

Schedule 5(f)

Fire Protection System (FPS)

California High-Speed Rail Authority



Standard Specifications

TSCC Specifications

SPEC-0010 – Fire Protection System (FPS)

Rev. 0.0

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1 INTRODUCTION

1.1 Scope of the Technical Specification

- 1.1.1 The scope of this Technical Specification is to define the Authority's Requirements for the Fire Protection System, hereinafter: FPS. Specific requirements relating to TSCC systems are listed in this document. Stations and facilities FPS are under shall stations contractor scope and facilities contractor scope.
- 1.1.2 The requirements are formulated using the following words and their meanings:
- **"Shall"**: Indicates mandatory requirement that must be strictly implemented; a waiver from a mandatory requirement is permissible only with approval of a design variance.
 - **"Should"**: Indicates a preferred course of action; a design variance is not required if it is not exercised.
 - **"Must"**: Indicates an obligation or a mandatory requirement.
 - **"May"**: Indicates a permissible course of action within the limits of the standards; a design variance is not required if it is not exercised.



2 REFERENCE STANDARDS AND DOCUMENTS

2.1 General

- 2.1.1 The TSCC Contractor shall apply the standards, guidelines, and specifications provided in this chapter for all stages of the design, test, manufacture, supply, delivery, assembly, installation, testing, commissioning, and training.

2.2 Design Guidelines

- 2.2.1 The latest version of the following Design Guidelines shall be applied:

ID	Code	Title
[R1]	Design Criteria Manual	Chapter 5 – Safety and Security
[R2]	Design Criteria Manual	Chapter 20 – Fire Protection and Alarm
[R2]	AREMA standards	Chapter 17 – High-Speed Rail Systems

TABLE 18 DESIGN GUIDELINES

2.3 TSI

- 2.3.1 There are no applicable TSIs for the FPS.

2.4 Standards

- 2.4.1 The TSCC Contractor shall fully consider and apply the following standards.

ID	Standard	Title
[R3]	EN 54	Fire detection and fire alarm systems
[R4]	EN 620-2:2012 +A1:2017	Fire safety – Safety signs
[R5]	ISO 3864	Safety colours and safety signs
[R6]	ISO 8421	Fire protection – Vocabulary
[R7]	ISO 13943	Fire safety – Vocabulary
[R8]	EN 15004	Fixed firefighting systems – Gas extinguishing systems
[R9]	EN 50121	Railway applications - Electromagnetic Compatibility
[R10]	EN 50122-1	Railway applications - Fixed installations - Electrical safety, earthing and the return circuit - Part 1: Protective provisions against electric shock
[R11]	EN 50124	Railway Applications - Insulation Coordination
[R12]	EN 50125	Railway Applications - Environmental Conditions for Equipment
[R13]	EN 50130-4	Alarm systems - Part 4: Electromagnetic compatibility - Product family standard: Immunity requirements for components of fire, intruder, hold up, CCTV, access control and social alarm systems
[R14]	EN 50173	Information technology - Generic cabling systems
[R15]	EN 50174	Information technology - Cabling installation



ID	Standard	Title
[R16]	EN 50346	Information technology -Cabling installation -Testing of installed cabling
[R17]	EN 61034	Measurement of smoke density of cables burning under defined conditions
[R18]	EN 62305	Protection against lightning
[R19]	IEC 61000	Electromagnetic compatibility (EMC)
[R20]	IEC 60331	Tests for electric cables under fire conditions
[R21]	IEC 60332	Tests on electric and optical fibre cables under fire conditions
[R22]	IEC 60529	Degrees of protection provided by enclosures (IP Code)
[R23]	IEC 60754	Test on gases evolved during combustion of materials from cables
[R24]	IEC 61643	Components for low-voltage surge protection
[R25]	ETSI EN 300 386	Telecommunication network equipment; Harmonized standard for ElectroMagnetic Compatibility (EMC) requirements
[R26]	ETSI EN 301 462	Human Factors (HF); Symbols to identify telecommunications facilities for deaf and hard of hearing people
[R27]	ISO 11064	Ergonomic design of control centers
[R28]	ISO 9001	Quality management systems — Requirements
[R29]	NFPA 72	National Fire Alarm and Signaling Code
[R30]	NFPA75	Standard for the fire protection of information technology equipment
[R31]	NFPA76	Standard for the fire protection of telecommunications facilities
[R32]	NFPA 130	Standard for Fixed Guideway Transit and Passenger Rail Systems
[R33]	NFPA 780	Standard for the Installation of Lightning Protection Systems
[R34]	NFPA 2001	Standard on clean agent fire extinguish systems
[R35]	2010 ADA	2010 ADA Standards for Accessible Design
[R36]	2025 California fire code	2025 California fire code
[R37]	UL2900 series	Cybersecurity for Network-Connectable Products
[R38]	TSA SD 1580/82-2022	Cybersecurity Requirements for High-Risk Rail Operators
[R39]	ANSI/ISA-18.2	Management of Alarms Systems for the Process Industries
[R40]	ANSI/UL 217	Standard for Safety Smoke Alarms
[R41]	ANSI/UL 2034	Standard for Single and Multiple station Carbon Monoxide Alarms

TABLE 19 LIST OF APPLICABLE STANDARDS

2.5 Other Documents

2.5.1 The following documents shall be referred:



ID	Document	Title
[R39]	Schedule 16	Scope of Work
[R40]	Schedule 5(a) SPEC-0005	Technical Specification Cybersecurity
[R41]	Schedule 3	Safety, Security and RAM Requirements

TABLE 20 OTHER DOCUMENTS

3 TERMS, DEFINITIONS, AND ABBREVIATIONS

3.1 Terms, Definitions and Abbreviations

- 3.1.1 All the terms, definitions and abbreviations are provided in Schedule 5(t) SPEC-0024 – Glossary of Terms, Abbreviations, and Definitions.



4 SYSTEM DESCRIPTION

4.1 Purpose of the FPS

- 4.1.1 The purpose of the FPS is to perform fire detection and notification of fire to the OCC operators and extinguish the fire within the California High Speed Rail infrastructure.
- 4.1.2 The FPS shall protect life, safeguard railroad assets, support operational continuity, mitigate fire risks, and ensure compliance with applicable fire safety regulations and standards.

4.2 FPS System Definition

- 4.2.1 FPS shall be an integrated system meant for reliable protection against fire hazards.
- 4.2.2 FPS shall be a state-of-the-art, software-controlled automatic system with necessary programming functions, annunciation, self-test and controls.
- 4.2.3 The control and monitoring of the FPS in station and facilities shall be performed by station management system and facilities management system, as designed by station and facilities contractors.
- 4.2.4 FPS in equipment housings and buildings shall be capable of being monitored and controlled from fire alarm display at OCC.

4.3 FPS System Operational Context

- 4.3.1 The mission of the FPS is to perform the following main functions: Fire Detection and Alarm and Fire Extinguishing.
- 4.3.2 The end users of the FPS are Authority personnel.
- 4.3.3 The FPS shall be operated according to the Authority's procedures.

4.4 Design Life

- 4.4.1 The Design Life requirements of the FPS shall be 30 years.
- 4.4.2 The TSCC Contractor shall provide an equipment lifecycle plan demonstrating how all FPS components will be maintained to meet the specified design life.
- 4.4.3 The TSCC Contractor shall ensure FPS components with shorter design lifespans shall be managed by scheduled technology refresh strategies and spares management plans.
- 4.4.4 The TSCC Contractor shall ensure that the manufacturers will be able to produce, supply and support FPS components, or provide replacements with equal or compatible technical specifications, for the entire lifetime required.



5 SYSTEM REQUIREMENTS

5.1 General Requirements

- 5.1.1 The FPS shall be designed in accordance with the requirements described in this specification, other relevant documents listed in Section 2 of this specification, other CHSR technical specifications and the Contract technical Requirements. In the event of any conflict between these documents, the requirements of this specification shall take precedence.
- 5.1.2 The FPS System shall be deployed in shelters and substations.
- 5.1.3 The TSCC Contractor shall perform the design, manufacturing, delivery, installation, inspection, test, commissioning, supply of necessary documentation, spare parts, special tools, and training for the FPS and its components in accordance with the relevant standards and regulations as it is stated in section 2.
- 5.1.4 Monitoring and control of the FPS in stations and facilities shall be performed by station building management systems and facilities building management systems, designed by the stations and facilities contractors.
- 5.1.5 The FPS for TSCC equipment shall be monitored and controlled through integration with ICSS at the OCC.
- 5.1.6 The FPS system shall be capable of triggering the CCTV system to display relevant CCTV views on the video wall or ICSS HMI in OCC.
- 5.1.7 The TSCC Contractor shall ensure compatibility and integration of the FPS, ICSS and the CCTV Systems for the monitoring and control.
- 5.1.8 The FPS protected areas (including raised floors and false ceilings, if applicable) shall be equipped with fire detection sensors.
- 5.1.9 Fire detection sensors shall be of addressable type and connected to the local control panel.
- 5.1.10 Fire detection sensor types shall be selected based on the characteristics of various occurrences and the area of application.
- 5.1.11 Each fire detection sensor shall have 2 levels of triggers, one to warn of a potential risk of fire and one to warn in case of a fire.
- 5.1.12 The fire detection sensors shall be selected based on the goal of earliest and safest detection possible, when choosing a fire detection sensor, the following criteria shall be considered.
 - What is to be detected (smoke / heat / flame).
 - Type of fire / fire development.
 - Environment / Surroundings.
 - Location.
 - Coverage area.
 - Acceptable degree of nuisance alarms.
- 5.1.13 The objective is to select the correct sensor for the appropriate application, to provide the earliest warning of fire without the risk of false alarm.
- 5.1.14 Positioning and selection of fire detection sensors shall be in strict compliance with applicable standards, legislations of the countries and manufacturer's instructions.
- 5.1.15 If required by Authority and applicable regulation, the Fire extinguishing system in TSCC equipment rooms and shelters shall be based on NOVEC™ 1230 extinguishing agent. NOVEC™ 1230 agent, which contains no chlorine or bromine, has an ozone depletion potential of zero.
- 5.1.16 Regardless of regulatory requirements, shelters and medium + low voltage power supply equipment rooms shall be equipped with a fire alarm system as a minimum requirement.



- 5.1.17 FPS cables shall be different color than other systems cables and separated from power cables.
- 5.1.18 The FPS components shall be arranged to be accessible and to facilitate the inspection, testing, loading and maintenance operations and to minimize interruption of protection.
- 5.1.19 The FPS equipment layout shall be standardized as much as practical.

5.2 Environmental Conditions Requirements

- 5.2.1 The TSCC Contractor's FPS system design shall be appropriate for, and resilient to, the local environmental and climatic conditions at each installation site. The equipment in shelters/building shall be compliant to the climatic class T2 defined in EN50125-3 according to environmental classification provided by EN 60721-2-1, concerning Temperature and Humidity.
- 5.2.2 All equipment shall be protected from damage or degradation in performance due to shock or vibration as experienced in the railway environment.
- 5.2.3 The IP rating of the outdoor equipment shall be at least IP65.
- 5.2.4 All outdoor equipment that is directly exposed to the sun shall be UV-protected.
- 5.2.5 All FPS equipment shall be suitable for their target environment and location to operate satisfactorily under all variations that may be met in normal usage.
- 5.2.6 All FPS equipment shall comply with WEEE and RoHS directives for electronic waste and hazardous substances, and a component take-back or recycling plan shall be provided.

5.3 Functional Requirements for FPS

- 5.3.1 Fire alarm activation shall be provided through fire detection sensors, manual call points and / or interface modules.
- 5.3.2 The alarms signal shall immediately be transmitted to the fire alarm display at OCC.
- 5.3.3 In the event of a fire incident, the FPS shall trigger the CCTV system to display the relevant CCTV view on the video wall or ICSS HMI in OCC.
- 5.3.4 Any alarm, trouble or supervisory indication shall not be reset until it has been acknowledged.
- 5.3.5 Alarms shall have priority over trouble signals. "Trouble" means a signal indicating a fault or impairment of the fire alarm system or a monitored circuit/component (e.g., device/loop fault, ground fault, power/battery failure, communications failure) per NFPA 72; Trouble shall not inhibit, delay, or mask any Alarm annunciation or action.
- 5.3.6 The local control panel shall receive all the signals from automatic fire detection sensors, audible/visual alarms, manual fire alarms (glass breaking type) and from fire suppression equipment.
- 5.3.7 All alarm handling and FPS features shall be controlled and monitored from the local control panel.
- 5.3.8 The local control panel shall monitor and control all the FPS equipment and shall forward the alarms and failure conditions (including loss of primary or secondary power) to the fire alarm display at the OCC.
- 5.3.9 The FPS shall also provide a rapid visual indication of the location of a fire incident and shall trigger the CCTV system to display the relevant CCTV view on the video wall or the ICSS HMI in the OCC.
- 5.3.10 The local control panels shall have trouble signal and alarm silencing switches and shall be equipped with a silence before reset feature to prevent accidental FPS reset during an alarm condition.
- 5.3.11 The OCC operator shall be capable of acknowledging the alarm, once it has been verified that the alarms and fire incident have been resolved.
- 5.3.12 The audible alarm shall be able to generate an appropriate sound level according to the applicable standards and legislation.
- 5.3.13 Measures to prevent false activation shall be developed by the TSCC Contractor.



- 5.3.14 The time delay between the pre-discharge alarm and the discharge shall allow personnel evacuation prior to discharge and shall not exceed the maximum disposure time for the agent.
- 5.3.15 In case of a failure of fire detection, the fire extinguishing container shall have the ability of manual operation.
- 5.3.16 The container shall be provided with necessary indicators of the agent quantity, any failure shall be reported to the local control panel and further to the fire alarm display at OCC and triggering the CCTV system to display relevant CCTV view.
- 5.3.17 Fire Protection System (FPS) shall be capable of integration with a Public Address and Customer information system (PACIS) to enable live or pre-recorded audio announcements during a fire incident. This integration allows the Operations Control Center (OCC) operator to issue instructions, provide information on the incident, and guide occupants to safety, facilitating faster and more organized evacuations.

5.4 Performance Requirements for FPS

5.4.1 Safety Requirements

- 5.4.1.1 FPS shall comply with the safety requirements defined in the System Safety Plan.
- 5.4.1.2 During the extinguishing process, all doors leading to the extinguishing area shall be closed (equipped with a puller) and with the possibility to open from the inside manually even when locked from the outside.
- 5.4.1.3 The doors shall be provided with signage in English and Spanish, which informs about the existence of an extinguishing system in the room and gives instructions to the personnel on how to act.
- 5.4.1.4 The safety precautions shall be ensured by the TSCC Contractor according to the applicable standards and legislation.

5.4.2 RAM Requirements

- 5.4.2.1 The TSCC Contractor shall be responsible for performing all the activities as specified in the Schedule 1.
- 5.4.2.2 FPS shall be operational 24/7 during operational service.
- 5.4.2.3 The FPS shall maintain an operational availability of 99.9% or greater over a 12-month period.
- 5.4.2.4 FPS shall maintain reliability of signal that provides a certainty of 99.99% that the received message is identical to the transmitted message.
- 5.4.2.5 The mean time to repair (MTTR) shall be less than 4 hours for critical components.

5.4.3 Secondary Power Operation

- 5.4.3.1 Operation on secondary power shall not affect the system and supervising signals including alarm, supervisory, and trouble signals and indications.

5.4.4 Detection Sensitivity

- 5.4.4.1 Each smoke detector shall comply with applicable standards such as ANSI/UL 217.
- 5.4.4.2 Each carbon monoxide alarm and detector shall meet the sensitivity testing and alarm thresholds of ANSI/UL 2034.

5.4.5 Alarm and Signal Detection

- 5.4.5.1 FPS shall transmit fire detection and alarm signal to the OCC within 5 seconds (95th percentile) and withing 8 seconds (99th percentile).
- 5.4.5.2 FPS shall transmit other alarm signals such as supervisory, trouble signal and indication to the OCC within 10 seconds (95th percentile).



- 5.4.5.3 FPS shall provide alarm information with priority coding such as fire alarm or faults to enable OCC operators to triage events effectively.
- 5.4.5.4 Alarm information shall include site ID, shelter location, type of alarm and timestamp.
- 5.4.6 **Alarm manageability and event logging**
 - 5.4.6.1 To avoid alarm flooding, the system alarm design shall follow guidelines in ANSI/ISA-18.2 standard.
 - 5.4.6.2 FPS shall be designed to minimize false alarms. Only actionable alarms are announced to operators; routine status/telemetry is logged but not announced.
 - 5.4.6.3 FPS shall log all fire events, faults, resets, and maintenance activities with timestamp accuracy of ± 1 second, synchronized to the NTS.
- 5.4.7 **Environmental**
 - 5.4.7.1 The FPS shall meet all performance requirements while operating under the conditions of the local environment.

5.5 Cybersecurity and Security Requirements

- 5.5.1 The FPS design, configuration, and operation shall be fully compliant with the CHSR Cybersecurity Technical Specification. All generic security controls, roles, logging, patching cadence, incident-response procedures, and assurance measures are established within the Authority's Cybersecurity Technical Specification.
- 5.5.2 The FPS shall have a System Owner who shall be accountable for cybersecurity risk ownership and mitigation.
- 5.5.3 The System Owner shall be responsible for ensuring that appropriate resources attend cybersecurity threat modelling and risk assessment activities.
- 5.5.4 Digital, IP-based communications shall be authenticated and protected from injection and tampering.
- 5.5.5 Interfaces between FPS systems and other systems, including EACS, HMIs, CCTV systems, ISCC, and others shall be co-engineered with the cybersecurity team in accordance with the CHSR Cybersecurity Technical Specification.
- 5.5.6 The FPS software and associated hardware shall support the protocols and technologies outlined in the Cybersecurity Specification; these capabilities shall be evaluation criteria and requirements in the procurement process.
- 5.5.7 The FPS software shall be securely configured by default by disabling all features and changing all default credentials prior to enabling required functionality during configuration.
- 5.5.8 Vendor hardening guidelines or other industry standards or benchmarks shall be implemented for software and hardware components procured for the FPS.
- 5.5.9 The FPS COTS software vendor shall be assessed to ensure that they take appropriate steps to mitigate supply chain vulnerabilities, will provide regular security patches for the duration of the products intended service life, has a vulnerability disclosure program, and follows secure software development practices in addition to other requirements outlined in the CHSR Cybersecurity Technical Specification.



6 INTERFACES REQUIREMENTS

6.1 General Requirements

- 6.1.1 Interfaces are classified as below:
- Third Party interfaces: interfaces between TSCC systems and systems provided by Third Party (excluding CHSR contractors).
 - External interfaces: interface between TSCC systems and systems provided by CHSR contractors (Civils Packages, Stations contractor, Facilities contractor, Solar PV and BESS contractors).
 - Internal interfaces between systems within the TSCC scope.
- 6.1.2 The TSCC Contractor shall develop the FPS design considering the identified external interfaces and internal interfaces to ensure the required functionalities and performance described in this specification for FPS.
- 6.1.3 The TSCC Contractor shall assess the identified interfaces and, if necessary, propose any additional interfaces required to ensure the functionalities and performance described in this specification for FPS.
- 6.1.4 The TSCC Contractor shall ensure the integration of the FPS with all identified third party, external and internal interfaces.

6.2 Third party Interface

- 6.2.1 The TSCC Contractor shall co-ordinate with the local fire authorities to include but not limited to planning approval.

6.3 External Interface – facilities contractor

- 6.3.1 The TSCC Contractor shall install the TSCC FPS equipment, as required and stipulated in this specification. The TSCC Contractor shall coordinate with the facility contractor to ensure integration with ICSS at the OCC, if required. The Facility Contractor, responsible for the construction of the OCC, shall install the FPS equipment that provides protection for the OCC facilities, and this work shall remain under the Facility Contractor's scope.

6.4 Internal Interface

- 6.4.1 **Interface with Network Timing System (NTS)**
- 6.4.1.1 FPS shall have a redundant interface to the Network Timing System (NTS) to retrieve a time reference.
- 6.4.2 **Interface with Digital Communications Network (DCN)**
- 6.4.2.1 FPS shall have a redundant interface to the DCN to allow monitoring and control of the FPS from the fire alarm display at OCC and triggering the CCTV system to display relevant CCTV view on the video wall or ICSS HMI in OCC.
- 6.4.3 **Interface with Electronic Access Control System (EACS)**
- 6.4.3.1 FPS shall have a redundant interface to the Electronic Access Control (EAC) system to release the lock of the doors on the emergency exit ways controlled by the local EACS control unit.
- 6.4.4 **Interface with Low Voltage Power System (LVPS)**
- 6.4.4.1 FPS shall have a redundant interface with the LVPS to ensure an uninterruptible power supply.
- 6.4.5 **Interface with Closed Circuit Television (CCTV), Integrated Control and Supervisory System (ICSS) and Passenger Announcement and Customer Information System (PACIS)**
- 6.4.5.1 FPS shall be interconnected with the CCTV System at the central level. In case of fire alarm, video related to the area where such the alarm is generated shall be highlighted to the operators in the OCC.



- 6.4.5.2 FPS shall have a redundant interface to the fire alarm display at OCC and trigger the CCTV system for the following functionality:
- 6.4.5.3 Equipment technical statuses (in service, in failure...) shall be transmitted to the fire alarm display at OCC and trigger the CCTV system to display the relevant CCTV view on the video wall or ICSS HMI in OCC.
- 6.4.5.4 Operation statuses (in maintenance, inhibited, operational, out of service, etc...) shall be transmitted to the fire alarm display at OCC and trigger the CCTV system to display the relevant CCTV view on the video wall or ICSS HMI in OCC.
- 6.4.5.5 Notifications, warnings and alarms shall be transmitted to the fire alarm display at OCC and trigger the CCTV system to display the relevant CCTV view on the video wall or ICSS HMI in OCC.
- 6.4.5.6 OCC operators shall be able to visualize and acknowledge FPS alarms. Acknowledge functions shall only be permitted once the incident has been verified and resolved.
- 6.4.5.7 The FPS shall interface with the Public Address and Customer Information (PACIS) system to enable integration with the Public Announcement system by OCC operator during a fire incident.
- 6.4.5.8 The TSCC Contractor shall:
- Support and provide any related equipment for the FPS alarm display in the OCC.
 - Coordinate with the ICSS for equipment arrangement at OCC, if applicable.
 - Provide support for ergonomic studies in the OCC control room, if applicable.
- 6.4.5.9 Events archiving and reports yielding shall be provided by the fire alarm display at OCC.
- 6.4.5.10 Authority personnel shall be able to visualize the equipment room/building layouts including location of the fire detection sensors.
- 6.4.5.11 The fire alarm display at OCC and triggering the CCTV system to display relevant CCTV view on videowall or ICSS HMI in OCC shall have a redundant interface for supervision of the Fire Protection System of the equipment room or building.
- 6.4.5.12 FPS shall provide an interface to the related cable containment to ensure proper pathway for the FPS cables.
- 6.4.6 **Interface with Enterprise Asset Management System (EAMS)**
- 6.4.6.1 The FPS shall provide static Asset Information and dynamic Asset Information to the EAMS for maintenance activities and asset lifecycle management activities.



7 MATERIALS, PRODUCT AND COMPONENTS REQUIREMENTS

7.1 General Requirements

- 7.1.1 All materials supplied by the TSCC Contractor shall conform to the requirements and test methods of the relevant EN standards or other applicable recognized standards. Refer to 2.4.
- 7.1.2 All materials supplied shall be of sufficient grade and quality to meet the design life requirements.
- 7.1.3 The FPS shall be complete with all equipment, supporting structures hardware, licenses, software, cabling and ancillary services which are useful for efficient operation of the FPS components. Such accessories and materials shall be deemed to be within the scope of this specification whether specifically mentioned or not.
- 7.1.4 All special tools and test equipment intended for configuration of the FPS shall be deemed to be within the scope of this specification whether specifically mentioned or not.

7.2 Software and Hardware Requirements

- 7.2.1 The FPS design shall be based on COTS (Commercial Off-The-Shelf), open architecture, and modular system architecture, with standard non-proprietary interfaces.
- 7.2.2 All cabling for FPS shall be designed, supplied, installed, and commissioned by the TSCC Contractor.
- 7.2.3 The FPS controllers shall have a redundant power supply.
- 7.2.4 The FPS devices shall be connected to the power supply of the facility where they are located (OCC, station, etc.).
- 7.2.5 The electrical cables, control and communication cables for FPS shall be fire-rated and comply with the relevant EN standards or other applicable recognized standards. Refer to 2.4.
- 7.2.6 The FPS controllers at each shelter (if applicable) shall be connected to the Digital Communication Network (DCN) to allow monitoring and control by the OCC operator. The interface connections and protocols shall be compatible with the relevant EN/IEEE standards or other applicable standards, as coordinated and agreed with the TSCC Contractor.
- 7.2.7 In cases where a network switch is required by the FPS to establish a connection through the DCN, a minimum of a Level 2 managed network switch shall be provided, fully compliant with the relevant EN/IEEE standards.
- 7.2.8 To avoid conflicts in network configuration with the DCN provided by the TSCC Contractor, the FPS IP configuration scheme shall be fully coordinated with, and formally approved by, the TSCC Contractor.

7.3 EMC Requirements

- 7.3.1 The FPS shall be fully immune and protected from any Electromagnetic Interference (EMI) with traction power, multi-tubular cabling, and Radio Frequency Interference (RFI). The EMI emissions shall be mitigated in accordance with applicable standards (EN 50122 or equivalent)



8 TOLERANCES

Not applicable to FPS.



9 SCOPE OF SUPPLY AND DELIVERY

9.1 General Requirements

9.1.1 The TSCC Contractor shall supply and deliver all components related to this specification.

9.2 Specific Requirements

9.2.1 The FPS scope of supply and delivery shall include (but is not limited to):

- Local control panels.
- Mimic panels.
- Fire detection sensors.
- Manual call points.
- Sounders with flashers.
- I/O modules.
- Agent storage containers.
- Actuators.
- Discharge piping.
- Discharge nozzles.
- Valves, gaskets, O-rings, sealants and other valve components.
- Software architecture, including a full definition of protocols used.
- Network switching.
- Management System.
- Fire alarm workstation in OCC, if applicable.
- All HW/SW licenses required.
- Auxiliary elements, supporting structures, specials tools and test equipment
- Spare parts.



10 MANUFACTURING

10.1 General Requirements

10.1.1 General manufacturing requirements are defined in the Schedule 16 Scope of Work.



11 INSTALLATION AND INTEGRATION

11.1 General Requirements

11.1.1 General installation and integration requirements are defined in the Scope of Work and Schedule 3.



12 TESTING & ACCEPTANCE

12.1 General Requirements

12.1.1 General testing and acceptance requirements are defined in the Scope of Work and Schedule 3.

12.2 Specific Requirements

12.2.1 The TSCC Contractor shall ensure the integrity of FPS functionality through the OCC operator in the event of a fire alarm. This shall include:

- Display of the fire alarm condition on the fire alarm display monitor.
- Automatic triggering of CCTV views of the related CCTV view on the video wall or ICSS HMI in OCC.
- Integrate with the Passenger Announcement and Customer information system (PACIS) and allow the PACIS system to issue public announcements, either pre-recorded or live announcements by the OCC operator, during fire incidents.



13 SUBMITTALS

13.1 General Requirements

13.1.1 General submittal requirements are defined in the Scope of Work.



14 QUALITY MANAGEMENT

14.1 General Requirements

14.1.1 General quality management requirements are defined in the Agreement and associated Schedules.



15 ADDITIONAL INFORMATION REQUESTED

15.1 General Requirements

- 15.1.1 In addition to the mandatory requirements outlined in this specification, the Authority reserves the right to request from the TSCC Contractor information pertaining to the performance of proposed or supplied elements under similar service conditions, with particular emphasis on railway management aspects which may influence FPS subsystem reliability, availability, and maintainability characteristics.



16 LOGISTICS

16.1 General Requirements

16.1.1 General logistics requirements are defined in the Agreement.

