

AIR TRAFFIC AND NAVIGATION SERVICES COMPANY SOC. LTD



REQUEST FOR PROPOSAL: ATNS/RFP

APPOINTMENT OF THE SERVICE PROVIDER FOR THE DESIGN, SUPPLY, DELIVERY, INSTALLATION, INTEGRATION, TESTING, COMMISSIONING, CERTIFICATION AND MAINTENANCE AND SUPPORT OF A FULLY INTEGRATED FIRE DETECTION AND SUPPRESSION SYSTEM (“FDSS”) FOR THE IDENTIFIED SITES AT KING SHAKA INTERNATIONAL AIRPORT (FALE) ATNS OPERATIONS CENTRE AND BLUFF RADAR SITE.

Volume 1A Appendix B

TECHNICAL SPECIFICATIONS, PROJECT MANAGEMENT AND LOGISTIC SUPPORT

October 2026

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LIST OF ABBREVIATIONS AND ACRONYMS

ACSA	Airports Company South Africa
ATM	Air Traffic Management
ATNS	Air Traffic and Navigation Services
C&E	Cause and Effect
CDRL	Contract Data Requirements List
CNS	Communication, Navigation, and Surveillance
CoC	Certificate of Compliance
COTS	Commercial Off-The-Shelf
EMC	Electromagnetic Compatibility
FACP	Fire Alarm Control Panel
FALE	King Shaka International Airport
FD	Fire Detection
FDS	Fire Detection And Suppression
FDSS	Fire Detection and Suppression System
HMI	Human Machine Interface
HVAC	Heating, Ventilation, and Air Conditioning
ICAO	International Civil Aviation Organization
ILSP	Integrated Logistic Support Plan

ISO	International Organisation for Standardisation
ITC	Installation, Transition and Commissioning
LCD	Liquid Crystal Display
LRUs	Line Replaceable Units
NEMA	National Environmental Management Act
OEM	Original Equipment Manufacturer
OH&S	Occupational Health and Safety (Act)
OHS	Occupational Health and Safety
PA	Public Address
PBU	Period of Beneficial Use
P, H, S & T	Packaging, Handling, Storage and Transportation
RAM	Reliability, Availability and Maintainability
SANS	South African National Standard(s)
SANPC	South African National Petroleum Company
SAT	Site Acceptance Test
SAQCC	South African Qualifications and Certification Committee
SHE	Safety, Health and Environment
USB	Universal Serial Bus
UPS	Uninterrupted Power Supply
WBS	Work Breakdown Structure

GENERAL INSTRUCTIONS TO BIDDERS

The Bidder shall submit all responses, diagrams, documentation and drawings according to the GENERAL INFORMATION AND INSTRUCTIONS TO BIDDER'S document and in the English language.

ALL RESPONSES TO THE REQUIREMENTS IN THIS DOCUMENT SHALL BE PROVIDED AS FOLLOWS:

BIDDERS SHALL RESPOND IN FULL TO EACH ITEM AND REFERENCES (CHAPTER, SECTION, PAGE NUMBER, PARAGRAPH NUMBER) TO DOCUMENTS AND RELEVANT INFORMATION SUPPORTING THE RESPONSES SHALL BE INDICATED.

Responses that are not clear or inadequate, or the lack thereof shall be interpreted as "**Not Compliant**". Bidders shall ensure that each response correctly addresses the requirement stated. Responses not addressing the requirement of the specific paragraph shall be interpreted as "**Not Compliant**".

Chapter 1 – Introduction

INTRODUCTION

Background

Air Traffic and Navigation Services (ATNS) has a mandate to provide Air Traffic Management (ATM) solutions and associated services on behalf of the State in accordance with the International Civil Aviation Organization (ICAO) standards, recommended practice as well as the South African Regulations and Technical Standards. The provision of fully functional and compliant general electrical and mechanical support systems, including robust fire detection and suppression, across all listed sites is critical to ensure minimal downtime of the Communication, Navigation, and Surveillance (CNS) systems. Consequently, the implementation and maintenance of these systems are essential for ensuring the continuous and reliable operation of all CNS infrastructure, while simultaneously fostering a safe and conducive working environment for personnel, in line with the OH&S Act.

The Fire Detection and Suppression System (FDSS) is a critical safeguard for ATNS's Communication, Navigation, and Surveillance (CNS) infrastructure and personnel. The system is intended to provide the early detection of fire hazards through a coordinated network of strategically positioned devices, including smoke detectors, heat detectors, and flame detectors. Upon detection of a potential fire event, the FDSS is required to initiate an immediate and appropriate response through the activation of suppression measures suited to the specific protected environment. Such measures may include gaseous suppression systems for areas containing sensitive electronic equipment, thereby limiting collateral damage and supporting rapid restoration of operations, as well as sprinkler-based systems for areas where such protection is more appropriate. The FDSS further interfaces with other building systems to enable automatic control actions, including the shutdown of Heating, Ventilation, and Air Conditioning (HVAC) systems to limit smoke migration, as well as the activation of alarm systems to alert personnel. Regular inspection, testing, and maintenance of the FDSS are essential to ensure ongoing reliability and operational readiness, thereby supporting a rapid and effective response to fire incidents and maintaining continuity of critical CNS operations.

System description

Fire detection and suppression system comprises of different components that are designed to detect, alert and extinguish fires. The system includes:

- (a) Fire detection systems – these systems include heat, smoke and flame detectors.
- (b) Fire suppression systems – most used suppression systems include clean gas
- (c) Control panels and alarms – The control panel is used for receiving information from various detectors and triggers suppression systems and alarms where necessary.
- (d) Public address (PA) system – Used for announcements in the event of emergency.

Figure 1 below illustrates the FDSS architecture, comprising an integrated network of fire detection devices and fire suppression systems. The detection subsystem includes smoke detectors for early warning, heat detectors for areas in which smoke detection may be less reliable, and manual call points to enable immediate human intervention. These devices are connected to a central Fire Alarm Control Panel (FACP), which serves as the primary control and monitoring unit of the FDSS. The FACP receives and processes signals from the field devices and, where required, activates alarm notification appliances, including audible and visual alarms, to alert occupants and initiate pre-programmed control actions. Such actions may include the activation of fire suppression systems, which may comprise clean agent, dry powder, or other suppression media, depending on the application and protected area. The clean agent suppression system is particularly suitable for the protection of sensitive electronic equipment. It typically consists of agent storage cylinders, a piping distribution network, and discharge nozzles, through which a non-conductive extinguishing agent is released to suppress fire while minimising damage to equipment.

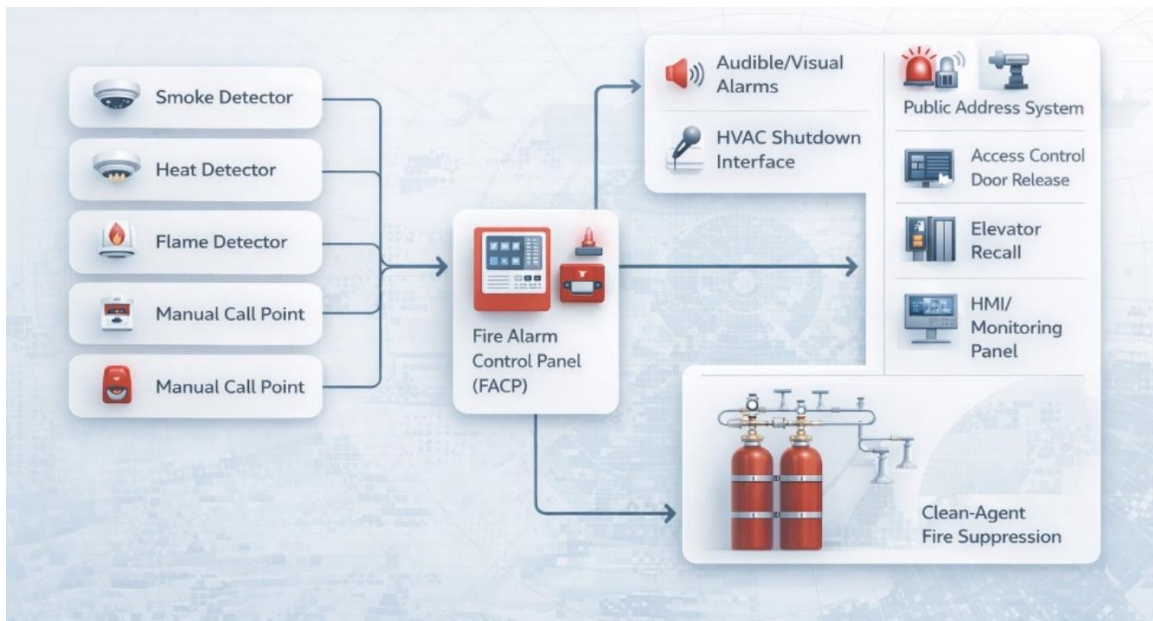


Figure 1: Fire detection and suppression system architecture

Scope of Work

The Contractor shall provide a complete turnkey solution for the design, supply, delivery, installation, integration, testing, commissioning, certification and maintenance of a fully integrated Fire Detection and Suppression System (FDSS) for the identified sites as follows:

*FDS- fire detection and suppression

*FD- fire detection only

Table 1: Site requirements

Site	Sub-site	Description	New/ Replacement	Site Size
ATNS Operations Centre, King Shaka International Airport (FALE) (29°36'25.9"S 31°06'44.5"E)	Approach radar hall	FDS	Replacement	226.8m ³ (including ceiling)
	Equipment Room A (ground floor)	FDS	Replacement	295.68m ³ (including ceiling)
	Equipment Room B (14 th floor)	FDS	Replacement	187.95m ³
	Control Tower shaft (staircase area)	FDS	Replacement	450m ³
	Under floor (ground floor passage)	FDS	Replacement	36.5m ³
	Under floor (Approach radar hall)	FDS	Replacement	51.44m ³

	Under floor (Equipment room A)	FDS	Replacement	67.06m ³
	Under floor (Equipment room B)	FDS	Replacement	44.23m ³
	Under floor (Control Tower cab)	FDS	Replacement	236.7m ³
	UPS room	FDS	Replacement	97.5m ³
	Main Building	FD	Replacement	5500m ³
Bluff Radar Site (29°58'53.0"S 30°57'56.8"E)	Equipment room, motor room,	FDS	Replacement	320m ³
	Generator room	FDS	New	52.7m ³

The scope shall include but not be limited to:

- a. Detailed design and engineering of site-specific systems.
- b. The decommissioning and environmentally compliant disposal of the identified existing FDSS.
- c. Supply and delivery of all FDSS components including field devices, cabling, containment, control panels (where applicable) and other supporting infrastructure.
- d. Installation and integration of the FDSS with existing infrastructure (HVAC system, elevators, access-controlled doors, power, etc.)
- e. Civil and electrical works required for installation.
- f. Testing, commissioning and certification.
- g. Training of ATNS employees on the operation of the new systems.
- h. Provision of maintenance and support services for 10 years, including annual servicing of existing firefighting equipment.

Chapter 2 – Fire Detection and Suppression System Specifications

FIRE DETECTION AND SUPPRESSION SYSTEM REQUIREMENTS

General requirements

Compliance with Standards and Regulations

- A. The FDSS shall be fully compliant with the latest editions of the following standards and regulations as a minimum:
 - a. Fire Engineering best practice principles.
 - b. SANS 10400-T- Fire Protection: provides minimum requirements for fire protection in buildings, including occupancy classification, fire detection coverage and system performance.
 - c. SANS 10139- Fire Detection and Alarm Systems for Buildings: Covers system design, installation practices, zoning, alarm annunciation, commissioning, inspection, testing and maintenance requirements.
 - d. SANS 14520- Gaseous Fire-Extinguishing Systems: Governs the design, installation, and testing of clean agent suppression systems, including agent concentration, discharge time, enclosure integrity, and safety considerations.
 - e. SANS 1186-1- Symbolic safety signs: Specifies requirements for safety signage, including fire equipment identification, evacuation signage, and hazard warnings.
 - f. ISO 7240 series- Fire detection components.
 - g. Occupational Health and Safety (OHAS) Act, No. 85 of 1993: All work shall comply with OHSA requirements, including risk assessments, safe work procedures, and personnel safety.
 - h. Any other applicable local authority regulations, aviation safety requirements and international best practices.
- B. All equipment shall be appropriately third-party certified and installed by manufacturer-accredited personnel.
- C. The Contractor shall ensure that all certifications, approvals and compliance documentation are provided at site handover.

Removal and Disposal of Existing Systems

- A. All identified existing, obsolete, or non-functional FDSS for sites listed as replacements in Table 1 shall be safely decommissioned, removed and disposed of by the Contractor.

- a. Removal shall include (but not limited to) all associated components such as detectors, control panels, piping, cylinders, cabling, containment and mounting hardware.
- b. The Contractor shall ensure that removal activities do not damage existing infrastructure or interfere with operational systems.
- c. Disposal shall be conducted strictly in accordance with ATNS environmental management procedures and applicable waste disposal legislation.
- d. Hazardous materials (if any) shall be identified, handled, and disposed of in accordance with relevant safety and environmental regulations.
- e. Recyclable components shall be appropriately recycled.
- f. The Contractor shall provide disposal certificates and records as proof of compliant disposal.

Supply of Complete System

- A. The Contractor shall design, supply, deliver, install, integrate, test, commission, certify and maintain a complete, fully functional and integrated fire detection and suppression system (FDSS) solution for the identified sites. The system shall be provided as a fully operational turnkey solution. The system shall include all electrical, mechanical, and control components necessary for full operation, whether explicitly listed or not. This includes but is not limited to:
 - a. Fire alarm control panels and gas suppression system panels.
 - b. Detectors (smoke, heat, aspirating, or multi-sensor as required).
 - c. Manual call points.
 - d. Audible and visual alarm devices.
 - e. Suppression agent cylinders, discharge nozzles, and associated mounting solutions.
 - f. Piping and distribution networks.
 - g. Control valves and actuators.
 - h. Power supplies and battery backup systems (where applicable).
 - i. Interface modules for integration with existing systems (where applicable) including all control relay modules.
 - j. Safety signage.
 - k. Cables, conduit and connectors.
 - l. Electrical consumables.
 - m. Mounting hardware and enclosures.

- B. The system shall be designed for fail-safe operation, high reliability and minimal false alarm rates.

Operational Continuity

- A. The design and implementation of the FDSS shall ensure no disruption to critical aviation and operational systems.
 - a. Installation work shall be carefully planned and coordinated to minimize downtime.
 - b. Where shutdowns are unavoidable, they shall be scheduled during approved maintenance windows.
 - c. Temporary fire protection measures shall be provided where systems are offline.
 - d. The Contractor shall ensure electromagnetic compatibility (EMC) and avoid interference with sensitive aviation and communication equipment.
 - e. All cabling and equipment shall be installed to prevent signal interference and maintain system integrity.

Use of Commercial Off-The-Shelf Components

- A. All FDSS components shall, as far as practicable, be based on commercially available, proven and supported products.
 - a. Equipment shall be sourced from reputable manufacturers with established local support and spare parts availability.
 - b. Proprietary or highly specialised components shall be avoided unless justified and approved.
 - c. The system shall allow for future scalability, upgrades and ease of maintenance.
 - d. Standardisation across sites is preferred to simplify operator training, use, and system maintenance.

Environmental Conditions

- A. The Contractor shall ensure that the FDSS, including all associated components, is designed, supplied, and installed to operate reliably under the specified environmental conditions without degradation in performance. All equipment shall, as a minimum, comply with the environmental parameters outlined in Table 3 below.

Table 2: Applicable environmental conditions

No.	Parameter	Requirement
1	Temperature	-10° to +45°C
2	Relative Humidity	10% to 90% (non-condensing)
3	Ingress Protection rating	Minimum IP65
4	Mechanical impact protection rating	Minimum IK08

- B. Equipment shall be suitably rated and protected to ensure long-term reliability and resistance to corrosion, dust, and moisture ingress.

Power Requirements

- A. The FDSS shall be connected to the existing electrical distribution network at each site. All circuits shall be clearly labelled and identified in accordance with applicable standards.
- B. All electrical installations and associated works shall comply fully with the requirements of SANS 10142-1: The Wiring of Premises- Part 1: Low Voltage Installations.
- C. The Contractor shall provide adequate surge protection to safeguard the FDSS against transient over-voltages, lightning-induced surges, and switching disturbances
- D. A complete earthing and bonding system shall be provided for all FDSS equipment and associated infrastructure. The entire FDSS electrical installation shall be properly earthed in accordance with SANS requirements and good engineering practice. All earthing conductors shall be clearly identified and securely terminated.
- E. No single point of failure shall result in total system loss.
- F. All electrical modifications and installations associated with the FDSS shall be certified. A valid Electrical Certificate of Compliance (CoC) shall be issued upon completion of the works.

Identification and Labelling

- A. All FDSS components and associated infrastructure shall be clearly and permanently identified and labelled according to applicable standards. Labelling shall include:
- Cable identification at both ends;

- Device and module identification;
 - Panel and enclosure labelling;
 - Circuit and zone identification.
- B. A zone chart and cause-and-effect diagram shall be displayed at or near the FACP.
- C. Labels shall be durable, legible, and resistant to environmental degradation.

System Lifespan

- A. The FDSS shall be designed and specified to achieve a minimum operational lifespan of not less than 10 years for electronic components, and not less than 20 years for mechanical components.
- B. The Contractor shall ensure that all equipment selected is supported by the Original Equipment Manufacturer (OEM) for the duration of the specified lifecycle, including availability of spares and technical support.

System Housing

- A. All FDSS equipment shall be housed within robust enclosures designed to provide protection against:
- Environmental contamination (dust, moisture, corrosion);
 - Mechanical damage;
 - Unauthorized access.
- B. Enclosures shall be suitable for the installation environment and shall meet or exceed the specified IP and mechanical protection ratings.
- C. Where required, enclosures shall incorporate:
- a. Lockable access provisions
 - b. Adequate ventilation or thermal management
 - c. Cable entry protection to maintain enclosure integrity

System functions and performance requirement

Fire Detection System

System Architecture and General Requirements

- A. The fire detection system shall be a fully addressable analogue intelligent system providing continuous monitoring of all protected areas.
- B. The system shall utilise detection technologies appropriate to the environmental conditions of the area, including but not limited to:

- Photoelectric smoke detectors;
 - Multi-criteria detectors;
 - Heat detectors;
 - Aspirating smoke detection systems in high-sensitivity or high-airflow areas.
- C. All detection devices shall be resistant to:
- Electromagnetic interference;
 - Dust and airborne contamination;
 - Airflow-induced dilution effects.
- D. The system shall be designed with loop redundancy such that a single fault will not result in loss of detection coverage to any protected zone.

Zoning and Detection Coverage

- A. The system shall be fully zoned in accordance with site layouts. Zoning shall include:
- a. Physical zoning aligned with facility rooms/ sections;
 - b. Logical/ software zoning within the FACP.
- B. Each loop shall not exceed manufacturer recommended device limits, and loop loading calculations shall be submitted for approval.
- C. No single fault shall disable more than one detection zone.

Detection Performance

- A. The system shall transmit alarm conditions to the FACP within the maximum response times defined by applicable standards and hazard classification.
- B. The system shall meet the following minimum performance criteria:
- a. Early warning detection capability in high-risk areas.
 - b. Alarm transmission delay: as close to real time as technically feasible, not exceeding industry thresholds.
 - c. Immediate/ real time fault detection and reporting.
 - d. Detector sensitivity shall be field adjustable under authorised access control only.

Alarm logic and Cause- and-Effect

- A. The system shall support configurable alarm logic including but not limited to:
 - a. Single detector alarm initiation
 - b. Cross-zone verification for suppression release
 - c. Pre-alarm and confirmed alarm states
- B. A single-stage fire alarm system shall be implemented, ensuring that upon activation, a general alarm condition is initiated and broadcasted throughout the entire protected building or facility.
- C. The Contractor shall develop a full Cause and Effect (C&E) matrix for approval prior to commissioning. The approved C&E matrix shall be fully programmed into the system and shall form part of the contractual baseline configuration. The C&E matrix shall define all system interactions including but not limited to:
 - Fire detection initiation;
 - Audible and visual alarm activation;
 - HVAC system and/or air-conditioning units shutdown sequencing;
 - Access control door release;
 - PA system activation;
 - Fire suppression system release (where applicable).

System Functional Requirements

- A. Upon activation of any fire detection device, manual call point, or fire suppression system, the system shall perform the following minimum functions:
 - a. Activate all audible alarm devices throughout the protected premises.
 - b. Activate visual alarm devices indicating alarm status and evacuation requirement.
 - c. Display clear indication of the alarm origin in terms of zone/ location on the FACP and associated displays.
 - d. Interface with HVAC systems and/ or air-conditioning units to automatically shut down air handling units serving the affected zone to control smoke propagation as mandated by SANS 10400-T.
 - e. Interface with access-control systems to unlock all access-controlled doors.

- f. Interface with elevator systems to activate elevator recall (immediately stop accepting normal calls, return to the ground level, open doors and remain out of service).
 - g. Activate the PA system (FALE only) to broadcast evacuation instructions.
 - h. Activate the fire suppression system (where applicable).
 - i. Log all events with time-stamped records in the system event memory.
- B. All audible alarm devices shall remain active continuously once triggered until manually silenced by authorised personnel from the designated control interface.
- C. System reset shall only be possible after:
- a. Confirmation of fault clearance.
 - b. Authorised control room intervention.
 - c. Completion of evacuation and safety verification procedures.
- D. Alarm silence and reset functions shall be strictly access controlled.
- E. All HVAC, air-conditioning, elevator, access control and PA systems shall return to normal operation once the alarm is reset.

Fire Suppression System

Design Requirements

- A. A clean agent gaseous fire suppression system shall be installed in all designated equipment rooms and other high-risk protected areas as defined in the site-specific requirements.
- B. The system shall include but not be limited to:
- Agent Cylinders;
 - Discharge valves;
 - Pipe network and nozzles;
 - Control panels and interfaces;
 - Abort and release stations;
 - Pressure relief systems (where required).
- C. The system shall be designed, engineered and installed to meet the following minimum performance requirements:
- a. Achieve and maintain the required extinguishing agent concentration throughout the protected enclosure, in accordance with the applicable design standard and hazard classification.

- b. Maintain a minimum agent hold time of not less than ten (10) minutes, or as otherwise required by the applicable standard, to prevent fire re-ignition or reflash.
 - c. Ensure full discharge of the extinguishing agent is completed within a maximum of ten (10) seconds, unless otherwise specified by the governing standard for the selected agent.
 - d. Provide uniform distribution of the extinguishing agent within the protected space, considering room geometry, obstructions, ventilation, and equipment layout to ensure effective fire suppression.
 - e. Comprehensive hydraulic flow calculations, including pipe sizing, nozzle selection, flow rates, and pressure losses, shall be prepared by the Contractor and submitted for review and approval prior to installation. All calculations shall be certified and demonstrate compliance with the applicable codes, standards, and manufacturer design criteria.
- D. The fire suppression system shall be fully automatic and shall discharge the extinguishing agent upon confirmed fire detection, based on approved detection logic (including cross-zoning where applicable), and in accordance with the applicable hazard classification and the requirements of SANS 14520 and SANS 10400-T.
- E. The gaseous suppression system shall, as a minimum, comply with the following requirements:
- a. The extinguishing agent shall be safe for use in occupied spaces and shall not cause oxygen depletion hazardous to personnel.
 - b. The system shall be a low-pressure design, suitable for safe and reliable operation.
 - c. The extinguishing agent shall be clean and shall not obscure visibility during discharge.
 - d. The system shall require minimal storage space for agent containers and associated equipment.
 - e. The extinguishing agent shall be non-corrosive, electrically non-conductive, and leave no residue after discharge.

Enclosure Integrity

- A. The Contractor shall ensure that all protected enclosures are suitable for total flooding fire suppression applications. This shall be verified through the execution of enclosure integrity testing such as door fan testing or an equivalent approved method. The testing shall confirm that each enclosure can retain the extinguishing agent at the required concentration and hold time in accordance with the system design criteria, relevant international standards and manufacturer specifications.
- B. Where leakage paths are identified during testing, the Contractor shall be responsible for sealing all such leakage points using approved materials and methods. Following remedial works, the enclosure shall be re-tested to confirm that the specified retention time is achieved. The final enclosure performance shall ensure that the extinguishing agent concentration is maintained for the minimum required duration to prevent fire re-ignition and reflash, thereby ensuring the effectiveness and reliability of the fire suppression system.

Activation Logic

- A. The system shall activate upon confirmed fire detection using cross-zone logic. The sequence shall include:
 - a. Pre-alarm;
 - b. Confirmed alarm;
 - c. Pre-discharge warning;
 - d. Time delay (30-60 seconds);
 - e. Agent discharge.

Safety Requirements

- A. The system shall include pre-discharge warning capability.
- B. Manual abort and emergency override stations shall be installed at designated control points.
- C. The system shall ensure safe evacuation time prior to any suppression release event.
- D. All extinguishing and alarm actions shall prioritise occupant safety and controlled evacuation.

Monitoring

- A. The system shall continuously poll and monitor the status of all connected field devices and subsystems, with the following as a minimum:
 - Device status;
 - Loop integrity;
 - Power supply status;
 - Communication faults;
 - Gas suppression cylinder pressure;
 - Gas suppression system readiness;
 - Fault conditions;
 - Gas suppression discharge status.
- B. The system must be addressable, allowing the control panel to pinpoint the exact device, type and location of a fault.
- C. All detected faults must be immediately displayed on the main control panel with both visual and audible warnings.
- D. All faults/ events shall be logged and reported. The system shall store event logging of at least 1000 events.
- E. The panel shall poll all devices such that near-instantaneous fault detection is achieved.

System Integration and Interfaces

- A. The fire detection and suppression system shall be a fully integrated system, with all detection, control and suppression components operating as a unified and coordinated solution.
- B. The FDSS shall be capable of integration with the following building systems where applicable:
 - HVAC system and/ or air-conditioning units;
 - Access control system;
 - Elevator control system and
 - PA systems and emergency voice evacuation systems.

Integration shall be achieved through appropriately rated control relay modules and/ or digital communication interfaces as required.

 - ACSA FACP (FALE ATNS Operations Centre only)

- C. System integration shall be supported using standard, open, industry-recognised communication protocols including, where applicable:
- BACnet;
 - Modbus;
 - TCP/IP;
 - Dry contact interfaces.
- D. The FDSS shall be equipped with:
- a. An ethernet interface for IP-based communications and system integration and
 - b. A minimum of two (2) of the following physical serial or bus interfaces:
 - RS-485
 - RS-422
 - RJ-45
 - USB
- All communication interfaces shall be suitable for continuous operation and compatible with the system's integration and monitoring requirements.
- E. IP-based interfaces shall support network segregation and access control. The FDSS shall not rely on external IT infrastructure for core fire protection functionality. Cybersecurity measures shall prevent unauthorised configuration or control of life-safety functions.
- F. The FDSS shall support time synchronisation to ensure accurate event logging across integrated systems.
- G. All system integrations and interfaces shall be fully tested during commissioning. Acceptance testing shall demonstrate correct operation under normal, fault and alarm conditions with results documented for approval.
- H. The system shall include provision for future expansion including spare input/output capacity and address space for additional interfaces without requiring replacement of the main control equipment.

Sub-system functions

Software

- A. The FACP software programming shall support control logic for suppression release, including but not limited to cross-zoning, coincidence detection, and configurable time delays.
- B. The software shall support configurable cause-and-effect logic to control all associated alarm, suppression, shutdown, and interface functions in accordance with the approved cause-and-effect matrix.
- C. The software shall distinguish between alarm, fault, supervisory, and disable/isolation conditions and process each in accordance with predefined priority rules.
- D. The software shall support supervised monitoring of field devices, communication links, and release circuits. Any abnormal condition shall generate an identifiable fault indication.
- E. All configuration data, system settings, and programmed logic shall be stored in non-volatile memory and retained in the event of total power loss.
- F. The software shall provide event logging with time and date stamps for all alarms, faults, supervisory events, system resets, and user actions.
- G. Access to programming, configuration changes, and system resets shall be protected by password or key-based authorisation with multiple access levels.

Human-Machine Interface

- A. The FACP Human-Machine Interface (HMI) shall include a clear, backlit LCD or graphical display capable of displaying system status, fault conditions, and alarm messages in clear, descriptive text.
- B. The HMI shall provide an immediate visual alarm signal (e.g. flashing light) and a persistent, clear text message identifying the device and its physical location.
- C. The HMI shall provide distinct visual and audible indications for alarm, fault, and supervisory conditions in accordance with applicable fire alarm standards.
- D. Alarm and fault messages shall be presented in plain language and shall not rely solely on numerical codes or abbreviations to convey system status.
- E. The HMI shall allow authorised operators to acknowledge, silence, reset, and isolate system functions in a controlled and logged manner.
- F. User navigation shall be intuitive and permit rapid access to active events without excessive menu navigation during emergency conditions.

- G. The HMI shall support local annunciation of all integrated sub-system events, including suppression activation, interface faults, and external communications status.
- H. Where remote or repeater annunciators are provided, all critical alarm and fault information displayed at the FACP shall be mirrored at the remote HMI.

Auxiliaries

- A. All cables required for the installation and operation of the FDSS shall be provided and installed. Cables shall be:
 - Fire-rated, low-smoke and suitable for life-safety systems where required.
 - Sized to accommodate voltage drop, load current, and future expansion.
 - Clearly identified and labelled at both ends.
- B. Cable trays, trunking, conduits, and supports shall:
 - Be suitable for the environmental conditions.
 - Provide adequate mechanical protection and segregation from non-fire systems.
 - Be securely fixed and routed in accordance with good engineering practice.
- C. Load terminal boxes shall be provided where required for the termination, distribution, and supervision of detection, alarm, release, or interface circuits. Load terminal boxes shall:
 - Be clearly labelled and accessible for inspection and maintenance.
 - Provide adequate space for cable termination and supervision components.
 - Include provisions for earth/ ground termination where applicable.
 - Be suitable for the environmental conditions of the installation location.

The use of load terminal boxes shall not compromise circuit supervision or system reliability.
- D. All electrical consumables required for a complete and compliant installation shall be provided, including but not limited to:
 - Glands, lugs, ferrules, terminal blocks, connectors, and fixings.
 - Insulation materials and identification sleeves.
 - Protective components such as fuses where required.
- E. All electrical consumables shall:
 - Be of suitable rating and quality for life-safety applications.
 - Comply with applicable electrical standards and codes.

- Be installed in accordance with manufacturer and regulatory requirements.
- F. Dedicated device outlets shall be provided for all FDSS field devices, including detectors, notification appliances, interfaces, and suppression control components where applicable. Device outlets shall:
- Be securely mounted and mechanically protected.
 - Provide adequate space for device termination and servicing.
 - Be clearly labelled to indicate circuit and device identification.
 - Maintain circuit integrity and supervision requirements.
- G. System isolator switches shall be provided to enable safe isolation of the FDSS or its sub-systems for maintenance and emergency purposes. Isolator switches shall:
- Be lockable in the OFF position.
 - Be clearly labelled to identify the controlled system or circuit.
 - Not compromise system supervision when operated.
 - Be installed in accessible locations.
- Operation of isolator switches shall generate an appropriate supervisory or fault indication at the Fire Alarm Control Panel.
- H. All field devices and auxiliary components shall be installed using appropriate enclosures and mounting accessories. Mounting systems shall ensure devices remain securely fixed and accessible for servicing. Enclosures shall:
- Be rated for the environmental conditions.
 - Provide mechanical protection and secure mounting.
 - Allow sufficient space for cable termination and maintenance.
- I. All necessary interface modules and relays required for system integration shall be provided. These shall:
- Include input modules, output modules, and interposing relays.
 - Be compatible with the FACP and connected systems.
 - Provide electrical isolation where required.
 - Be supervised for wiring faults and operational failure.
 - Be rated for the intended load and duty cycle.
- J. Junction boxes and pull boxes shall be installed where required to facilitate cable routing, termination, and maintenance. They shall:
- Be accessible for inspection and servicing.
 - Be appropriately sized for cable capacity and bending radius.
 - Maintain circuit integrity and supervision requirements.

- Be rated for environmental and fire conditions where applicable.
- K. All cables shall be adequately protected against mechanical damage. Installation shall ensure separation from non-fire systems where required and compliance with applicable installation standards.
- L. Each FACP shall be provided with a secure documentation holder to ensure that all documentation is protected from damage and readily accessible. The holder shall contain:
- As-built drawings;
 - Approved cause-and-effect matrix;
 - Zone identification diagrams;
 - Operating and maintenance instructions.

Chapter 3 – Site Specific Specifications

SITE SPECIFIC REQUIREMENTS

King Shaka International Airport (FALE) ATNS Operations Centre

The following requirements are specific to the FALE Operations Centre.

Facility Description

The FALE ATNS Operations Centre provides facilities for conducting air traffic control operations. The main building comprises offices, a control tower cab, a kitchen area, a reception/ foyer area, workshops and ablution facilities. A significant number of personnel are stationed on the ground floor including management, engineering technicians, administrative staff and employees from the South African Weather Services.

Air traffic controllers operate from both the approach radar hall and the control tower cab. The existing system within the main building consists of a comprehensive fire detection and alarm system, with the FACP located on the ground floor in the foyer.

The equipment rooms and UPS room contain high-value equipment critical to ATNS operations. Cables are routed through floor voids on the ground floor (equipment rooms and passage areas), as well as on Level 14 and Level 16 of the building, and within cable ducts in the control tower shaft. In these areas, the system includes both fire detection and fire suppression.

The ATNS Operations Centre has recently been equipped with a new public address (PA) system, namely the RCF PA System (SE5120/SE5121 Life Safety Voice Alarm System).

Airports Company South Africa (ACSA) will install a separate FACP in the guardhouse located outside the ATNS Operations Centre. The guardhouse is already fitted with an existing fire detection and suppression system which will be connected to the new ACSA FACP. This ACSA FACP will, in turn, be integrated into the ACSA airport network.

Site Requirements

- A. A complete turnkey Fire Detection and Suppression System (FDSS) shall be designed, supplied, delivered, installed, tested, commissioned and certified for the FALE ATNS Operations Centre. Fire detection shall be installed throughout the facility, while fire suppression shall be implemented in the designated areas as specified in Table 1.
- B. The new FDSS system shall be integrated with the HVAC system, two elevators, all access-controlled doors and the PA system.
- C. The Contractor shall be responsible for the complete decommissioning, removal, and lawful disposal of the existing FDSS. All disposal activities shall be carried out in an environmentally compliant manner and in accordance with applicable local regulations, standards, and best practices.
- D. The Contractor shall ensure that the new FACP installed and commissioned under this project is fully compatible with the ACSA FACP. Such compatibility shall enable ACSA to establish reliable communication and seamless interfacing between the two systems. Details regarding the ACSA FACP and interface requirements will be provided during the compulsory site briefing. The Contractor shall be responsible for the complete installation, configuration, testing, and commissioning of the FDSS installed under this project to ensure readiness for integration. ACSA shall be responsible for the final integration and interfacing of the two FACP's within their network.

Bluff Radar Site

The following requirements are specific to the Bluff Radar site.

Facility Description

The Bluff Radar Site is located within the premises of the South African National Petroleum Company (SANPC) refinery in Prospecton, Durban. The site consists of a radar tower building that houses high-value equipment critical to ATNS operations. Security personnel are stationed on-site on a 24-hour basis. Technical personnel visit the site periodically to perform maintenance activities; however, there are no employees permanently based within the building.

The existing FDSS at the Bluff Radar site comprises fire detection installed throughout the building, with fire suppression provided in the ground floor equipment room.

Diagrams illustrating the existing fire detection and fire suppression systems are provided below for reference.

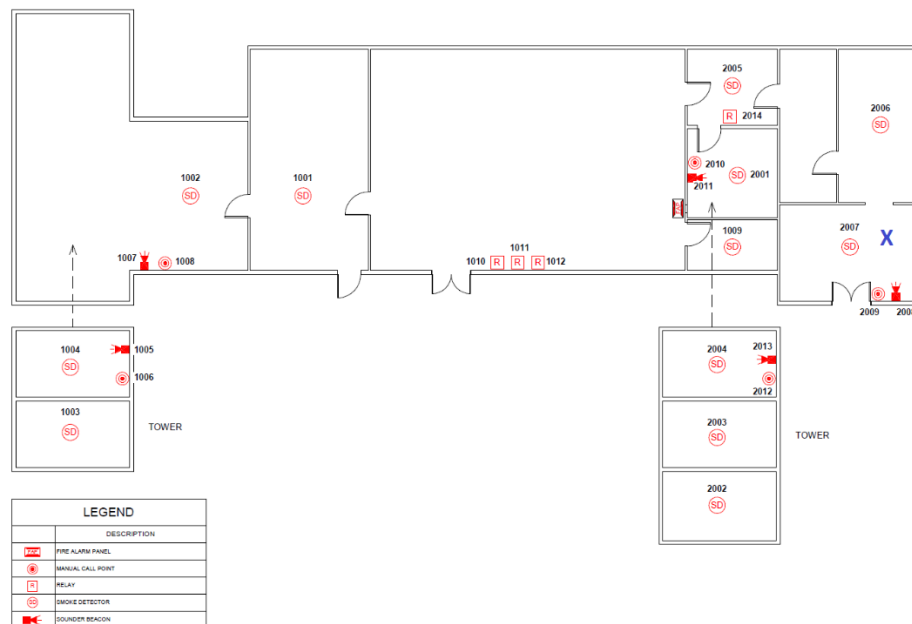


Figure 2: Bluff Radar site fire detection system

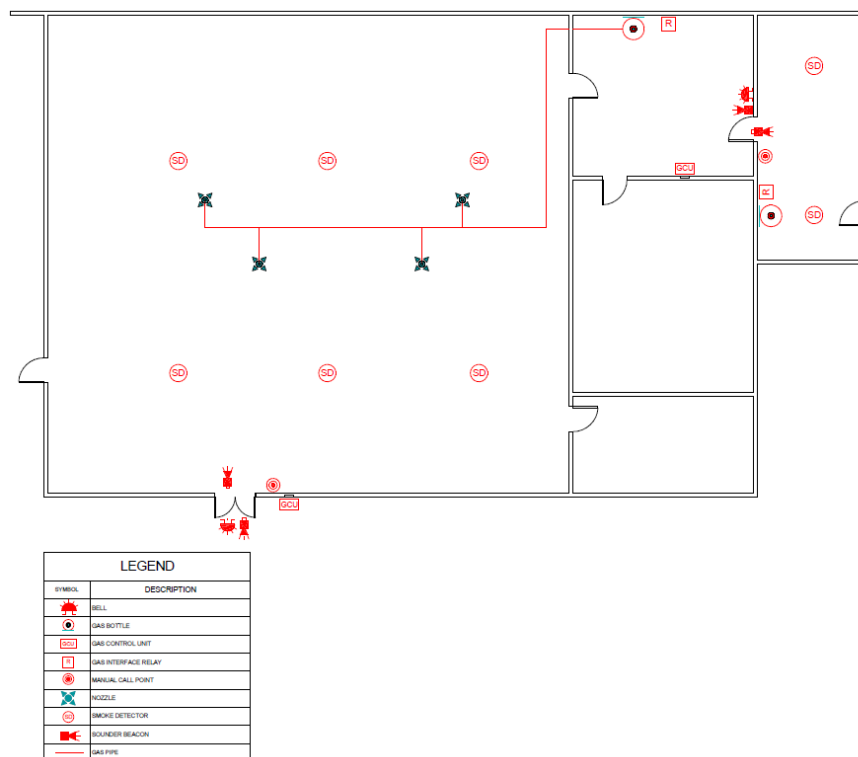


Figure 3: Bluff Radar site fire suppression system

Site Requirements

- A. A complete turnkey FDSS shall be provided for the Bluff Radar site. Fire detection shall be installed throughout the facility, while fire suppression shall be implemented in the designated areas as indicated in Figure 3. In addition, the area designated by the blue “X” in Figure 2 shall also be protected by the new fire suppression system.
- B. The new FDSS system shall be integrated with the air-conditioning units such that they are automatically shut down to control smoke propagation.
- C. The Contractor shall be responsible for the complete decommissioning, removal, and lawful disposal of the existing FDSS. All disposal activities shall be carried out in an environmentally compliant manner and in accordance with applicable local regulations, standards, and best practices.
- D. The FDSS must suitably interface with the radar equipment via dry contact relay(s) with normally open/ normally closed configuration to provide indication of any fire alarms and the status of the fire alarm control panel at the radar equipment.

Chapter 4 – Integrated Logistic Support Specifications

LOGISTIC REQUIREMENTS

Integrated logistic support plan

- A. The contractor shall provide an integrated logistic support plan (ILSP) which shall define in detail the support system that will be implemented for the ongoing support of this project.

Reliability, Availability and Maintainability (RAM)

- A. The availability of the fire detection and suppression systems shall be 99.80% per year, over the 10-year operational life cycle of the system.
- B. The reliability and availability figures shall consider planned system downtimes for routine hardware and software maintenance.

Maintenance and Support

- A. A comprehensive 10-year maintenance and support contract for all hardware and software components of the provided fire detection and suppression systems, system components and supporting infrastructure shall be proposed for ATNS consideration.
- B. The maintenance and support of the FDSS shall be quarterly.
- C. The system shall be maintained using the current ATNS maintenance concept, based on O, I & D maintenance levels.
- D. O level maintenance should be performed by ATNS facility administrators
- E. I & D level maintenance will be provided by the OEM, through a maintenance and support agreement.
- F. The software shall be such that after the system has been commissioned, there will be no need for experienced and qualified consultant computer programmers for the operation and maintenance of the system.
- G. A list of all routine maintenance tasks that need to be performed on the fire detection and suppression systems to ensure that the system performs to specifications for the duration of its lifespan shall be provided
- H. The bidder shall include annual servicing and certification of existing firefighting equipment listed in Table 3 in the maintenance and support contract. The services will be conducted at FALE ATNS Operations Centre.

Table 3: List of fire-fighting equipment

Item Description	Quantity
5kg CO ²	35
2.5kg DCP	15
Hose reel	8
Building Hydrant	1
Hydrant valve/ connector	2
9kg DCP	20
3kg	5
4.5kg CO ²	5
Total	91

- I. The maintenance and support of the firefighting equipment shall be annually.
- J. The bidder shall be able to maintain and repair fire-fighting equipment as and when required. Ad hoc repairs shall be carried out on a quotation basis, subject to evaluation and approval of the quotation by Management before the work commences.

Packaging Handling Storage and Transportation (PHS&T)

- A. The contractor shall develop a plan detailing instruction and procedures regarding all PHS&T matters and submit to ATNS for consideration.
- B. ATNS shall not be responsible for any damage incurred during packaging and transportation of the equipment.

Training

- A. Basic and advanced maintenance training on the fire detection and suppression systems (all hardware, software and LRUs) shall be provided for at least 6 personnel.
- B. The contractor shall provide a training plan for ATNS approval.

Spares

- A. All spare parts to ensure the required availability of the system over its lifespan shall be provided.
- B. An itemized spares plan inclusive of all associated costs is required. The plan shall be based on maintaining and supporting the electrical and mechanical systems throughout the lifespan.

Test Equipment, Tools and Accessories

- A. A list of all test equipment, tools and accessories required for the support of the system shall be submitted for consideration by ATNS.
- B. The specifications and quantities of the test equipment, tools and accessories shall be provided.
- C. Any specialized tools and test equipment required for the maintenance of the electrical and mechanical systems shall be supplied.

Documentation

- A. All project-related documentation shall be provided to ATNS, prior to SAT, in both soft and hard copies. At a minimum, the following documentation is required:
 - a. Documentation Plan.
 - b. Packaging, Handling, Storage and Transportation (P, H, S & T) plan.
 - c. Installation, transition and commissioning plan.
 - d. Logistics support plan.
 - e. Configuration management plan.
 - f. Training plan and documentation.
 - g. Maintenance support plan.
 - h. Spares Plan.
 - i. Life cycle cost document.
 - j. Interface control document.
 - k. Equipment specific documentation.
 - l. Design and as-built documents.
 - m. Device schedules and loop configuration drawings.
 - n. Flow calculations.
 - o. Cause-and-Effect matrix.
 - p. Operation and service Manuals.
 - q. OEM and COTS documentation.
 - r. Commissioning certificates.
 - s. Test reports.
- B. All documentation shall be in the English language.

Warranty and Period of Beneficial Use (PBU)

- A. A period of one-year warranty starting from the date of site acceptance shall cover all repairs and replacements of hardware, as well as all corrections or modifications to software required for reasons of non-compliance with specifications or errors not detected during acceptance tests.
- B. System operation will be monitored and evaluated during the warranty period.
- C. The PBU is intended to monitor the performance of the system and to implement appropriate recourse under low-performance conditions. The PBU shall run from the Site Acceptance Test (SAT) to the end of one year after the acceptance of the system.

Chapter 5 – Project Management Specifications

PROJECT MANAGEMENT REQUIREMENTS

General

- A. Site meetings shall be attended as arranged by the project managers and agreed to by the project team.

Draft Plans

- A. Comprehensive project management plans shall be established, implemented and maintained throughout the project execution. The Plans shall encompass draft plans that will be refined as necessary during the execution of the project. These plans shall include:
 - a. Project management
 - b. Resource management.
 - c. Risk management.
 - d. Quality management.
 - e. Communication management.
 - f. Integration management.
 - g. Installation, Transitioning and Commissioning.
 - h. Environmental Management Programme.
 - i. Change Management.

Project Management Plan

- A. A Project Management Plan for the project shall be developed in consultation with ATNS project manager.
- B. The Project Management Plan shall include at least the following:
 - a. Project scope and overview.
 - b. Project deliverables.
 - c. Work Breakdown Structure (WBS) defining the scope of work and resources necessary to meet the contract requirements.
 - d. Project organization and responsibilities.
 - e. Master Time Schedule (Gantt Chart).
 - f. Quality assurance activities to be performed in the project by the Contractor.
 - g. Configuration and integration management activities (regarding hardware, software and documentation version changes); and
 - h. Cost management.

Project Delivery Schedule and Scope Management

- A. A project delivery schedule which details all project activities that needs to be undertaken for the successful completion of the project scope of work shall be developed.
- B. A Work Breakdown Structure (WBS) illustrating the breakdown of the project scope into activities that can be managed, monitored and measured in terms of duration, cost and resources shall be provided.

Resource Management

- A. A resource management plan that provides details of the project team allocated to carry out the scope of the project shall be provided.
- B. Roles and responsibility matrix shall be drawn up for each project team member to highlight their involvement in the project.

Risk Management

- A. A risk management plan that stipulates how project-related risks will be identified, assessed and mitigated shall be proposed.
- B. The plan shall articulate the assessment methodology to be used in quantifying risk ratings attached to each identified risk.

Quality Management

- A. A Quality Assurance Plan for the project detailing how quality will be controlled, assured and maintained throughout the lifecycle of the project shall be provided.
- B. The Quality Assurance Plan shall describe the organization, processes, tasks, and responsibilities with respect to quality assurance.
- C. The Quality Assurance Plan shall identify all documents to be produced in appropriate phases of the project and shall state how these documents are checked for adequacy.
- D. The Quality Assurance Plan shall identify the standards, practices, conventions, and metrics to be applied and shall state how compliance with these items is to be monitored and assured.

Communications Management

- A. A communications management plan for the project detailing how project related information shall be communicated to various project stakeholders shall be provided.

- B. A project status report shall be compiled and submitted to ATNS at agreed intervals during the project to inform ATNS of the status of the project. The project status report shall include the following:
 - a. The project risks and their mitigation plans.
 - b. Project issues and their proposed resolutions.
 - c. Tasks completed and tasks outstanding.

Installation, Transition and Commissioning

- A. An installation, Testing and commissioning plan detailing how the scope of work will be carried out at the site shall be prepared.
- B. The plan, specifying all installation, testing, and commissioning activities, shall be provided to ATNS for approval prior to the start of installation.
- C. The ITC plan shall describe all aspects of the installation to be included in the documentation concerning:
 - a. Installation and testing procedures.
 - b. Cabling arrangements, routing, identification.
 - c. EMC, interference, susceptibility to radio frequencies.
 - d. Earthing arrangements.
 - e. Equipment mounting, cooling, etc.
- D. The ITC plan shall account for equipment storage.
- E. The security of all stored equipment shall be accounted for and shall not be the responsibility of ATNS
- F. ATNS authorities shall be notified when installation on the site is finished and testing, and commissioning may commence.
- G. ATNS authorities shall conduct an inspection of the site and the installation itself prior to site acceptance taking place.
- H. If defects or deficiencies are found during the site inspection, necessary remedial actions shall be taken. Any remedial actions shall not be at ATNS's expense.
- I. The contractor shall be responsible for storage, security and safety of the equipment, materials and tools during installation.

Environmental Management Programme

- A. An environmental management programme detailing the approach to be taken to minimize negative environmental impacts through the project phases shall be prepared and approved by ATNS prior to project implementation.

Change Management

- A. A change management plan detailing the approach to be taken to minimize negative impact of change through the project phases shall be prepared and approved by ATNS prior to project implementation. This shall include at least the following:
 - a. Change management Goals,
 - b. Change management Team,
 - c. Communication Strategy,
 - d. Change Impact Analysis (Evaluate, Review and Adaptation)

Chapter 6 – Systems Engineering Specifications

SYSTEMS ENGINEERING

General

- A. A description of how technical requirements will be integrated to ensure delivery of a fully operational system shall be provided.
- B. A Contract Data Requirements List (CDRL) that incorporate all data requirements in line with the project specifications and project scope of work shall be provided.

Testing and Acceptance

- A. The purpose of a Site Acceptance Test (SAT) is to demonstrate Compliance of the delivered equipment and proper functioning of the system after commissioning. The SAT shall be carried out after the system installation has been completed on-site.
- B. ATNS reserves the right to request further tests to be performed (which are not listed in the SAT specification) if deemed necessary. These tests shall be also included in the SAT report.
- C. All failures that occur during SAT shall be rectified and shall not be at ATNS's expense, and all relevant tests shall be repeated.
- D. A report stating all the successful completion or unsuccessful attempt of SAT with all measurements and results shall be compiled and issued.
- E. After the successful completion of the site acceptance tests, the system will be handed over to ATNS for formal acceptance.
- F. ATNS shall grant a formal acceptance if the system complies with the specification, SAT has been successfully completed and signed and approved SAT report have been issued.
- G. The SAT Certificate shall be prepared, signed, and sent to ATNS within an agreed time according to the official communication procedure.

Chapter 7 – Environmental Requirements

ENVIRONMENTAL SUSTAINABILITY REQUIREMENTS

Environmental Requirements

- A. The contractor shall ensure that all activities onsite are environmentally sound and proactively adhere to the National Environmental Management Act 107 of 1998 (NEMA) principle - Duty of care and remediation of environmental damage.

Waste Management

- A. The contractor must consider proper waste management practices of generated waste and should be disposed of in accordance with the Waste Act to prevent environmental pollution and ATNS' waste management procedure i.e.,
 - a. Waste generated deemed for disposal shall be collected, transported, and treated by a licensed waste management Service Provider- service provider to provide permit
 - b. The facility where the waste is being treated/ disposed shall be a licensed facility- service provider to provide licence/accreditation of the facility receiving waste collected
 - c. A certificate of disposal shall be issued by the waste management service provider
 - d. The waste hierarchy principles shall be implemented - service provider to provide waste management plan.

Occupational Health and Safety

- A. The contractor shall comply with the requirements of occupational, health and safety Act where applicable. Provision for any costing involved with these requirements shall be included in the pricing Schedule under the relevant heading on the Project Management sheet.
- B. The bidder shall provide the following documents:
 - a. Letter of good standing;
 - b. Company Safety, Health and Environment (SHE) policy;
 - c. SHE plan;
 - d. Baseline risk assessment as per the client's scope of work;
 - e. OH&S competency certificate i.e. First aider, legal liability, incident investigator, H&S representative.
- C. The contractor shall submit a SHE file to the ATNS SHE unit before the commencement of work.

- D. The design and installation of FDSS shall be done by certified professionals registered with the South African Qualifications and Certification Committee (SAQCC).
- E. All electrical connections for the FDSS shall be performed by a qualified electrician and compliance certificate.
- F. The contractor shall place clear warning labels placed near the nozzles, warning of the dangers of extinguishing agent discharge.