TRAIN-17-02-001	The Contractor shall develop and submit for SEPTA's approval a Training Plan that describes the Contractor's program for training SEPTA personnel and each course to be delivered over all four (4) Phases during CDR for initial review by SEPTA. A final Training Plan shall be submitted for SEPTA review and approval during Design Review.	TRN-01
TRAIN-17-02-002	The Training Plan shall include a training schedule, summary descriptions of the training course (including course lengths), learning objectives and outcomes, sequence of activities, targeted trainees for each course and course length, recommended number of trainees per course, methods, and criteria for evaluating trainee performance, SEPTA resources and equipment required, and any pre-conditions that must be met for the training to occur.	TRN-01

Req #	Requirement	Assigned CDRL
TRAIN-17-02-003	The Training Plan shall address the Contractor's approach for training SEPTA trainers to deliver training subsequent to the Contractor's involvement. The Training Plan shall describe the Contractor's approach, resources and hours required, and any training aids that might be included. The Training Plan shall also include a training communication plan and strategy for continuous training and training material updates due to changes after implementation training is delivered.	TRN-01

17.3 Training Materials

Req #	Requirement	Assigned CDRL
TRAIN-17-03-001	The Contractor shall provide all necessary training materials for the delivery of each course discussed in the Training Plan. All training materials shall be specific to the delivered AFC System, including references to features, functionalities, setup, use cases and examples. No sensitive information (e.g., passwords) shall be contained in any training materials.	TRN-02
TRAIN-17-03-002	The Contractor shall provide modern training materials which include: (1) Course agenda and objectives; (2) On-demand and web-based resources required for the specific course; (3) Detailed lesson plans; (4) Outlined presentations; (5) Pre and post training assignments; (6) Instructions needed to complete the training; (7) Trainee guides and handouts; (8) Instructor guides; (9) System manuals; and (10) Quick reference guides (as applicable).	TRN-02
TRAIN-17-03-003	The Contractor shall include use cases and examples to reinforce the training. Use cases and examples shall include end-to-end user scenarios that include multiple features, functionalities to demonstrate the operations of the AFC System. Use cases and examples shall include setup details, step-by-step instructions, and expected results.	TRN-02
TRAIN-17-03-004	Training documentation shall be separate from the operation and maintenance manuals and may reference those manuals. Any update to the training or maintenance manuals shall result in an update to the other document. The Contractor shall update documentation based on the current phase.	TRN-02

Req #	Requirement	Assigned CDRL
TRAIN-17-03-005	The Contractor shall provide hard copies of the training materials in a binder format that utilizes labeled dividers to organize the different modules to the corresponding agenda of the training course. The Contractor shall also provide [five (5) spare copies] to SEPTA.	TRN-02
TRAIN-17-03-006	Draft training materials shall be submitted at FDR. Final training materials shall be submitted to SEPTA at least [90 calendar days] before training classes are scheduled to begin. All documentation and training material shall be submitted in an electronic form specified by SEPTA.	TRN-02
TRAIN-17-03-007	During the warranty and SMA terms, the Contractor shall provide updated course instruction and materials resulting from any significant AFC System hardware or software changes.	TRN-02
TRAIN-17-03-008	SEPTA 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, SEPTA shall receive copies of the updated material at no cost for use in SEPTA training programs.	TRN-02

17.4 Manuals

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

Req #	Requirement	Assigned CDRL
TRAIN-17-04-001	The first round of all training manuals below must be delivered and approved by SEPTA before the completion of the Phase 1 Pilot. Updated training manuals shall be delivered and approved by SEPTA before the completion of the applicable phase's Pilot.	TRN-03
TRAIN-17-04-002	Device and software manuals shall be provided in a printable and searchable electronic format (e.g., PDF, Word) and shall include the following content at a minimum: (1) General field equipment familiarization material; (2) Location, function, and operation of all controls, and indicators; (3) Field equipment setup, login, and shutdown procedures; (4) Symptoms, diagnostic methods, and procedures for isolating minor faults; and (5) Description of all user messages and enunciations.	TRN-03

Req #	Requirement	Assigned CDRL
TRAIN-17-04-003	Manuals shall contain all text, step-by-step procedures, illustrations, drawings, block diagrams, schematics, exploded diagrams, parts lists, troubleshooting guides, and repair and replacement procedures needed to allow SEPTA to operate, maintain, diagnose, and repair all equipment and systems, including managing and configuration for fare management or business rules.	TRN-03
TRAIN-17-04-004	Manuals related to back-office operation and maintenance shall be presented in terms that are meaningful to users and system administrators. They shall include functional explanations and descriptions of each application, program, interface, and its use. Step-by-step procedures shall be provided that explain how each parameter is configured and the effects obtained by varying each parameter. All user guidance, alarms, and error messages shall be described, along with the steps necessary for recovery from error.	TRN-03
TRAIN-17-04-005	Manuals related for repair, maintenance, and installation shall provide all information needed for troubleshooting service failures, performing equipment installations and replacements, and for performing preventative maintenance for each component, including general servicing, and inspecting.	TRN-03
TRAIN-17-04-006	Care shall be taken to provide easily understood explanations and step-by-step instructions with cross-references to all drawings, diagrams, and photographs. All documentation provided for the AFC System shall be presented in English and utilize English units of measurements as commonly employed in the U.S. Unless otherwise specified by SEPTA, documentation shall be written at an 8 th -grade reading level.	TRN-03
TRAIN-17-04-007	Manuals shall include descriptions of all user messages (including error messaging), their meanings, resolution/corrective action, and common scenarios that would generate such messages.	TRN-03
TRAIN-17-04-008	Block diagrams, illustrated parts breakdowns, and schematic drawings shall be used to facilitate descriptions of assemblies and the relationships of components, subsystems, and systems.	TRN-03
TRAIN-17-04-009	Electrical wiring diagrams and other diagrams necessary for the operation of the equipment shall be provided. No single diagram shall show more than [one (1) system] or parts thereof, and diagrams shall be complete and legible in all respects.	TRN-03

Req #	Requirement	Assigned CDRL
TRAIN-17-04-010	Operating instructions shall describe procedures to be followed as a result of system restarts or failures. The documents shall contain sufficient information to enable the User, including customer facing operations where applicable, to restart or reconfigure the AFC System and analyze diagnostic data dumps.	TRN-03
TRAIN-17-04-011	Disaster recovery procedures shall be clearly specified in sufficient detail to consider all possible scenarios. Recovery instructions shall describe detailed procedures to be followed in the event that AFC System recovery is needed. Detailed data backup and recovery procedures shall be provided.	TRN-03
TRAIN-17-04-012	The Contractor shall submit an illustrated parts catalog including all installation hardware, wiring assemblies, and LLRUs. Each listed part in the illustrated parts catalog shall be referenced by the Contractor using an assigned part number and, where applicable, OEM part number. The illustrated parts catalog may be a subset of the maintenance materials.	TRN-03

17.5 Training Courses

The Contractor shall provide the following training courses and provide all course content and training materials in a SEPTA approved format. The first round of all training listed below must be delivered and approved by SEPTA before the completion of the Phase 1 Pilot. Any additional features introduced in Phase 2 and Phase 3 shall warrant the delivery of updated training courses that cover the impacted new components/features. Updated training shall be delivered and approved by SEPTA before the completion of the applicable phase's Pilot.

Req #	Requirement	Assigned CDRL
TRAIN-17-05-001	The first round of all training listed below must be delivered and approved by SEPTA before the completion of the Phase 1 Pilot. Updated training shall be delivered and approved by SEPTA before the completion of the applicable phase's Pilot. The Contractor shall provide separate sessions for any training courses when it is necessary to tailor curriculum for technical personnel or as requested by SEPTA.	TRN-04

Req #	Requirement	Assigned CDRL
TRAIN-17-05-002	Course: Field Maintenance and Servicing Course Description: All SEPTA maintenance personnel who may be required to perform scheduled maintenance and support activities shall attend a training course. This course shall provide the employee all knowledge necessary for operation, troubleshooting, maintenance, repair, component change-out, and scheduled maintenance of all AFC System field devices.	TRN-04
TRAIN-17-05-003	Course: Shop Repair Course Description: A selection of mechanics and electricians, who shall perform the periodic overhaul, remedial repair, and adjustment of AFC System components, shall be given a comprehensive instruction course in the operation, troubleshooting, maintenance, repair, and overhaul of the equipment.	TRN-04
TRAIN-17-05-004	Course: Operation, Configuration, and Administration Course Description: Supervisory personnel who shall manage AFC System equipment and service technicians shall receive specialized training in the operation, configuration, and administration of the devices. This class shall 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.	TRN-04
TRAIN-17-05-005	Course: Back-office User Training Course Description: Personnel who shall use the back-office systems shall be trained in the use of all application programs and functions provided by the AFC 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 shall include at a minimum: (1) General back-office user procedures; (2) Status monitoring functions; (3) Device configuration parameters; (4) Device management functions; (5) Fare table management; (6) Hotlist management; (7) Media inventory management; (8) Generation of all standard reports; (9) Bankcard authorization operations and configuration; (10) Backup data retrieval procedures; and (11) Interfaces with other systems.	TRN-04
TRAIN-17-05-006	Course: Back-office Accounting Course Description: Those management personnel who shall perform accounting and financial management shall receive specialized training in the use of the Revenue Management System (RMS) and financial reporting. Using sample data created from testing or other sources, RMS data and reports shall be generated from the system and used to explain the resulting output.	TRN-04

Req #	Requirement	Assigned CDRL
TRAIN-17-05-007	Course: Back-office Administration Course Description: AFC System personnel who shall be responsible for administration and maintenance shall be trained in all aspects of system administration to ensure optimal performance, as well as correct minor system problems. Content shall include at a minimum: (1) User administration; (2) Networking configurations; (3) Interfaces with other SEPTA computer systems; and (4) Merchant acquirer interface.	TRN-04
TRAIN-17-05-008	Course: Report and Query Generation and Customization Course Description: The Contractor shall instruct advanced users and administrators in the use of the web-based reporting system, and data warehouse design and query generation, including the use of the web-based report writer tool. The course shall also provide an overview of the selected COTS solution to ensure users have a familiarity with the application.	TRN-04
TRAIN-17-05-009	Course: Support Systems and Special Tools Course Description: The Contractor shall provide training on the use, operation, and maintenance of all support systems and special tools.	TRN-04
TRAIN-17-05-010	Course: Website Administration Course Description: The Contractor shall provide training on the website administrative functions. The course shall include at a minimum: (1) Discussion of the underlying website design and linking to other sites; (2) Instruction on how to configure all pages of the website; (3) Review of all procedures to modify database tables that affect website content; (4) Demonstration on how to monitor the website status and operating conditions; and (5) CMS content updates.	TRN-04
TRAIN-17-05-011	Course: Customer Service Training Course Description: The Contractor shall provide customer service training on all aspects of the AFC System that shall be visible to and used by the public, and the tools that those SEPTA staff shall employ. The course shall cover at a minimum: (1) All fare products, policies, and transaction types; (2) CST functionality and user interfaces; (3) CRM system functionality and user interfaces; (4) Use of the customer website; (5) IVR use and options; and (6) General account management features and functions.	TRN-04

Req #	Requirement	Assigned CDRL
TRAIN-17-05-012	Course: Bus Operations Course Description: The Contractor shall provide training for bus operation trainers. Training shall include a high-level overview of the overall complete AFC System and detailed training regarding all aspects of the solution that the bus operator may interface with. This includes integration features between existing onboard equipment (e.g., CAD/AVL or farebox) and the AFC System, fare payment validator operations and screens that customers see.	TRN-04
TRAIN-17-05-013	Course: Rail Station Agents Course Description: The Contractor shall provide training for Rail Station Agents. Training shall include a high-level overview of the overall complete AFC System and detailed training regarding all aspects of the system that the rail station agent may interface with. This includes integration features between existing station equipment and applications, detailed Rail Station Agent Console application training, and a general overview of the fare payment validator operations and screens that customers see at the gates and turnstiles.	TRN-04
TRAIN-17-05-014	Course: Handheld Fare Validation and Payment Device and Application Training Course Description: The Contractor shall provide fare enforcement staff with training on all aspects of the fare enforcement solution including: (1) Conductor validation and sales; (2) Bus loader validation; (3) Fare enforcement reporting; (4) Inspection level investigation and queries; (5) Inspection application operation and field level troubleshooting; (6) Distribution of mobile fare inspection application, updates and management of software on devices; and (7) Hardware operation and field level troubleshooting.	TRN-04

17.6 Required Submittals

CDRL ID	Contractor Deliverable	Due
TRN-01	Training Plan	Design Review
TRN-02	System Training Course Materials	Design Review
TRN-03	System Manuals	Design Review
TRN-04	Training Materials and Manuals for all Training Courses	Design Review

18. Installation Requirements

This section includes detailed information regarding roles and responsibilities for installation of Contractor-provided equipment, and requirements for decommissioning existing equipment, storage space available to Contractor for installations, pre-and post-installation test criteria, prototyping, and bus and station availability/hours for installation. The section also includes details for required installation documentation and drawings.

18.1 General Requirements

Req #	Requirement	Assigned CDRL
INST-18-01-001	The Contractor shall supply all labor, supervision, and materials (including tools, permitting applications and drawings) required for the installation of all new equipment and systems delivered in accordance with the requirements.	INS-01
INST-18-01-002	The Contractor's installation of any equipment, shall in no way interfere with or degrade the operation of SEPTA's current AFC System. Exceptions to this requirement must be requested in writing by the Contractor at least [60 days] prior to the requested installation taking place and shall be subject to SEPTA approval. The installation of all equipment provided by the Contractor shall be compliant with all applicable ADA requirements and shall be approved by SEPTA ADA compliance officers.	INS-01
INST-18-01-003	The Contractor shall install and test all bus FPVs on SEPTA vehicles. The Contractor shall provide and install all cabling, electrical and communication wiring, service loops, and terminations/connections required to install all bus FPVs onboard vehicles. All mounting hardware and brackets necessary for each bus type to properly install and secure the equipment in its planned location(s) shall be provided by the Contractor.	INS-01
INST-18-01-004	The Contractor shall validate that all onboard Contractor installed equipment is working properly with SEPTA's existing mobile data routers. If issues are found, the Contractor shall work with SEPTA to identify and correct any communication problems that exist.	INS-01
INST-18-01-005	The Contractor shall install and test all platform and Rail FPVs, Rail SAC, Turnstiles, ADA Faregates, and FVMs at SEPTA stations and platforms. SEPTA shall provide the necessary power and communications within [10 feet] of the installation locations. The Contractor shall provide and install all required cabling and hardware necessary to properly install, secure, and activate the equipment in its planned location.	INS-01

Req #	Requirement	Assigned CDRL
INST-18-01-006	The Contractor shall be responsible for replacing all existing Ethernet runs from the communication cabinets to the install locations of all Contractor-provided equipment. The Contractor shall use CAT6 or better cabling for the Ethernet runs, and shall be responsible for any network hardware (e.g., network switches, hubs, etc.) necessary to connect the equipment at the installed locations.	INS-01
INST-18-01-007	The Contractor shall provide and install all FVM, platform validator, rail station operator console, and faregate mounting hardware and support structures, such as pedestals, stainless steel mounting poles, and mounting brackets, as needed. Use of mounting pedestals or stanchions to support validators, consoles, faregates, and FVMs shall be subject to SEPTA review and approval. Grade 304 stainless steel or better shall be used on FVMs and mounting poles, with Grade 316 stainless steel used on mounting pedestals and/or bases.	INS-01
INST-18-01-008	The Contractor shall install and test all CSTs at SEPTA ticket offices and designated satellite locations. SEPTA shall provide the necessary power and communications at the device installation locations. The Contractor shall provide and install all required cabling and hardware necessary to properly install and secure the equipment in its planned location.	INS-01
INST-18-01-009	The Contractor shall be responsible for the removal, modification, and relocation of existing metal handrails currently located near faregates, if required during the installation of any new faregates.	INS-01
INST-18-01-010	The Contractor shall repair and match the existing floor during the removal of, and installation of, new ADA Faregates, and FVMs, where necessary.	INS-01
INST-18-01-011	The Contractor shall install, configure, and test all test equipment, back-office systems, and other necessary hardware and software for SEPTA's onsite test facility at a location designated by SEPTA. The Contractor shall also install, configure, and test all test bench equipment and necessary hardware and software at SEPTA-designated maintenance facilities. SEPTA shall provide the necessary power and communications at the installation locations. The Contractor shall provide and install all required cabling and hardware necessary to properly install and secure the test equipment in its planned location.	INS-01

Req #	Requirement	Assigned CDRL
INST-18-01-012	A commissioning test shall be performed for each installation and may be witnessed by SEPTA. Detailed test results shall be recorded to show that each device and system has been inspected and tested in accordance with these specifications and submitted to SEPTA for review and approval.	INS-01

18.2 Installation Plan

Req #	Requirement	Assigned CDRL
INST-18-02-001	The Contractor shall provide a detailed site-specific work plan for SEPTA review and approval at each phase's FDR, and a final SEPTA approved version no later than [120 calendar days] prior to the first delivery of equipment.	INS-01
INST-18-02-002	The Installation Plan shall describe all aspects of device and AFC System installation per site for each phase of the implementation, including but not limited to: (1) Method of delivery; (2) Hours of work; (3) Staffing plans; (4) Safety aspects (i.e., safety certification, watchman/flagging requirements); (5) Temporary change of customer flows, etc.); (6) Site and vehicle surveys; (7) Antenna testing; (8) Prototype installations; (9) Site preparation; (10) Pre-wiring; (11) Equipment and vehicle staging; (12) Production installation; (13) QA/QC; (14) Scheduling; and (15) Storage/disposal of removed equipment according to local and EPA regulations. The Installation Plan shall also detail the installation and configuration of all software systems, including the back-office, systems, interfaces, and web applications, and their respective schedules.	INS-01
INST-18-02-003	In the Installation Plan, the Contractor shall provide the power and communication requirements for each piece of equipment and at each install location. The communication requirements shall include a description of the networking equipment necessary at all bus yards and rail stations to connect the Contractor devices to SEPTA-provided fiber backbone. These requirements may be revised and submitted to SEPTA following completion of the site surveys.	INS-01

Req #	Requirement	Assigned CDRL
INST-18-02-004	The Installation Plan shall include, and is not limited to: (1) Bus FPVs; (2) Bus mounting hardware; (3) FVMs; (4) Rail SACs; (5) Platform FPVs; (6) Turnstile Readers; (7) ADA Faregates; (8) FVMs installed on [one (1) SEPTA vehicle] for demonstrations; (9) CSTs; (10) Back-office hardware, including redundant system hardware; (11) Back-office applications and databases; (12) Web applications; (12) Mobile applications; (13) System interfaces and API configuration; (14) Test environment hardware and devices; (15) Spare parts; (16) Support equipment; and (17) Smartcard media.	INS-01
INST-18-02-005	The Installation Plan shall include patron routing and traffic flow patterns around work areas during faregate construction. Patron routing shall be developed in collaboration with SEPTA.	INS-01

18.3 Site Surveys

Req #	Requirement	Assigned CDRL
INST-18-03-001	The Contractor shall perform detailed site surveys for all vehicle types, and equipment and back-office install locations, including rail stations, bus stops, and other SEPTA locations to identify installation requirements and any existing provisions that may be used to support installation. Rail station site surveys and subsequent reports shall include: (1) Site preparation needs; (2) Site conditions; (3) Conduit conditions and needs; (4) Cabling conditions and needs; (5) Communication needs; (6) Space constraints; (7) Environmental conditions;; (8) External factors (e.g., rodent nests); (9) Any impacts to artwork or hardscapes with historical impacts; (10) Issues with long cable runs impacting degradation in communications; (11) Constraints with existing equipment or space; and (12) Any other survey findings that may impact the installation, implementation, or operations of the equipment. The Contractor's survey report shall include recommendations to address any issues or findings.	INS-01
INST-18-03-002	Initial vehicle and rail station surveys shall be completed as a part of Design Review. As part of each phase's FDR, the Contractor shall submit the installation details and specifications for all equipment installations to SEPTA for review and approval.	INS-01

Req #	Requirement	Assigned CDRL
INST-18-03-003	The Contractor shall identify all communication requirements at bus and rail sites, including a description of all networking equipment necessary to connect the Contractor devices to SEPTA-provided fiber backbone. SEPTA facilities that shall house networking equipment shall be identified during Design Review.	INS-01
INST-18-03-004	Prior to the rail installation, the Contractor shall identify any modifications or additional provisions needed for installation of the system equipment and related system components but shall work as much as possible within the limits of station design. All modifications shall be subject to SEPTA for review and approval.	INS-01

18.4 Prototype Installations

Req #	Requirement	Assigned CDRL
INST-18-04-001	The Contractor shall perform a prototype installation of the field devices in each of the different field environments in which the equipment shall be installed, including a prototype installation of all bus equipment for each vehicle type and station equipment for each station type (sheltered, unsheltered, elevated, etc.).	INS-01
INST-18-04-002	The prototype installations for each vehicle type in the bus fleet shall help determine the appropriate mounting locations for each piece of equipment, and any mounting bracket requirements not identified during the site surveys.	INS-01
INST-18-04-003	The Contractor shall work with SEPTA and community outreach groups to determine the best location for the bus FPV mounting and positioning such that they minimize encroachment on passengers, are accessible, and do not obstruct the driver's field of vision, including the view of the front door. The prototype installation results shall be documented and submitted to SEPTA for review and approval.	INS-01
INST-18-04-004	The prototype installations shall be subjected to at least [one (1) week] of testing to ensure the robustness and integrity of the installation design.	INS-01
INST-18-04-005	All prototype installations are subject to SEPTA review and approval before installation in remaining locations.	INS-01

18.5 Onsite Work Requirements

Req #	Requirement	Assigned CDRL
INST-18-05-001	All Contractor and subcontractor employees working within operational rail stations, platforms, rights-of-way, and bus divisions shall comply with applicable rail and bus operations rules and procedures, including safety rules and regulations. All onsite personnel engaged in installation activities shall attend SEPTA safety training and briefing sessions before working onsite. The Contractor and all subcontractor employees working within Amtrak stations or lines (at SEPTA stations) shall also complete Amtrak safety training. Safety training may include: safety procedures, staffing requirements, required personal protective gear, and other such items.	INS-01
INST-18-05-002	The Contractor shall deliver and execute a Site-Specific Work Plan which includes all details of work at each specific site for each work site. Such safe access shall be afforded to construction equipment, vehicles, and personnel in accordance with SEPTA policies and OSHA regulations. All access plans shall be subject to review and approval by SEPTA.	INS-01
INST-18-05-003	The Contractor shall comply with and be responsible for all regulatory requirements applicable to design, construction, installation, and testing, including the application and granting of all applicable permits.	INS-01
INST-18-05-004	For any work that is to be performed within [50 feet] of the railroad tracks, the Contractor shall procure and provide proof of Railroad Insurance. The Contractor shall also be responsible for completing all required Railroad Training before any work within [50 feet] of the tracks begins.	INS-01

18.6 Installation Procedures

Req #	Requirement	Assigned CDRL
INST-18-06-001	The Contractor installation procedures shall be in accordance with the approved Installation Plan and SEPTA rules and guidelines.	INS-02
INST-18-06-002	The Contractor shall provide a proposed schedule for back-office and system equipment installation and configuration for review and approval by SEPTA.	INS-02
INST-18-06-003	The Contractor's proposed installation methodology shall seek to maximize the efficiency with which the installation is performed while minimizing the impact on transit operations.	INS-02

Req #	Requirement	Assigned CDRL
INST-18-06-004	Any holes that must be created in bus vehicles that extend into bus flooring or through vehicle exterior shall be sealed using wiring grommets to the satisfaction of SEPTA. Any damage to vehicles as a result of the bus FPV installation shall be repaired by the Contractor at the Contractor's expense.	INS-02
INST-18-06-005	Any damage to rail stations or bus facilities as a result of the FVM, platform FPV, Turnstile Reader, or ADA Faregate installations shall be repaired by the Contractor at the Contractor's expense. Any holes that must be created shall be sealed to the satisfaction of SEPTA.	INS-02

18.7 Onboard Installation

Req #	Requirement	Assigned CDRL
INST-18-07-001	The FPV shall be installed on each bus such that the reader shall be in proximity to the front and/or back door, and shall be positioned so that a customer may easily present fare media for payment upon boarding the bus.	INS-02
INST-18-07-002	The FPV shall be mounted so that it can be adjusted for optimal operating and viewing angle while minimizing sun glare and not causing window screen glare impacting safe bus operations. After adjusting, the mounting hardware shall not allow the FPV to shake or become loose as a result of shock and vibration encountered during normal bus operation. The mounting adjustments shall not require special tools or interfere with the maintenance of other onboard bus systems and components.	INS-02
INST-18-07-003	When installed, the FPV shall not obstruct the operator's view out the vehicle windows and shall not cause glare on the windshield during bright sun conditions or at night with the vehicle interior lights off.	INS-02

18.8 Rail and Platform Installation

Req #	Requirement	Assigned CDRL
INST-18-08-001	The rail and platform equipment shall be designed and installed for optimal operating and viewing angles while minimizing sun glare.	INS-02

Req #	Requirement	Assigned CDRL
INST-18-08-002	All rail and platform equipment shall be positioned so that a customer may easily present fare media for payment or purchase fares on the platform.	INS-02
INST-18-08-003	When installed, all rail and platform equipment provided by the Contractor shall not obstruct access to the station platform and vehicle(s).	INS-02
INST-18-08-004	The ADA Faregate base shall be provided with a minimum of four mounting holes to secure the cabinet to the floor. Any specialized mounting devices shall be provided by the Contractor.	INS-02
INST-18-08-005	All new installations, (i.e., Turnstile Readers, ADA Faregates, and SACs) shall be installed with power and communications supplied from conduit within the floor. The use of ramps or any other configuration to conceal cabling on the floor is prohibited. Existing conduits are not to be used for power and communications.	INS-02
INST-18-08-006	The Contractor shall install the FPV at rail stations and platforms using either the SEPTA-provided stainless steel masts, cabinets, modems and antennas, or providing their own per the Fare Equipment Hardware requirements. The FPV and components shall be securely mounted in a location and manner that is safe for customers and maintenance personnel. After adjusting, the mounting hardware shall not allow the FPV to shake or become loose as a result of normal rail operation. The mounting adjustments shall not require special tools. If the Contractor provides new installation equipment, the base of the installation shall be customized to fit the existing bolts and base size, where possible.	INS-02
INST-18-08-007	Each rail station shall include two stainless steel masts to support one FPVs per mast, and incorporate a secure access door if any power or communication equipment inside the mast requires maintenance.	INS-02
INST-18-08-008	Each mast must include a waterproof, vandal-proof sign-holder and sign affixed to the mast to support the display of basic, printed customer information (e.g., branding, how-to information, etc.). Final mast design shall be determined during Design Review.	INS-02
INST-18-08-009	All rail and platform components, cabling, installation methods, and mounting shall be prototyped and subject to written approval by SEPTA before installation.	INS-02

Req #	Requirement	Assigned CDRL
INST-18-08-010	All communications between the FVMs and back-office shall be via a hardwired connection, with the exception of the FVMs that the Contractor shall install on SEPTA vehicles, at bus loops, and airport platforms. The Contractor shall be responsible for removing and replacing all existing Ethernet cabling runs from the communication cabinets in each station to the installed location of the equipment with new CAT6 or better rodent-resistant or armored cabling. The Contractor shall be responsible for all network hardware (e.g., network switches, hubs, etc.) necessary to connect the FVM equipment at the installed locations.	INS-02

18.9 Shop and As-Built Drawings

Req #	Requirement	Assigned CDRL
INST-18-09-001	The Contractor shall submit shop drawings used in its manufacturing facility, assembly facility, or shop to fabricate, assemble, and/or install parts of the system, whether manufactured from raw materials or purchased from others in a ready-to-use condition. Shop drawings and their projected delivery dates should be noted on the Master Program Schedule.	INS-03
INST-18-09-002	Shop drawings shall be signed by and bear the seal of a Pennsylvania licensed Professional Engineer where appropriate.	INS-03
INST-18-09-003	Shop drawings shall be submitted in a format designated by SEPTA no less than [45 calendar days] prior to the start of installation for SEPTA review and approval.	INS-03
INST-18-09-004	The Contractor shall revise and resubmit drawings that have been reviewed by SEPTA and marked "Disapproved" or "Unacceptable for Evaluation." No work indicated by any shop drawings shall be commenced until drawings have been marked as "Approved" or "Approved as Noted."	INS-03
INST-18-09-005	The Contractor shall document each device installation in the form of an as-built drawing. The as-built documentation shall identify equipment location information, wiring traces, and all additional information needed to maintain the newly installed infrastructure.	INS-03

Req #	Requirement	Assigned CDRL
INST-18-09-006	For each vehicle type, station, and platform on which system equipment is installed, the Contractor shall supply as-built drawings showing the routing of all wires and the method and location of all device mounting installations. As necessary, these drawings may include digital photographs of sufficient detail and clarity to convey the necessary information.	INS-03
INST-18-09-007	All drawings shall contain dimensions, physical details, connections, and other information pertinent to system diagnostics, maintenance, and troubleshooting.	INS-03
INST-18-09-008	The Contractor shall submit for each set of as-built drawings the following no later than [30 calendar days] following each equipment installation: [One (1) copy] on electronic media, in a format approved by SEPTA. Drawings shall reside in the document control system as specified.	INS-03
INST-18-09-009	A master index of drawings shall be submitted that clearly indicates the organization of the shop and as-built drawings, listed by drawing number. The master drawing index shall also provide cross-references to related drawings and shall indicate the hierarchy of all drawings and drawing layers.	INS-03

18.10 Required Submittals

CDRL ID	Contractor Deliverable	Due
INS-01	Installation Plan	Design Review
INS-02	Installation Procedures	Design Review
INS-03	Shop and As-Built Drawings	Design Review

19. System Transition Requirements

The Contractor shall be responsible for supporting transition from the current Key System (i.e., Key 1.0 System) as part of the new AFC System implementation. The following requirements summarize these responsibilities and associated activities.

19.1 Transition Responsibilities

Req #	Requirement	Assigned CDRL
STR-19-01-001	The Contractor shall support transition from the current Key system (i.e., Key 1.0 System) to the AFC System provided by the Contractor in a manner that provides as seamless a transition as possible for customers, while minimizing transition dependencies and risk for SEPTA.	STR-01
STR-19-01-002	The Contractor shall provide a Transition Plan for migrating from current operations to the new system, which employs a transition strategy that provides backwards compatible validation of Key 1.0 fare media during transition, such that all Contractor-provided validation devices shall accept Key 1.0 fare media, and shall communicate with the Key 1.0 back-office for the processing of associated transactions. Key 1.0 fare media shall not be accepted following transition (i.e., decommissioning of the Key 1.0 system).	STR-01
STR-19-01-003	Transition shall occur in multiple phases: (1a) Development and system-wide deployment (i.e., installation) of backwards compatible fare validation devices; and (1b) Deployment of Contractor-provided back-office into the production environment; (2) Transition of open payment processing from the Key 1.0 back-office to Contractor-provided back-office; (3a) Migration of existing Key 1.0 customer data to Contractor-provided back-office to create mirror Customer Accounts; (3b) Deployment of the new Contractor-provided and third-party sales channels as defined in these specifications; and (3c) Issuance of new closed-loop fare media as defined in these specifications; and (4) Retirement of Key 1.0 fare media and decommissioning of Key 1.0 back-office.	STR-01
STR-19-01-004	The Transition Plan developed by the Contractor shall document the transition process in detail, including any additional, temporary, or special staffing requirements. The Contractor shall provide design leadership and support across all phases to ensure a holistic and coherent transition.	STR-01

Req #	Requirement	Assigned CDRL
STR-19-01-005	In order to support development of the software necessary for the Contractor-provided validation devices to accept Key 1.0 fare media and communicate with the Key 1.0 back-office for the processing of associated transactions, SEPTA shall provide the following information to the selected Contractor: (1) All cryptographic keys used to authenticate Key 1.0 fare media and protect data stored on such media; (2) Detailed data format specifications for all forms of Key 1.0 fare media; (3) Detailed specifications for the validation logic employed by Key 1.0 fare validation devices; and (4) API specifications for interfacing with the Key 1.0 back-office to process fare validation transactions. This information shall be provided to the selected Contractor under a royalty-free license upon award.	STR-01
STR-19-01-006	The Contractor shall be responsible for the development and testing of all software required to accept the Key 1.0 fare media and interface with the Key 1.0 back-office.	STR-01
STR-19-01-007	For the transition of open payment processing to the Contractor-provided back-office, the Contractor shall work with SEPTA and its PSP, to allow for continued use of previously accepted open payment fare media.	STR-01
STR-19-01-008	For the customer account data migration, SEPTA shall provide access to Key 1.0 customer data to the selected Contractor. The Contractor shall work with SEPTA to import and adapt existing customer data records and use this data to create “mirror Customer Accounts” within their back-office, including those for both individual and institutional customers. The data migrated into these customer accounts shall include at a minimum: (1) Customer identity data, including customer-provided PII; (2) Stored funding sources; and (3) Account status information, including any data used to identify account state.	STR-01
STR-19-01-009	For the migration of customer PII and stored funding sources, the Contractor shall work with SEPTA and its PSP to ensure this data is transferred securely and stored funding sources can continue to be used without any action required by the customer.	STR-01
STR-19-01-010	For the customer account data migration, the Contractor shall develop an approach which enables the data import and adaptation process to be re-run on updated data sets, and have incremental changes within those data sets reflected in their back-office.	STR-01

Req #	Requirement	Assigned CDRL
STR-19-01-011	New sales channels and fare media shall be deployed using a phased approach that shall not commence until all new fare validation equipment has been installed and all customer data has been migrated from the Key 1.0 system. SEPTA shall work with the Contractor during Design Review to document within the Transition Plan the order in which new sales channels and fare media shall be introduced.	STR-01
STR-19-01-012	The Contractor shall support, through the Contractor-provided CST devices, the transfer remaining value associated with Key 1.0 fare media. The CST shall only be required to load the associated value to transit accounts within the new system, and shall not be required to read Key 1.0 fare media as part of the transfer process.. The timing and process for retirement of Key 1.0 fare media shall be determined by SEPTA.	STR-01

19.2 Required Submittals

CDRL ID	Contractor Deliverable	Due
STR-01	Transition Plan	Design Review

20. System Operations Requirements

Prior to the successful completion of required training, and the granting of System Acceptance for the applicable phase of the AFC System, the Contractor shall retain full responsibility for operations and maintenance of the system. Following System Acceptance for the applicable phase of the AFC System, the Contractor shall retain some operations and maintenance responsibilities under the warranty and operations and maintenance agreements described in this section.

Within “Operations and Maintenance Support” of the pricing sheet, each individual phase of the project requires individual pricing for the SMA, BOA, EMA, and NOA. This allows the Contractor to accurately capture incremental operations and maintenance cost increases as additional systems and functionality are added within each new phase. Furthermore, while maintaining an on-time schedule is critically important, in the unlikely event the Project is delayed by SEPTA, the pricing sheet includes an annual escalation rate for each service agreement to allow the Contractor to cover any potential increased costs from a SEPTA driven schedule delay of [12 months] or more.

A [12 year] base Contract for System Operations is planned for all system support. The operations and maintenance responsibilities not covered by the warranty and operations and maintenance agreements described in this section shall be performed by SEPTA or Contractors starting at Final Acceptance for the applicable part of the system. SEPTA and Contractor-performed operations and maintenance responsibilities are identified in Table 20-01 as follows:

Table 20-01: Responsible Party for System Operations

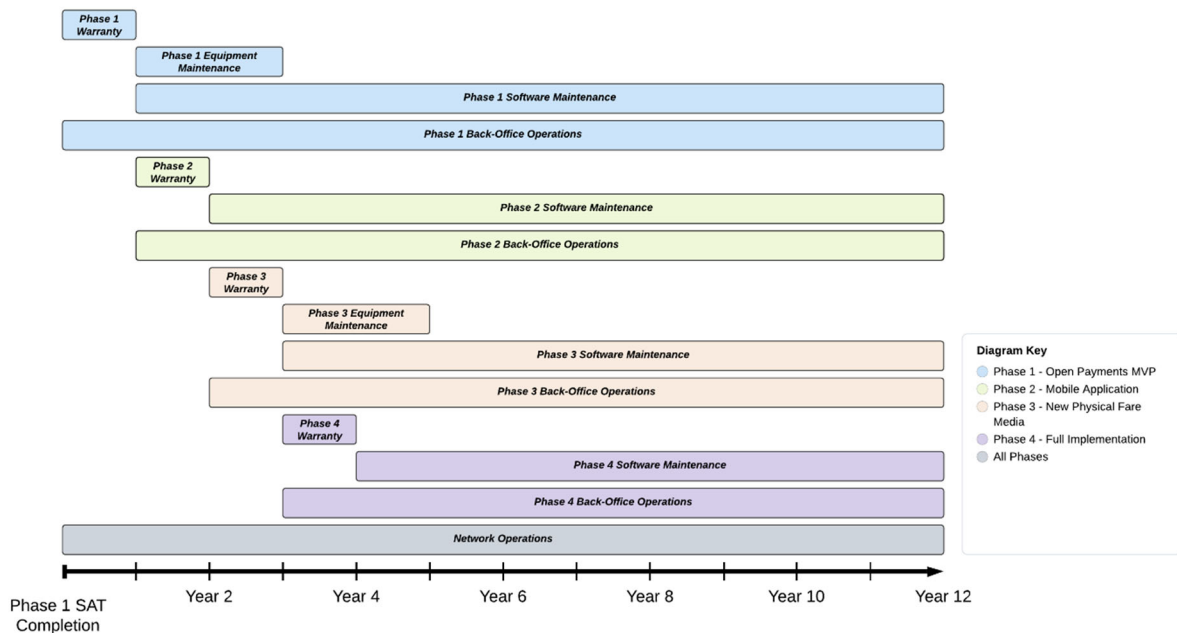
System Component	SEPTA	Contractor	Hybrid	Notes
Call Center Operations	X			SEPTA will operate
In-Person Customer Service	X			SEPTA will operate
Financial Management	X			SEPTA will operate
Institutional Partner Management	X			SEPTA will operate
Station Communications Network Maintenance		X		Contractor will perform maintenance
Onboard Communications Network Maintenance		X		Contractor will perform maintenance and hold cellular service contract
Payment Processor Maintenance		X		Contractor will perform maintenance
IVR Hosting and Maintenance		X		Contractor will perform maintenance
Back Office Hosting and Maintenance		X		Contractor will perform maintenance
Data Warehouse Maintenance		X		Contractor will perform maintenance
Reporting System Maintenance		X		Contractor will perform maintenance
Media Inventory Management System Maintenance		X		Contractor will perform maintenance
System Monitoring and Management Application Maintenance		X		Contractor will perform maintenance
Customer Relationship Management System Maintenance		X		Contractor will perform maintenance

Financial Management System Maintenance		X		Contractor will perform maintenance
Test Environment Maintenance		X		Contractor will perform maintenance
Retail Network (OPTION)		X		Contractor will perform maintenance
Institution Website Hosting and Maintenance (OPTION)		X		Contractor will perform maintenance
Customer Website Hosting and Maintenance (OPTION)		X		Contractor will perform maintenance
Mobile Application Hosting and Maintenance (OPTION)		X		Contractor will perform maintenance
Turnstile and ADA Faregate Maintenance			X	SEPTA will perform Level 1 & 2 maintenance; Contractor will perform Level 3
Station Agent Console Maintenance			X	SEPTA will perform Level 1 & 2 maintenance; Contractor will perform Level 3
Customer Service Terminal Maintenance			X	SEPTA will perform Level 1 & 2 maintenance; Contractor will perform Level 3
Rail Fare Payment Validator Maintenance			X	SEPTA will perform Level 1 & 2 maintenance; Contractor will perform Level 3
Fare Vending Machine Maintenance (OPTION)			X	SEPTA will perform Level 1 & 2 maintenance; Contractor will perform Level 3
Onboard Fare Payment Validator Maintenance			X	SEPTA will perform Level 1 & 2 maintenance; Contractor will perform Level 3
Handheld Validation, Inspection, Sales Device Maintenance			X	SEPTA will perform Level 1 & 2 maintenance; Contractor will perform Level 3

Authority Test Facility Maintenance			X	SEPTA will perform Level 1 & 2 maintenance; Contractor will perform Level 3
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In order to facilitate a smooth transition of these responsibilities and transition of the Contractor-performed operations and maintenance responsibilities at the end of the agreements, SEPTA shall shadow the Contractor's personnel during system testing, and throughout the operations and maintenance agreements. The timing shown in exhibit below is for demonstration purposes only.

Figure 20-01: Operations and Maintenance Agreement Timeline



20.1 Warranty

The defined warranty period for all system components delivered under each phase of the project shall commence upon achievement of BU for the corresponding phase. BU is defined as the period following the successful completion of the SAT for the corresponding phase during which the system is considered in service and publicly launched.

Req #	Requirement	Assigned CDRL
SOR-20-01-001	The Contractor shall provide a minimum [one (1) year] warranty, commencing at BU (i.e., completion of SAT) for each phased delivery of the AFC System. The Contractor shall clearly indicate warranty duration provided in the proposal.	SOR-01
SOR-20-01-002	The Phase 1 warranty shall include all system components delivered in Phase 1 including: (1) Back-office solution and infrastructure; (2) ADA Faregates; (3) Validators; (4) Handheld Validation and Payment Devices; and (5) the Turnstile Integration.	SOR-01
SOR-20-01-003	The Phase 2 warranty shall include all system components delivered in Phase 2 including the Mobile Application solution.	SOR-01
SOR-20-01-004	The Phase 3 warranty shall include all system components delivered in Phase 3 including: (1) CSTs; (2) FVMs; (3) Retail Network solution; (4) Customer Website solution; and (5) Physical fare media.	SOR-01
SOR-20-01-005	The Phase 4 warranty shall include all system components delivered in Phase 4 including the Institutional Website solution.	SOR-01
SOR-20-01-006	The Contractor shall warrant that all of the equipment, computer systems, and software provided for the AFC System, including those components warrantied by third-party suppliers, shall be free from defects in operation, material, and workmanship under normal operating use. Remedial work to correct deficiencies shall include the repair or replacement of equipment, components, devices, and/or materials.	SOR-01
SOR-20-01-007	The warranty shall cover the following: (1) Repair or replacement of all equipment or systems required as a result of an identified hardware defect; (2) 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; and (3) All labor associated with hardware and software testing and deployment, both in the lab and field environments, needed to support warranty activities.	SOR-01
SOR-20-01-008	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.	SOR-01

Req #	Requirement	Assigned CDRL
SOR-20-01-009	If during the warranty term, the rate of failure of any component or device exceeds [10%] of the mean quantity installed, a “fleet defect” shall be declared, and the entire quantity of such components or devices shall be considered defective.	SOR-01
SOR-20-01-010	If a fleet defect is declared, the Contractor shall undertake and complete a corrective work program to replace all components of that type with new (not refurbished) components. The repair schedule and procedures shall be subject to SEPTA review and approval. All items replaced under these terms shall be warranted for at least [one (1) year] after replacement.	SOR-01
SOR-20-01-011	A fleet defect shall be considered resolved when the installed components are determined to meet or exceed all of the KPI and Service Level Agreement (SLA) requirements, and upon SEPTA approval.	SOR-01
SOR-20-01-012	The Contractor shall be responsible for all personnel, labor, tools, materials, shipping charges, and other costs associated with the repair or replacement of components and/or subsystems throughout the warranty term.	SOR-01
SOR-20-01-013	Any system component repaired or replaced under terms of warranty shall be warranted for at least [six (6) months], or the remaining duration of the original warranty, whichever is longer.	SOR-01
SOR-20-01-014	Following the completion of the warranty term, should there be warranty work to complete, the warranty shall be extended to provide equal coverage for each piece of equipment.	SOR-01
SOR-20-01-015	The warranty shall not apply to any equipment that has been damaged by any person other than the Contractor or Contractor’s representatives. Environmental conditions described in these technical specifications shall be considered normal operating conditions for the AFC System and shall not qualify for exclusion.	SOR-01
SOR-20-01-016	SEPTA shall operate and maintain the equipment and software in accordance with the Contractor’s specific instructions in order to maintain this warranty. SEPTA shall be held blameless if the Contractor has provided inadequate or inaccurate training, and/or incomplete operating manuals, maintenance manuals, electrical and electronic schematics, mechanical diagrams, or software documentation.	SOR-01

Req #	Requirement	Assigned CDRL
SOR-20-01-017	In the event the Contractor fails to comply promptly with warranty requirements, SEPTA shall, upon written notice to the Contractor, have the right to deduct the cost of the SEPTA's prevailing labor and material costs for repairing a defect from any compensation due, or coming due, to the Contractor. In the event the Contractor has been paid in full, the Contractor shall agree to compensate SEPTA for the costs incurred.	SOR-01
SOR-20-01-018	The Contractor shall replace spare modules used by the Contractor during the warranty term. The Contractor shall maintain sufficient spare sub-assemblies, modules, and components to meet the system availability requirements through the conclusion of the warranty.	SOR-01
SOR-20-01-019	The Contractor shall follow proper SEPTA security procedures for gaining access to field equipment and facilities and shall not engage in such procedures without having received SEPTA-provided training. The Contractor shall not modify or repair any equipment in revenue service without the approval of the SEPTA PM or a SEPTA-authorized representative.	SOR-01
SOR-20-01-020	During the entire warranty term, all repairs, adjustments, or replacements of equipment by the Contractor shall be documented by the Contractor within a SEPTA-approved maintenance management system at the completion of every day.	SOR-01
SOR-20-01-021	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 shall be submitted and approved during Design Review and a final version shall be provided a minimum of [90 calendar days] prior to the start of any warranty term.	SOR-01

20.2 Software Maintenance Requirements

During the specified term of the warranty and SMA, and during any optional extensions exercised by SEPTA, 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.

20.2.1 General Requirements

Software maintenance shall include custom software updates, third-party device firmware updates, database software updates, operating system updates, API updates maintenance and updates, antivirus updates, license renewal, and other activities needed to maintain system operations and meet the performance standards set forth in these specifications.

Req #	Requirement	Assigned CDRL
SOR-20-02-01-001	Software Maintenance shall commence at warranty completion for each phased delivery of the AFC System. Prior to commencement, all Software Maintenance activities shall be covered by the Contractor.	SOR-02
SOR-20-02-01-002	The Contractor shall provide Software Maintenance for the term of the Contract, sustaining the AFC System as an evergreen IT solution, such that the system components and infrastructure is never out of date and effectively maintains PCI and EMV compliance. The Contractor shall be responsible for conducting annual PCI audits and delivering the AoC and RoC to SEPTA.	SOR-02
SOR-20-02-01-003	The Contractor shall provide preventative and corrective Software Maintenance to support Back-Office Operations, while meeting all relevant system performance requirements and SLAs.	SOR-02
SOR-20-02-01-004	The Contractor shall warrant that all computer systems and software provided for the AFC System, including those components warranted by third-party suppliers, shall be free from defects under normal operating use. Remedial work to correct all deficiencies shall be covered as part of Software Maintenance.	SOR-02
SOR-20-02-01-005	The Contractor shall perform the following activities as part of Software Maintenance: (1) Software updates or re-writes required to fix all identified software defects or bugs throughout the term of the Contract; (2) Application of all necessary patches or security updates released by the Contractor or third-party software providers; (3) Operating system updates to address security vulnerabilities and maintain OEM support; and (4) All software testing and deployment, both in the lab and field environments, needed to support all operations and maintenance activities.	SOR-02
SOR-20-02-01-006	The Contractor shall upgrade and maintain all COTS back-office software on a continuous basis, such that all software versions used in productions are no older than [two (2) years] from the date of release. All upgrades shall occur no later than [one (1) year] prior to the end of any software support period.	SOR-02
SOR-20-02-01-007	The Contractor shall update and maintain all APIs and associated documentation, such that all specified functionality is fully delivered by the AFC System open architecture. The Contractor shall ensure access to all APIs are provided as specified by SEPTA.	SOR-02

Req #	Requirement	Assigned CDRL
SOR-20-02-01-008	As standard practice when releasing 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 not being updated. Any regression issues shall be documented as deficiencies and resolved accordingly.	SOR-02
SOR-20-02-01-009	The Contractor shall perform all Software Maintenance activities in a manner that does not disrupt or degrade back-office performance or availability, unless approved by SEPTA.	SOR-02
SOR-20-02-01-010	The Contractor shall update all relevant software components to support the latest host OS no more than [two (2) years] from the date of release and must be updated no later than [one (1) year] prior to the end of support.	SOR-02
SOR-20-02-01-011	The Contractor shall provide all support required to develop and deploy software enhancements beyond the Contract scope at the Contractor's labor rates specified in the price schedule. Software enhancement include modifications to the software that add capabilities and improve or change software functions that are not modifiable using the system configuration updates.	SOR-02
SOR-20-02-01-012	The Contractor shall document all software updates and deployments within a SEPTA-approved maintenance management system, by the end of each day.	SOR-02
SOR-20-02-01-013	The Contractor shall keep all hosting environments (e.g., development, test, training, staging, and production) at the same configuration and patch level as appropriate to the environment's intended purpose.	SOR-02
SOR-20-02-01-014	The Contractor shall update and maintain the agency test facility throughout the warranty and maintenance terms to maintain a fully mirrored environment of Contractor's test facility.	SOR-02
SOR-20-02-01-015	The Contractor shall update training course materials and manuals as needed to reflect software changes performed throughout the term of the Contract. The Contractor shall provide ongoing training to SEPTA and their representatives as changes and updates are completed.	SOR-02
SOR-20-02-01-016	The Contractor and SEPTA shall agree on an appropriate course of action if a third-party software provider goes out of business, or if maintenance updates for third-party software degrades the performance of the AFC System.	SOR-02

Req #	Requirement	Assigned CDRL
SOR-20-02-01-017	The Contractor shall develop a Software Maintenance Plan outlining the processes and approach to meeting all specified Software Maintenance requirements. A draft of the Software Maintenance Plan shall be reviewed and approved during Design Review, and a final version shall be provided a minimum of [90 days] prior to the start of BU.	SOR-02

20.2.2 Communication, Response, and Resolution

Req #	Requirement	Assigned CDRL
SOR-20-02-02-001	The Contractor shall make corrections and modifications to the system software in coordination with SEPTA staff. The Contractor shall investigate serious issues (e.g., any error which causes system reliability or availability to fall below stated requirements) immediately and classify each incident's severity according to the impact to operations.	SOR-02
SOR-20-02-02-002	The Contractor shall document all details relating to software and firmware updates and submit all plans in advance of deployment for SEPTA review and approval.	SOR-02
SOR-20-02-02-003	The Contractor shall schedule and plan all software and firmware deployments with SEPTA. Advance notification shall be provided, and approval granted by SEPTA, for all software maintenance activities requiring interruption of service or system operations.	SOR-02
SOR-20-02-02-004	If SEPTA deems 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.	SOR-02
SOR-20-02-02-005	The Contractor shall maintain a change log of all changes that are performed and provide this changelog to SEPTA on a mutually agreed-upon schedule. The changelog shall be sufficiently detailed to allow SEPTA to determine when any feature was added or modified, and the scope of the change.	SOR-02
SOR-20-02-02-006	The Contractor shall provide technical support to SEPTA for the general use and operation of all software components throughout the warranty and maintenance terms.	SOR-02

Req #	Requirement	Assigned CDRL
SOR-20-02-02-007	The Contractor shall provide a phone number, e-mail account, or other SEPTA-approved mechanism for the reporting of software defects, malfunctions, and system outages, [24 hours a day, seven (7) days a week].	SOR-02
SOR-20-02-02-008	During the warranty and maintenance terms, the Contractor shall respond to reports of system outages within [15 minutes] of notification, [24 hours a day, seven (7) days a week]. A fully qualified service representative shall be onsite within [two (2) hours] after being contacted by SEPTA staff if it is determined that a physical presence is needed to resolve the identified critical system issue.	SOR-02
SOR-20-02-02-009	During the warranty and maintenance terms, the Contractor shall respond to a report of any software defect and malfunction within [two (2) hours] of notification. A fully qualified service representative shall be onsite within [eight (8) hours] after being contacted by SEPTA staff if it is determined that a physical presence is needed to resolve the identified issue.	SOR-02
SOR-20-02-02-010	The Contractor shall make every attempt to resolve software defects and malfunctions impacting revenue collection within [three (3) hours] of being reported.	SOR-02
SOR-20-02-02-011	If the software problem impacts revenue collection, and the resolution shall take longer than [three (3) hours], the Contractor shall report the cause of the problem as soon as it becomes evident and provide status reports at least every [one (1) hour] thereafter, until the problem is corrected or a workaround is established. The frequency and interval of status reports may be adjusted if approved by SEPTA.	SOR-02
SOR-20-02-02-012	The Contractor shall submit to SEPTA, no less than monthly, a bulletin setting forth planned modifications and updates to the software, upgrade schedules, and a calendar of key dates for system changes for the coming [three (3) months] and beyond.	SOR-02

20.2.3 Software Change Management

Req #	Requirement	Assigned CDRL
SOR-20-02-03-001	The Contractor shall facilitate software change management meetings no less than monthly throughout warranty and maintenance terms, either in person or online.	SOR-02

Req #	Requirement	Assigned CDRL
SOR-20-02-03-002	The Contractor shall track and maintain a list of software maintenance issues, software defects, and open items, and shall ensure each item is updated with the latest details. The Contractor distributes the list to SEPTA in advance of each monthly meeting.	SOR-02
SOR-20-02-03-003	The Contractor shall notify SEPTA whenever corrections, modifications, or revisions of system software are available, and in advance of deployment.	SOR-02
SOR-20-02-03-004	Without releasing the Contractor from its obligations under the warranty and maintenance terms, SEPTA shall have the right to refuse to install any updates, at their sole discretion.	SOR-02
SOR-20-02-03-005	All changes to any delivered and installed part of the system shall comply with the mutually agreed upon change request and software deployment procedures defined in the Contractor's PMP.	SOR-02

20.3 Back-Office Operations Requirements

The Contractor shall be responsible for Back-Office Operations under the BOA for a defined operating period following AFC System launch. During the operating period, the Contractor shall monitor and report on AFC System performance and health and support immediate downtime issue resolution [24 hours a day, 365 days a year] ensure timely and accurate processing of transactions, oversee the operation of the back-office support systems (e.g., CRM and financial management systems) and websites, support testing and deployment of new software releases and maintains up-to-date system patching and configuration.

Req #	Requirement	Assigned CDRL
SOR-20-03-001	The Contractor shall be responsible for performing all Back-Office Operations for the term of the Contract, commencing at BU of the AFC System.	SOR-03

Req #	Requirement	Assigned CDRL
SOR-20-03-002	As part of Back-Office Operations, the Contractor shall be responsible for the following activities: (1) Monitoring system performance and health; (2) Ensuring timely and accurate processing of transactions; (3) Overseeing the operation of all back-office support systems (e.g., CRM and FMS); (4) Maintaining fare policy and business rules configurations and performing configuration changes upon request from SEPTA; (5) Supporting report updates and ad-hoc data requests; (6) Monitoring and preventing fraudulent activities in the AFC System and resolving all incidents; (7) Providing unlimited and comprehensive real-time access to all data; (8) Providing ad-hoc assistance to SEPTA for resolving financial exceptions/variances; and (9) Delivering accurate and timely deliverables to SEPTA supporting financial process execution.	SOR-03
SOR-20-03-003	The Contractor shall be responsible for system and fare configuration updates as specified by SEPTA, including updates to all universal device and system configuration parameters, and fare table and configuration updates to support all fare structure elements supported by the AFC System. The Contractor shall provide standard configuration updates no less than monthly, and provide configuration and fare pricing updates necessary to resolve system issues and accommodate special events on an ad-hoc basis.	SOR-03
SOR-20-03-004	The Contractor shall be responsible for actively hosting, managing, and maintaining the configuration of the cloud-hosted environment. The Contractor shall define and maintain the ongoing configuration for all Contractor-provided systems and services, and allocate the processing, memory, and storage resources to support ongoing operations. The Contractor shall annually test the automated failover between production back-office instances in multiple failover scenarios to demonstrate no data loss or significant degradation in system performance.	SOR-03
SOR-20-03-005	The Contractor shall be responsible for customer and institutional website hosting, operation, and content updates as specified by SEPTA, no less than quarterly. The Contractor shall perform updates to the welcome pages to provide critical customer updates and alerts on an ad-hoc basis.	SOR-03
SOR-20-03-006	The Contractor shall be responsible for updates to the Contractor-provided reports no less than quarterly, and shall develop and execute data warehouse queries on an ad-hoc basis to support SEPTA data requests.	SOR-03

Req #	Requirement	Assigned CDRL
SOR-20-03-007	The Contractor's lead engineer shall continue in a full-time operations and maintenance services role throughout the term of Contract. The Contractor may propose an alternate to fill the primary operations management role, subject to SEPTA's approval, and may elect to have additional onsite staff as needed to support Back-Office Operations.	SOR-03
SOR-20-03-008	The Contractor shall allow SEPTA staff and representatives to shadow and observe all Back-Office Operations activities.	SOR-03
SOR-20-03-009	The Contractor shall meet all relevant system performance requirements and SLAs (e.g., back-office accuracy, availability, and server authorization rate) while performing all Back-Office Operations.	SOR-03
SOR-20-03-010	The Contractor shall be responsible for the operations and maintenance of all mobile applications distributed to third-party app stores, deployed to devices, and are publicly available for download. The Contractor shall provide access to third-party app stores and details as needed by SEPTA.	SOR-03
SOR-20-03-011	The Contractor shall perform all activities necessary to support mobile application operations including: (1) deploying application software and updates to the app stores; (2) publishing all collateral necessary for app store pages; (3) monitoring performance, analytics, and crash data; (4) maintaining compliance to all app store requirements and guidelines; (5) configuration and settings updates; (6) monitoring app store reviews for issues and improvements; and (7) status updates and data requests.	SOR-03
SOR-20-03-012	The Contractor shall establish and maintain a Security Operations Center (SOC) to monitor against security threats and vulnerabilities using the system SIEM tool and log files. The SOC shall be operational 24 hours a day, 7 days a week, and shall be responsible for incident response and remediation in accordance with severity level and SEPTA security policies. The Contractor shall notify SEPTA of any critical incidents immediately and provide a report on security operations no less than monthly.	SOR-03
SOR-20-03-013	The Contractor shall develop a Back-Office Operations Plan and operating procedures outlining the processes and approach to meeting all specified Back-Office Operations requirements. A draft of the Back-Office Operations plan shall be reviewed and approved during Design Review, and a final version shall be provided a minimum of [90 days] prior to the start of BU.	SOR-03

20.4 Equipment Maintenance Requirements

Following the completion of each warranty period, the Contractor shall be responsible for Level 3 equipment maintenance under the EMA, where the Contractor shall repair and return all field equipment and parts delivered by SEPTA. During this period, SEPTA shall be responsible for Level 1 and Level 2 equipment maintenance and shall escalate field issues to the Contractor as needed.

Table 20-02: Maintenance Level Descriptions

Maintenance Level	Definition
Level 1	Maintenance activities of simple complexity which require minimal training and tools. Examples include cleaning, lubrication, and replacing bulbs.
Level 2	Maintenance activities of moderate complexity which require general training, standard operating procedures, and general tools. Examples include replacing ticket stock and fuses.
Level 3	Maintenance activities of high complexity which require specialized training, technical diagnosis, and special tools. Examples include repairing circuit boards and dismantling equipment.

Req #	Requirement	Assigned CDRL
SOR-20-04-001	The Contractor shall establish a Return Merchandise Authorization (RMA) process to facilitate the delivery of faulty equipment and parts to the Contractor for repair and replacement. The Contractor shall provide a monthly status report for all returned parts and detailed repair reports for each returned part.	SOR-03
SOR-20-04-002	The Contractor shall replace all spare devices and modules used for all maintenance activities performed prior to BU, as well as during the warranty, with brand new equipment a maximum of [14 calendar days] after use. The Contractor shall maintain an inventory of all spare devices and modules, update the status and location of each item, and provide an inventory log to SEPTA on a mutually agreed-upon schedule.	SOR-03
SOR-20-04-003	The Contractor shall provide a recommended list of spare modules and parts to support the installed fleet at completion of SAT. Recommended quantities shall be provided based on expected usage.	SOR-03
SOR-20-04-004	The Contractor shall provide a recommended list of consumables at completion of SAT to support system operations for [one (1) year]. Consumables are items that have a limited life cycle due to constant use and are expected to be replaced on a frequent basis, such as bulbs, fuses, and receipt paper. Recommended quantities shall be provided based on expected usage.	SOR-03

Req #	Requirement	Assigned CDRL
SOR-20-04-005	The Contractor shall provide a list of special tools needed to maintain the AFC System at completion of SAT. Special tools are defined as special diagnostic tools and equipment that is not readily available from commercial sources. The Contractor shall provide sufficient documentation to allow SEPTA to manufacture these tools.	SOR-03
SOR-20-04-006	The Contractor shall document all equipment repairs, adjustments, and replacements within a SEPTA-approved maintenance management system, by the end of each day.	SOR-03
SOR-20-04-007	The Contractor shall support and resolve all escalated field equipment issues from SEPTA as needed.	SOR-03

20.5 Network Operations Requirements

The Contractor shall be responsible for the operation and maintenance of all networking and communications equipment necessary to operate the AFC System, under the NOA. SEPTA shall own all such networking equipment which shall be provided to the Contractor for configuration, testing, and maintenance. The Contractor shall contract with all cellular carriers necessary to enable cellular service in the AFC System.

Req #	Requirement	Assigned CDRL
SOR-20-05-001	The Contractor shall be responsible for the configuration, testing, and maintenance of the communications network required to enable the secure transmission of all data between Contractor-provided system components and the AFC System back-office. SEPTA shall provide all networking equipment (e.g., modems, routers, and switches) required to support the hardwired communications network. The Contractor shall propose any major changes related to the networking equipment for SEPTA review and approval.	SOR-03
SOR-20-05-002	The Contractor shall be responsible for configuring the cellular communications network and APNs, securing the network to comply with PCI-DSS, and installing SIM cards into cellular-based devices to facilitate online communications. The Contractor shall contract directly with the cellular carriers for cellular data service and shall ensure the wireless contract is assignable to SEPTA upon request.	SOR-03

Req #	Requirement	Assigned CDRL
SOR-20-05-003	The Contractor shall be responsible for maintaining all networking equipment and software configurations in the SEPTA communication rooms, in stations, and on vehicles, including modems, routers, switches, servers, racks, and device controllers.	SOR-03
SOR-20-05-004	The Contractor shall monitor, troubleshoot, and resolve all communications issues pertaining to the AFC System network configuration. Any issues identified shall be tracked in accordance with the Software Maintenance processes and plan.	SOR-03
SOR-20-05-005	The Contractor shall develop a Network Operations Plan outlining the processes and approach to meeting all specified Network Operations requirements. A draft of the plan shall be reviewed and approved during Design Review, and a final version shall be provided a minimum of [90 days] prior to the start of BU.	SOR-03

20.6 Required Submittals

CDRL ID	Contractor Deliverable	Due
SOR-01	System Warranty	Design Review
SOR-02	Software Maintenance Plan	Design Review
SOR-03	Back-Office Operations Plan	Design Review
SOR-04	Equipment Maintenance Plan	Design Review
SOR-05	Network Operations Plan	Design Review

21. System Performance Requirements

The Contractor shall meet all the applicable performance requirements contained within individual equipment and back-office sections of these specifications, in addition to the performance requirements described throughout this section. The performance requirements described in this section are Key Performance Indicators (KPIs), all of which shall be measured and reported on by the Contractor starting at Acceptance Testing (i.e. Pilot) for each project phase. The KPIs shall be used as the primary criteria for the passing of acceptance testing during each phase, as well as the granting of Final Acceptance. In addition, the KPIs shall be measured and reported on by the Contractor monthly, throughout the term of the system operations agreements, with failure to meet these requirements resulting in a credit being assessed and applied against the monthly operations payments made to the Contractor.

21.1 Key Performance Indicators (KPI)

21.1.1 Devices

21.1.1.1 Device Reliability (Failure Rate)

Device reliability shall be measured as a function of equipment failure rate

$$\text{Device Reliability} = \left(1 - \frac{\# \text{ of Chargeable Device Failures}}{\# \text{ of Active Devices}} \right) \times 100$$

Chargeable failures are as defined in these specifications. Active pieces of equipment are defined as those deployed for customer and agency use in the production environment and do not include spares or test equipment. Equipment failure rate calculations must not exceed the KPI requirement outlined in the table below during each measurement period in order to pass.

KPI #	Device	Requirement	Measurement Period	Base Credit Assessed	Payment Impacted	
					SMA	BOA
SPR-21-01-01-001.01	Bus Fare Payment Validators	> 97%	Calendar Month	10%	✓	
SPR-21-01-01-001.02	Railroad Platform Fare Payment Validators	> 97%	Calendar Month	10%	✓	
SPR-21-01-01-001.03	Rail Turnstiles	> 97%	Calendar Month	10%	✓	
SPR-21-01-01-001.04	ADA Faregates	> 95%	Calendar Month	10%	✓	
SPR-21-01-01-001.05	Fare Vending Machines *	> 90%	Calendar Month	10%	✓	
SPR-21-01-01-001.06	Customer Service Terminals	> 95%	Calendar Month	10%	✓	
SPR-21-01-01-001.07	Handheld Devices	> 95%	Calendar Month	10%	✓	

**If equipment option is exercised*

21.1.1.2 Device Accuracy

Device accuracy shall be measured by comparing the quantity and value (where available) of transactions generated by the devices, as recorded within the device audit registers, to those received by the back-office:

Device Accuracy

$$= \left(1 - \frac{|Device\ Audit\ Register\ Transaction\ Count - ATP\ Transaction\ Count|}{Device\ Audit\ Register\ Transaction\ Count} \right) \\ \times \left(1 - \frac{|Device\ Audit\ Register\ Transaction\ Value - ATP\ Transaction\ Value|}{Device\ Audit\ Register\ Transaction\ Value} \right)$$

KPI #	Device	Requirement	Measurement Period	Base Credit Assessed	Payment Impacted	
					SMA	BOA
SPR-21-01-01-002.01	Bus Fare Payment Validators	> 99.99%	Calendar Month	12.50%	✓	
SPR-21-01-01-002.02	Rail Platform Fare Payment Validators	> 99.99%	Calendar Month	12.50%	✓	
SPR-21-01-01-002.03	Rail Turnstiles	> 99.99%	Calendar Month	12.50%	✓	
SPR-21-01-01-002.04	ADA Faregates	> 99.99%	Calendar Month	12.50%	✓	
SPR-21-01-01-002.05	Fare Vending Machines *	> 99.99%	Calendar Month	12.50%	✓	
SPR-21-01-01-002.06	Customer Service Terminals	> 99.99%	Calendar Month	12.50%	✓	
SPR-21-01-01-002.07	Handheld Devices	> 99.99%	Calendar Month	12.50%	✓	

**If equipment option is exercised*

21.1.2 Back-Office

21.1.2.1 Back-Office Accuracy

Back-office component data accuracy shall be measured by comparing the counts and value of ATP transaction records, against the counts and value of transactions recorded in the component being

evaluated. Back-office component data accuracy shall be impacted by any incidents where the ATP has recorded a transaction, but the transaction (i.e., in discrete or aggregated form) is missing or recorded incorrectly in the back-office component being evaluated. Back-office component data accuracy shall be calculated as follows:

Back – Office Component Accuracy

$$= \left(1 - \frac{|ATP \text{ Transaction Count} - \text{Component Transaction Count}|}{ATP \text{ Transaction Count}} \right) \times \left(1 - \frac{ATP \text{ Transaction Value} - \text{Component Transaction Value}}{ATP \text{ Transaction Value}} \right)$$

KPI #	System	Requirement	Measurement Period	Base Credit Assessed	Payment Impacted	
					SMA	BOA
SPR-21-01-02.001.01	Transit Account Database	> 99.99%	Calendar Month	10%	✓	✓
SPR-21-01-02.001.02	Customer Relationship Management System (Customer Account Database)	> 99.99%	Calendar Month	10%	✓	✓
SPR-21-01-02.001.03	Financial Management System	> 99.99%	Calendar Month	10%	✓	✓
SPR-21-01-02.001.04	Data Warehouse	> 99.99%	Calendar Month	10%	✓	✓
SPR-21-01-02.001.05	Reporting System	> 99.99%	Calendar Month	10%	✓	✓

21.1.2.2 Back-Office Availability

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

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

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 Credit Assessed	Payment Impacted	
					SMA	BOA
SPR-21-01-02-002.01	Account-Based Transaction Processor	> 99.99%	Calendar Month	12.50%	✓	✓
SPR-21-01-02-002.02	Customer Relationship Management System	> 99.99%	Calendar Month	12.50%	✓	✓
SPR-21-01-02-002.03	System Monitoring and Management Application	> 99.99%	Calendar Month	12.50%	✓	✓
SPR-21-01-02-002.04	Financial Management System	> 99.99%	Calendar Month	12.50%	✓	✓
SPR-21-01-02-002.05	Media Inventory Management System	> 99.99%	Calendar Month	12.50%	✓	✓
SPR-21-01-02-002.06	Data Warehouse	> 99.99%	Calendar Month	12.50%	✓	✓
SPR-21-01-02-002.07	Reporting System	> 99.99%	Calendar Month	12.50%	✓	✓
SPR-21-01-02-002.08	Virtual Credential Management System	> 99.99%	Calendar Month	12.50%	✓	✓
SPR-21-01-02-002.09	Customer Website (Web Server) *	> 99.99%	Calendar Month	12.50%	✓	✓
SPR-21-01-02-002.10	Institutional Website (Web Server) *	> 99.99%	Calendar Month	12.50%	✓	✓
SPR-21-01-02-002.11	Customer Mobile Application (Mobile	> 99.99%	Calendar Month	12.50%	✓	✓

KPI #	System	Requirement	Measurement Period	Base Credit Assessed	Payment Impacted	
					SMA	BOA
	Application Server) *					
SPR-21-01-02-002.12	Interactive Voice Response System	> 99.99%	Calendar Month	12.50%	✓	✓
SPR-21-01-02-002.13	Retail Network (Retail Partner Interface) *	> 99.99%	Calendar Month	12.50%	✓	✓

**If associated options are exercised*

21.1.3 Operations

21.1.3.1 Fare Media Read Rate

Fare media read rate measurement shall be based on the percentage of fare media read within the read threshold time. This is measured from the recognition of correctly presented media by the reader to the transmission of an associated fare payment or fare inspection API request:

$$\text{Fare Media Read Rate} = \frac{\text{Number of Fare Media Reads within Threshold Time}}{\text{Total Number of Fare Media Reads}}$$

KPI #	Transaction Type	Requirement	Read Threshold Time	Measurement Period	Base Credit Assessed	Payment Impacted	
						SMA	BOA
SPR-21-01-03-001.01	Closed-Loop Contactless Fare Media	> 99.99%	100ms	Calendar Month	12.50%	✓	
SPR-21-01-03-001.02	Closed-Loop QR Code Fare Media	> 99.99%	100ms	Calendar Month	12.50%	✓	
SPR-21-01-03-001.03	Open Payment Fare Media	> 99.99%	100ms	Calendar Month	12.50%	✓	

21.1.3.2 API Response Rate

API response rate shall be the percentage of API requests that are responded to by the ABT within the response threshold time. This is measured from receipt of an API request by the API server to the transmission of a response to the system or device that generated the request.

$$\text{API Response Rate} = \frac{\text{Number of API Requests Responded to within Threshold Time}}{\text{Total Number of API Requests}}$$

KPI #	Transaction Type	Requirement	Response Threshold Time	Measurement Period	Base Credit Assessed	Payment Impacted	
						SMA	BOA
SPR-21-01-03-002.01	Fare Payment Requests	> 99.99%	50ms	Calendar Month	12.50%		✓
SPR-21-01-03-002.02	Fare Inspection Requests	> 99.99%	50ms	Calendar Month	12.50%		✓
SPR-21-01-03-002.03	All Other Requests	> 99.99%	200ms	Calendar Month	12.50%		✓

21.1.3.3 Transaction Data Population

Transaction data population timeliness shall be measured as the percentage of transactions captured by the ATP that are transmitted to a back-office component within an established threshold time. This is measured from commitment of the transaction to the ATP production database to population of the transaction in the destination component.

$$\text{Transaction Data Population Timeliness} = \frac{\text{Number of Transactions Populated within Threshold Time}}{\text{Total Number of Transmitted Transactions}}$$

KPI #	System	Requirement	Population Threshold Time	Measurement Period	Base Credit Assessed	Payment Impacted	
						SMA	BOA
SPR-21-01-03-003.01	Transit Account Database	> 99.99%	5 seconds	Calendar Month	10%		✓

KPI #	System	Requirement	Population Threshold Time	Measurement Period	Base Credit Assessed	Payment Impacted	
						SMA	BOA
SPR-21-01-03-003.02	Customer Relationship Management System (Customer Account Database)	> 99.99%	1 minute	Calendar Month	10%		✓
SPR-21-01-03-003.03	Financial Management System	> 99.99%	2 minutes	Calendar Month	10%		✓
SPR-21-01-03-003.04	Data Warehouse	> 99.99%	2 minutes	Calendar Month	10%		✓
SPR-21-01-03-003.05	Reporting System	> 99.99%	2 minutes	Calendar Month	10%		✓

21.1.3.4 Report Generation

Report generation timeliness shall be measured as the percentage reports generated within an established threshold time:

$$\text{Report Generation Timeliness} = \frac{\text{Number of Reports Generated within Ninety (90) Seconds}}{\text{Total Number of Report Generation Requests}}$$

KPI #	Transaction Type	Requirement	Measurement Period	Base Credit Assessed	Payment Impacted	
					SMA	BOA
SPR-21-01-03-004.01	Canned Report Generation	> 99.9%	Calendar Month	10%		

Measurement shall be restricted to generation of the canned reports delivered by the Contractor.

21.2 Performance Monitoring

21.2.1 General Requirements

Req #	Requirement	Assigned CDRL
SPR-21-02-01-001	The Contractor shall be responsible for measuring and reporting on the performance of the system against all established KPIs over each calendar month.	SOR-06
SPR-21-02-01-002	System performance shall be measured using data generated by system devices and components, and stored in the data warehouse. Data generated manually shall be used when it is the only option for tracking an activity associated with a particular KPI (e.g., response time).	SOR-06
SPR-21-02-01-003	The Contractor shall automate the capture of all necessary data and the performance of KPI calculations wherever possible. For validation purposes, SEPTA shall have full access to the source data and code used to perform the calculations.	SOR-06
SPR-21-02-01-004	The Contractor shall commence system performance measurement during the first Pilot and continue to perform this activity throughout the operations agreements.	SOR-06

21.2.2 Failure Review Board (FRB)

A Failure Review Board (FRB) shall be established to determine, in the event of a dispute, which equipment and back-office failures shall be chargeable against the performance KPIs. The FRB shall also assess the severity of failures during Acceptance Testing in order to make a determination on the successful completion of the various phases' Pilot and SAT, the granting of Final Acceptance, and whether any fleet defects exist.

Req #	Requirement	Assigned CDRL
SPR-21-02-02-001	A FRB shall be established to determine, in the event of a dispute, which incidents are chargeable against the system performance KPIs. The FRB shall also assess the severity of failures during Acceptance Testing in order to make determinations of successful completion, the granting of Final Acceptance, and whether any system defects exist.	SOR-06
SPR-21-02-02-002	The FRB shall be established during the [30 day] settling period prior to any acceptance testing to evaluate device and back-office failures, as well as other AFC System issues, throughout acceptance testing.	SOR-06

Req #	Requirement	Assigned CDRL
SPR-21-02-02-003	The acceptance test plan submitted by the Contractor shall include a proposed FRB structure and system performance review process.	SOR-06
SPR-21-02-02-004	At a minimum, the FRB shall be comprised of the SEPTA PM, or a designated representative, and the Contractor's lead engineer.	SOR-06
SPR-21-02-02-005	The members of the FRB shall attempt to settle any disputes based on the requirements in these specifications and shall use best judgment in any scenarios where the requirements are silent or unclear.	SOR-06
SPR-21-02-02-006	The SEPTA PM shall make the final and binding decision on any disputes that remain unsettled by the FRB after a period of [14 calendar days].	SOR-06
SPR-21-02-02-007	The FRB shall be responsible for the review and approval of the system acceptance test plan and shall agree to the criteria for the execution and approval of the acceptance test phases.	SOR-06
SPR-21-02-02-008	During acceptance testing, the FRB shall meet no less than weekly. The FRB shall review all failures and other system issues that arise during each Pilot and SAT to assess their severity and impact on the completion of these test phases. The FRB shall establish a schedule for the resolution of identified issues.	SOR-06
SPR-21-02-02-009	Following each Pilot and SAT, the FRB shall make a recommendation on whether to approve or extend these test phases. Final discretion for the approval of acceptance testing and the granting of each phase's Acceptance shall reside with SEPTA.	SOR-06
SPR-21-02-02-010	Following Final Acceptance, the FRB shall continue to meet monthly for the remainder of the operations agreements. During this time, the FRB shall be responsible for reviewing system performance and settling any disputes around measurement and reporting against the established KPIs.	SOR-06

21.2.3 Failure Definition

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.

A non-chargeable failure is a malfunction caused by a condition external to the system component under consideration, and not included in a functional, environmental, test, or other requirement in

these specifications. A non-chargeable failure is not expected to be encountered during normal and correct operation of the system components.

Req #	Requirement	Assigned CDRL
SPR-21-02-03-001	A chargeable failure is a hardware or software malfunction where the delivered system devices or components 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.	SOR-06
SPR-21-02-03-002	A non-chargeable failure is a malfunction caused by a condition external to the system component under consideration, and not included in the functional, environmental, or other requirements in these specifications. A non-chargeable failure is not expected to be encountered during normal and correct operation of the AFC System.	SOR-06
SPR-21-02-03-003	Chargeable failures include, and are not limited to, the following: (1) A malfunction which prevents the system device or component from performing its designated function, or meeting the performance criteria, when used and operated under the environmental and operational conditions stated in these specifications; (2) A malfunction that might cause a threat to customers, employees, or others; (3) An occurrence that does not cause the system device or component to become entirely inoperable, but requires some form of maintenance attention to restore normal function; (4) Any occurrence where data is not successfully transmitted between elements of the system; (5) Planned software updates or fixes that adversely affect the operation or performance of the system; and (6) Scheduled maintenance or repair activities that adversely affect the operation or performance of the AFC System.	SOR-06
SPR-21-02-03-004	The following specific conditions, at minimum, shall be considered chargeable failures in any system devices delivered: (1) Software anomalies and bugs (every incident of a software anomaly or bug causing a malfunction shall be considered a failure); (2) Hardware failures that are not clearly a result of conditions outside the requirements of this specification; (3) Failures of mounting hardware; (4) Data storage failures, including those due to the disk space provided; (5) Partial or complete failures of a passenger display; (6) Failures to accurately read and/or process a card; (7) Failures to properly register and report any transactions in a timely manner; (8) Data download/upload failures; (9) Operation system, software, or security patch update failures; (10) Failures impacting the accurate and timely generation of reports; (11) Event or alarm transmission failures; (12) Unexpected shutdown of equipment; and (13) All maintenance requiring module replacements.	SOR-06

Req #	Requirement	Assigned CDRL
SPR-21-02-03-005	Non-chargeable failures include, and are not limited to, the following: (1) Mishandling of system devices or components; (2) Any failures caused by externally applied stress conditions outside of normal operating conditions and in excess of the requirements in these specifications; (3) Failures caused by incorrectly exercised operating, maintenance or repair procedures performed by SEPTA, where correct procedures have been delivered by the Contractor (failures resulting from any maintenance or repair performed by the Contractor shall be chargeable); (4) Failure caused by vandalism; (5) Communications failures beyond the control of the Contractor; (6) Downtime due to scheduled maintenance; (7) Heater or cooling adjustments; (8) Battery replacements; and (9) Dependent failures as a result of a nonchargeable failure.	SOR-06
SPR-21-02-03-006	Under mutual agreement, the FRB shall classify additional failures as chargeable or non-chargeable as required. All failures shall be considered relevant and chargeable unless determined to be non-chargeable by the FRB.	SOR-06
SPR-21-02-03-007	During Pilot and SAT, the FRB shall evaluate failures to establish their severity as critical or non-critical. Critical failures shall need to be resolved in order to approve the test phase, and in some cases, may result in an extension of the test phase.	SOR-06
SPR-21-02-03-008	The FRB shall be the sole arbiter of failures and their severity. For incidents declared failures, the FRB shall assign severities according to the following general guidelines, subject to modification by the FRB.	SOR-06
SPR-21-02-03-009	At a minimum, critical failures shall include incidents that produce a major or substantial business impact, or impact to normal operations, such as: (1) Non-trivial loss of revenue or expense; (2) Significant negative customer experience; (3) Limited or loss of access to a production application; (4) System operation at a degraded level, such that normal business operations cannot be conducted; and (5) Application or system experiencing continual or repeated issues.	SOR-06
SPR-21-02-03-010	At a minimum, non-critical failures shall include incidents that produce little or no business impact, or impact to normal operations, such as: (1) Negligible loss of revenue or expense; (2) Minor customer inconvenience; and (3) System operating at a degraded level such that normal business operations are minimally impacted.	SOR-06

21.3 Credit Assessment

Req #	Requirement	Assigned CDRL
SPR-21-03-001	Credits shall be assessed for a failure to meet any KPIs identified as having an associated credit.	SOR-06
SPR-21-03-002	A failure shall result in the percentage in the “Credit Assessed” column being applied to the full amount of the operations payment identified in the “Payment Impacted” column for the month of measurement.	SOR-06
SPR-21-03-003	A failure to meet the same KPI for [two (2) or more months] in a row shall constitute a persistent failure, and result in a multiplier being applied to the credit percentage.	SOR-06
SPR-21-03-004	The credit multiplier shall increase by a factor of [one (1) for each] month that a KPI is not met (e.g., if a KPI is not met [two (2) months] in a row, the credit shall be doubled in the second month; if a KPI is not met [three (3) months] in a row, the credit shall be tripled in the third month)	SOR-06
SPR-21-03-005	Successfully meeting a KPI shall end a persistent failure and reset the credit multiplier.	SOR-06
SPR-21-03-006	The total credit applied to an operations payment shall be capped at [25%] of the full amount of that payment in a calendar month. Credits shall not be carried over from month to month.	SOR-06
SPR-21-03-007	The Contractor shall be responsible for reporting on credits in the system performance reports and shall deduct credits directly from any invoices submitted to SEPTA.	SOR-06

21.4 Performance Reporting

Req #	Requirement	Assigned CDRL
SPR-21-04-001	The Contractor shall be responsible for reporting on performance against all KPIs on a monthly basis.	SOR-06
SPR-21-04-002	The Contractor shall create canned system performance reports that can be scheduled, run, viewed, and downloaded by SEPTA using the reporting system. These reports shall not count toward the custom reports to be defined by SEPTA.	SOR-06

Req #	Requirement	Assigned CDRL
SPR-21-04-003	At a minimum, the following reports shall be provided: (1) Device Reliability; (2) Device Accuracy; (3) Back-Office Component Accuracy; (4) Back-Office Component Availability; (5) Fare Media Read Rate; (6) API Response Rate; (7) Transaction Data Population Timeliness; and (8) Report Generation Timeliness.	SOR-06
SPR-21-04-004	The reports shall be generated without manual data entry by the Contractor wherever possible.	SOR-06
SPR-21-04-005	The reports shall include tables and graphical charts showing the current and historical performance of each device or component under measurement.	SOR-06
SPR-21-04-006	The reports shall include a calculation of any credits to be assessed in the current month based on current and prior performance.	SOR-06
SPR-21-04-007	The Contractor shall commence performance reporting during the Pilot and continue to perform this activity throughout the operations agreements.	SOR-06

21.5 Required Submittals

CDRL ID	Contractor Deliverable	Due
SOR-06	Performance Measurement Plan	Design Review

22. Contract Data Requirements List (CDRL)

This list is a summary table that provides a list of all CDRLs expected as part of this Project. The table lists all documents, their corresponding sections and the CDRL ID.

Section	CDRL ID	Contractor Deliverable
4.1, 4.3	PM-01	Project Management Plan (PMP)
4.4	PM-02	Equipment and Software Change Control Plan
4.2	NA	Meeting Agendas and Minutes
5.1, 5.2, 5.3	As needed	Common design requirements addressed as needed through SDDs (SDD-01 through SDD-30)

Section	CDRL ID	Contractor Deliverable
5.4	SDD-01	Licensing and Data Ownership Plan
5.5	SDD-02	ADA Compliance and Accessibility Plan
6.1, 6.2, 6.5	SDD-03	System Architecture Design
6.3	SDD-04	Open Architecture Design
6.4	SDD-05	Fare Payment Credential Design
6.6	SDD-06	Back-Office Hosting and Architecture Design
7	SDD-07	Payment Processing and Open Payment Design
8.1, 8.3, 8.4	SDD-08	System Security Design
8.2	SDD-09	Cybersecurity Management Plan (CMP)
9	SDD-10	Business Rules Design
10.1, 10.2	SDD-11	Fare Payment Validator Hardware and Software Design
10.1, 10.3	SDD-12	ADA Faregate Hardware and Software Design
10.1, 10.4	SDD-13	Fare Vending Machine (FVM) Hardware and Software Design
10.1, 10.5	SDD-14	Customer Service Terminal (CST) Solution Design
10.1, 10.6	SDD-15	Handheld Validation and Payment Solution Design
11.1	SDD-16	Back-Office Software Design Specification
11.2	SDD-17	Account-Based Transaction Processor (ATP) Design
11.3	SDD-18	Customer Relationship Management (CRM) System Design
11.4	SDD-19	System Monitoring and Management Application (SMMA) Design
11.5	SDD-20	Financial Management System (FMS) Design
11.6	SDD-21	Media Inventory Management System (MIMS) Design
11.7	SDD-22	Data Warehouse Design
11.8	SDD-23	Reporting System Design

Section	CDRL ID	Contractor Deliverable
11.9	SDD-24	Virtual Credential Management System Design
12.1, 12.2	SDD-25	Customer Website Design
12.1, 12.3	SDD-26	Institutional Website Design
12.1, 12.4	SDD-27	Fare Payment and Account Management Mobile Application Design
12.1, 12.5	SDD-28	Interactive Voice Response (IVR) Design
13	SDD-29	Retail Network Design
14	SDD-30	System Integration Design
15	SDD-31	Design Review Plan
16.1, 16.2	TEST-01	System Testing Plan
16.3	TEST-02	SEPTA Testing Facility Design
16.4	TEST-03	FACI Test Procedures and Reports
16.5	TEST-04	Integration Testing Inspection and Reports
16.6	TEST-05	Acceptance Test Plan Acceptance Test Plan and RMAT Test Procedures
16.6.2	TEST-06	System Acceptance Testing (SAT)s and Reports
17.1, 17.2	TRN-01	Training Plan
17.3	TRN-02	System Training Course Materials
17.4	TRN-03	System Manuals
17.5	TRN-04	Training Materials and Manuals for all Training Courses
18.1, 18.2, 18.3, 18.4, 18.5	INS-01	Installation Plan
18.6, 18.7, 18.8	INS-02	Installation Procedures
18.9	INS-03	Shop and As-Built Drawings
19	STR-01	Transition Plan

Section	CDRL ID	Contractor Deliverable
20.1	SOR-01	System Warranty
20.2	SOR-02	Software Maintenance Plan
20.3	SOR-03	Back-Office Operations Plan
20.4	SOR-04	Equipment Maintenance Plan
20.5	SOR-05	Network Operations Plan
21	SOR-06	Performance Measurement Plan (PMP)