

Part 1 General – Performance Specification

1.1 SYSTEM REQUIREMENTS

- .1 The Emerson border crossing requires an intelligent transportation system (ITS) for processing commercial vehicles. The ITS will be responsible for releasing commercial vehicles from queue lanes, monitoring and managing the staging area capacity, prioritizing vehicles in the FAST lane, and recording activity data to allow for performance reporting.

Table 1 outlines the functional system requirements for the ITS.

Table 1: System Component Description

Requirement	Description
PIL status	Identify which PILs are open and closed.
Route commercial vehicles to general traffic crossing	Lane signals must flash red when all commercial PILs are closed.
Release vehicles from queue	Activate green lane signal to release one vehicle from queue. No more than one vehicle can be released from the queue at time.
Variable FAST ratio	FAST-to-Non-FAST queue release ratio must be configurable, and set to 3:1 by default.
Manage access to staging area	Maximum of two vehicles for every active commercial PIL allowed in the staging area.
Toggle in and out of FAST mode	The FAST-to-Non-FAST release ratio will only occur when vehicles are queued in PIL lane 9 (i.e., FAST lane) and lanes 8 and/or 7. When there are no vehicles in Lane 9, vehicles in lane 7 and 8 will alternate being released.
Release vehicles from queue	Vehicles can be released as soon as the previous vehicle being released clears its detection zone (unless each open PIL already has two vehicles in the queue).
Allow for real-time and historical performance measurements	Performance measurements for FAST and non-FAST vehicles will be calculated as the queue wait time, PIL processing time, and staging area wait time.
System override	In the event of an equipment failure or other unforeseen event, the system must allow for vehicles to be released manually by a PIL operator.
Indication of PIL state	A switch in each PIL is required to signify to the ITS the current state (in operation or not) of the PIL.
Uninterrupted power supply (UPS)	System will be equipped with a UPS to allow for system to operate in the event of a power failure. UPS will have the functionality to operate on a standby generator.
In-PIL FAST vehicle indicator	Each PIL operator requires an indicator to notify them when the vehicle they are processing is a FAST vehicle.

- .2 To fulfill the functional system requirements, the logical component diagram, shown in Figure 1, outlines the interaction of components and component classes in the ITS. The logical system (excluding communication media between components) comprises three component classes as described in Table 2. The three classes consist of: (1) inputs are components that send a signal into the system, (2) internal are components that process the incoming data and send signals to the outputs, and (3) outputs are components that end users interact with. Please refer to drawings for a conceptual overview of the physical system.
- .3 The successful bidder will be required to select system components that meet the requirements outlined in the section 2 of this document, and install, calibrate and commission said components. A previously contracted ITS consultant (henceforth known as “the ITS consultant”) will deploy the system operational software to operate the system upon completion and validation of calibration and commissioning.

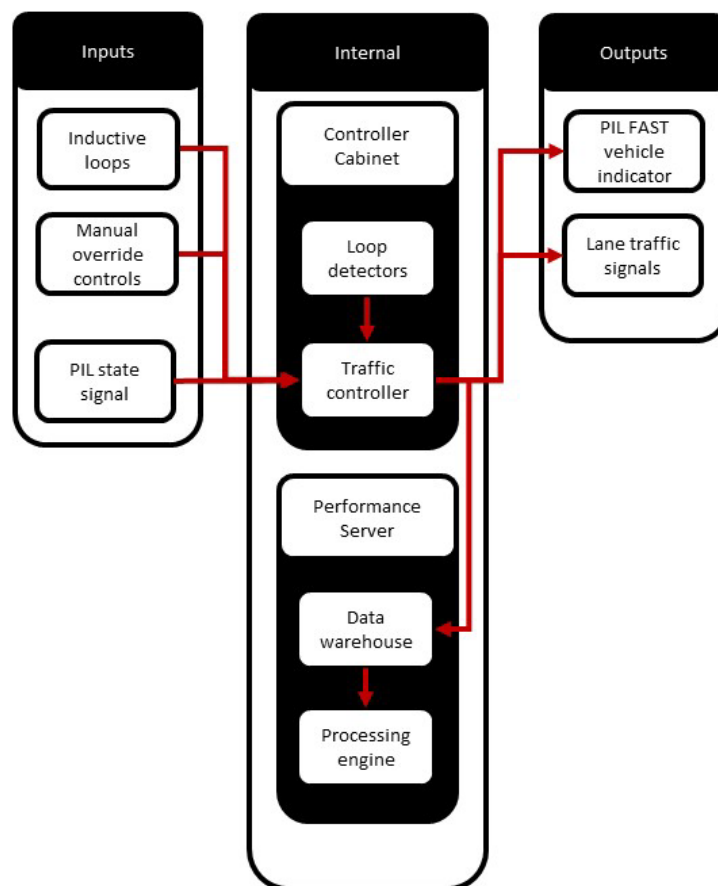


Figure 1: ITS Logical Component Diagram

1.2 REFERENCES

- .1 Canada Green Building Council (CaGBC)
 - .1 LEED Canada-NC Version 1.0-[2004], LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations (including Addendum [2007]).
 - .2 LEED Canada-CI Version 1.0-[2007], LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Guide For Commercial Interiors.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA C22.1-[06], Canadian Electrical Code, Part I (20th Edition), Safety Standard for Electrical Installations.
- .3 National Electrical Manufacturers Association (NEMA)

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature, software development kits and, datasheets for, all input, internal and output components, and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Provide drawings stamped and signed by professional engineer registered or licensed in the Province of Manitoba, Canada.
- .4 Test Reports:
 - .1 Submit test and verification reports to Departmental Representative.
- .5 Sustainable Design Submittals:
 - .1 Submittals: in accordance with Section 01 35 43 - Environmental Procedures.
- .6 FAST ITS Input and Output Speculations Submittals:
 - .1 Submit to the ITS Consultant documentation describing the input signals the traffic controller will see for each input component, and the channels each output component is configured to.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit Operations and Maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
 - .1 Maintenance instructions.
 - .2 List of components.
 - .3 List of spare parts and supplies.
 - .4 List of devices address identification.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements].

- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 INDUCTIVE LOOPS REQUIREMENTS

- .1 Detect presence of a vehicle.
- .2 Transmit vehicle detection signal to loop detector through a wired medium.
- .3 Detect trucks and trailers with an undercarriage height of up to 50”.
- .4 Operate in wet environments with temperatures ranging from -35°C to 40°C.
- .5 Minimum 2-year warranty on parts and installation.
- .6 Relay the induction frequency and amplitude to the loop detector.
- .7 Operate on the power made available through the signal controller.
- .8 Single conductor, 14 or 16 AWG, and rated for 600V.

2.2 LOOP DETECTOR REQUIREMENTS

- .1 Receive signals from loops, process the signals, and relay the processed signal to the traffic controller.
- .2 Process the induction signature to determine vehicle classification, axle count, and axle spacing.
- .3 Operate in wet environments with temperatures ranging from -35°C to 40°C.
- .4 Minimum 2-year warranty on parts and installation.

2.3 MANUAL OVERRIDE REQUIREMENTS

- .1 Allow for queue signal lights to be controlled by a PIL operator in PIL 9.
- .2 User must be able to easily set the system to manual override and release vehicles from specific lanes manually.
- .3 The manual override function must restrict communication between the controller unit and the signal lights.

2.4 CONTROLLER CABINET REQUIREMENTS

- .1 House the traffic controller, and loop detectors.
- .2 Support all component input, and output signals.
- .3 Allow access to all necessary cables.

- .4 Provide component communication between components installed within the controller cabinet.
- .5 Provide physical security for all components housed within.
- .6 Procure manufacturer support for the configuration installation of input and out components on cabinet.

2.5 TRAFFIC CONTROLLER REQUIREMENTS

- .1 Utilize a Linux open architecture to allow for custom software to operate on the controller. Custom software must be able to access all system data inputs and transmit on all system data outputs. Operating system (OS) must allow for multi-tasking.
- .2 Processor speed greater than 200 MHz.
- .3 DRAM greater than 100 MB.
- .4 Flash storage greater than 60 MB of FLASH storage for OS and user applications.
- .5 SRAM greater than or equal to 2 MB for non-volatile parameter storage.
- .6 Communicate with loop detectors, output voltage to queue control signal lights, in-PIL FAST vehicle indicator lights, output data feed over Ethernet to performance server, and 6 general purpose digital signal inputs. Based on NEMA TS-1 and TS-2 standards, all inputs to the controller unit must use 24 VDC logic. All “True” or “On” signals are at the Logic Ground level. All “False” or “Off” signals are at the +24 VDC level.
- .7 Support deployment of no less than 10 loop detectors.
- .8 Support input of potential additional detection technologies (e.g., radar, magnetometers and so on)
- .9 Operate in wet environments with temperatures ranging from -35°C to 40°C.
- .10 Minimum 2-year warranty on parts and installation.
- .11 Provides necessary power to loops, loop detectors, in-PIL FAST vehicle indicator lights and signal lights. Expected outputs are 12 to 24 VDC rated at 2Amps, and 12VAC @60Hz. Expected input is 89-135 VAC.
- .12 Minimum 5 years tested time to failure.
- .13 Utilize NTCIP and/or SNMP messaging protocols.
- .14 Provide necessary functionality to allow “back-to-back” traffic signals at a single signal sight.
- .15 Allow for output of data using Ethernet connection.
- .16 Availability of manufacturer support for development, and deployment of custom software.

2.6 SIGNAL LIGHT REQUIREMENTS

- .1 Lighting circuits to allow each set of signal lights to run separate power circuits. A set is defined as a pair of signal lights, where one signal faces the driver and the other faces the PIL.
- .2 Direct-view LED.
- .3 Operate in wet environments with temperatures ranging from -35°C to 40°C.
- .4 Minimum 2-year warranty on parts and installation.
- .5 Using astro-brackets.

2.7 PERFORMANCE SERVER REQUIREMENTS

- .1 Standard 110V AC power input.
- .2 Processor with minimum 1 GHz quad core (Multi-core) allow for multithreading.
- .3 Minimum two DDR3 DIMM slots supporting. DDR3 800/1066/1333 MT/s.
- .4 Minimum of two x8 PCI Express slots.
- .5 Minimum of two x4 PCIE slots.
- .6 Minimum of two RJ-45 connectors with indicator LEDs.
- .7 Minimum of four USB connectors.
- .8 Minimum of one serial port.
- .9 Minimum 1 Gigabit Ethernet LAN connect interface.
- .10 Minimum 1 SATA slot for hard disk.
- .11 Minimum 64 GB Hard Disk to store database and store processed data.
- .12 Installed within a wall mountable server rack, equipped with cooling fan, power supply, physical access security, and din rail mount.
- .13 Equipped with Government of Canada IT approved server operating system.

2.8 PIL STATE SIGNAL REQUIREMENTS

- .1 Dual state rotary switch a PIL operator can use to manually set to digitally send a signal to the ITS that the PIL is active, or not active.
- .2 Must use 24 VDC logic to communicate to the traffic controller that the PIL is active.

2.9 DATA WAREHOUSE REQUIREMENTS

- .1 Will be developed and deployed on the performance server by the ITS Consultant. No requirements are applicable for tender package.

2.10 PROCESSING SERVER REQUIREMENTS

- .1 Will be developed and deployed on the performance server by the ITS Consultant. No requirements are applicable for tender package.

2.11 IN-PIL FAST VEHICLE INDICATOR

- .1 LED light powered by and controlled by traffic controller.
Provide a visual indication to PIL operator that the vehicle at the PIL is a FAST vehicle.

Part 3 Execution

3.1 APPLICATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Install loops and lead in cables according to manufacturer's recommendations. Loops and lead in wire are to be installed according to a schedule that will ensure no island, curb, or sidewalk concrete is damaged. Loops are to be installed in spaces designated on civil drawings, and saw cuts are permitted on road pads.
- .2 Install control cabinet according to manufacturer's recommendations in the space specified on electrical drawings.
- .3 Install PIL state signals according to manufacturer's recommendations in PILs as specified.
- .4 Install manual override controls according to manufacturer's recommendations in PIL 9 as shown.
- .5 Install server rack and performance server according to manufacturer's recommendations in the space specified on electrical drawings.
- .6 Install in-PIL FAST vehicle indicator according to manufacturer's recommendations in PILs as specified.
- .7 Install traffic controller in control cabinet according to manufacturer's recommendations.
- .8 Install loop detectors in control cabinet according to manufacturer's recommendations.
- .9 Install queue traffic lights according to manufacturer's recommendations in the area specified on the civil and electrical drawings.
- .10 Connect communications and power cabling according to manufacturer's recommendations, in the locations specified on the electrical drawings.

3.3 COMMISSIONING

- .1 Compose test plan for work specified in this Section. Test plan is to be submitted to the ITS consultant for review, and approval. Test plan will include, but is not limited to, details for configuring, calibrating and testing induction signals used to identify the presence of a vehicle at each detection zone.

- .2 Test, verify and put work of this Section into full operation.
- .3 Provide support for ITS consultant during on-site software deployment and testing.
- .4 Provide necessary maintenance personnel training.

3.4 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
- .2 Clean installed products in accordance to manufacturer's recommendation.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal and 01 35 43 - Environmental Procedures.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 00.

1.2 REFERENCES

- .1 Refer to **Attachment A** for further requirements.
- .2 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S316-14, Installation and Classification of Closed Circuit Video Equipment (CCVC) Systems for Institutional and Commercial Security Systems.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for video surveillance equipment and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit:
 - .1 Functional description of equipment.
 - .2 Technical data sheets of all devices.
 - .3 Device location plans and cable lists.
 - .4 Video camera surveillance chart.
 - .5 Video interconnection detail drawings.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed province of Manitoba, Canada.
 - .2 Submit shop drawings to indicate project layout, camera locations, point-to-point diagrams, cable schematics, risers, mounting details and identification labeling scheme.
 - .3 Submit zone layout drawings indicating number and location of zones and areas covered.
- .4 Samples:
 - .1 Submit for review and acceptance of each unit.
 - .2 Samples will be returned for inclusion into work.
 - .3 Submit 1 sample of each camera selected complete with housing, brackets and mounting hardware.
 - .4 Camera will be returned for incorporation into work as appropriate.
- .5 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

- .1 Submit UL Product safety Certificates.
- .2 Submit verification Certificate that service company is "UL List alarm service company".
- .3 Submit verification Certificate that monitoring facility is "UL Listed central station".
- .4 Submit verification Certificate that video surveillance system is "Certified alarm system".
- .6 Test and Evaluation Reports:
 - .1 Submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.
- .7 Manufacturer's Instructions: submit manufacturer's installation instructions.
- .8 Manufacturer's Field Reports: submit manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in PART 3 - FIELD QUALITY CONTROL.

1.4 CLOSEOUT SUBMITTALS

- .1 Operation and Maintenance Data: submit maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals. Include following:
 - .1 System configuration and equipment physical layout.
 - .2 Functional description of equipment.
 - .3 Manufacturer's Instructions for operation, adjustment and cleaning.
 - .4 Illustrations and diagrams to supplement procedures.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect video surveillance materials from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 SEE ATTACHMENT A

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for video surveillance installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative,.
 - .2 Inform Departmental Representative, of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION

- .1 Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheet.
- .2 Install cable, boxes, mounting hardware, brackets, video cameras and system components in accordance with manufacturer's written installation instructions.
- .3 Install components secure, properly aligned and in locations shown on reviewed shop drawings.
- .4 Connect cameras to cabling in accordance with installation instructions.
- .5 Install labels where required.
- .6 Refer to attachment A for further requirements.

3.3 FIELD QUALITY CONTROL

- .1 Manufacturer's Field Services:
 - .1 Obtain written reports from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product.
 - .2 Submit manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits to review Work at stages listed:
 - .1 After delivery and storage of products, and when preparatory Work, or other Work, on which the Work of this Section depends, is complete but before installation begins.
 - .2 Twice during progress of Work at 25% and 60% complete.
 - .3 Upon completion of Work, after cleaning is carried out.

- .4 Refer to Attachment A for further requirements.

3.4 SYSTEM STARTUP

- .1 Perform verification inspections and test in the presence of Departmental Representative, Consultant.
 - .1 Provide all necessary tools, ladders and equipment.
 - .2 Ensure appropriate subcontractors , and manufacturer's representatives and security specialists are present for verification.
- .2 Visual verification: objective is to assess quality of installation and assembly and overall appearance to ensure compliance with Contract Documents. Visual inspection to include:
 - .1 Sturdiness of equipment fastening.
 - .2 Non-existence of installation related damages.
 - .3 Compliance of device locations with reviewed shop drawings.
 - .4 Compatibility of equipment installation with physical environment.
 - .5 Inclusion of all accessories.
 - .6 Device and cabling identification.
 - .7 Application and location of ULC approval decals.
- .3 Technical verification: purpose to ensure that all systems and devices are properly installed and free of defects and damage. Technical verification includes:
 - .1 Measurements of tension and power.
 - .2 Connecting joints and equipment fastening.
 - .3 Measurements of signals (dB, lux, baud rate, etc).
 - .4 Compliance with manufacturer's specification, product literature and installation instructions.
- .4 Operational verification: purpose to ensure that devices and systems' performance meet or exceed established functional requirements. Operational verification includes:
 - .1 Operation of each device individually and within its environment.
 - .2 Operation of each device in relation with programmable schedule and or/specific functions.
 - .3 Operation control of camera lens, pan, tilt and zoom.
 - .4 Switching of camera to any monitor.
 - .5 Switching of system video recorder to selective monitor.
 - .6 Set dwell times.
 - .7 Demonstrate:
 - .1 Sequence viewing of cameras on each monitor.
 - .2 Bypass capability.
 - .3 Display of stored image to cardholder.
- .5 Refer to **Attachment A** for further requirements.

3.5 ADJUSTING

- .1 Remove protective coverings from cameras and components.

3.6 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .1 Clean camera housing, system components and lens, free from marks, packing tape, and finger prints, in accordance with manufacturer's written cleaning recommendations.

3.7 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by video surveillance installation.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Section Includes:
 - .1 Materials and installation for fire alarm systems.
 - .2 Trouble signal devices.
 - .3 Manual alarm stations.
 - .4 Automatic alarm initiating devices.
 - .5 Audible signal devices.
 - .6 End-of-line devices.
 - .7 Visual alarm signal devices.
 - .8 Ancillary devices.

1.2 REFERENCES

- .1 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN/ULC-S524-2001, Standard for the Installation of Fire Alarm Systems.
 - .2 CAN/ULC-S525-1999, Audible Signal Device for Fire Alarm Systems.
 - .3 CAN/ULC-S526-2002, Visual Signal Devices for Fire Alarm Systems.
 - .4 CAN/ULC-S527-1999, Control Units.
 - .5 CAN/ULC-S528-1991, Manual Pull Stations for Fire Alarm Systems.
 - .6 CAN/ULC-S529-2002, Smoke Detectors for Fire Alarm Systems.
 - .7 CAN/ULC-S530-M1991, Heat Actuated Fire Detectors for Fire Alarm Systems.
 - .8 CAN/ULC-S531-2002, Standard for Smoke Alarms.
- .2 National Fire Protection Agency
 - .1 NFPA 72-2002, National Fire Alarm Code.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Shop drawings: stamped and signed by professional engineer registered or licensed in Province of Manitoba, Canada.
 - .2 Include:
 - .1 Layout of equipment.
 - .2 Zoning.
 - .3 Complete wiring diagram, including schematics of modules.

- .3 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .2 Instructions: submit manufacturer's installation instructions.
 - .3 Manufacturer's Field Reports: manufacturer's field reports specified.
- .4 Closeout Submittals:
 - .1 Submit maintenance and engineering data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals in accordance with ANSI/NFPA 20.
 - .2 Authority of Jurisdiction will delegate authority for review and approval of submittals required by this Section.
 - .3 Submit to Authority of Jurisdiction 2 sets of approved submittals and drawings immediately after approval but no later than 15 working days to prior to final inspection.
 - .4 Submit following:
 - .1 Manual pull stations.
 - .2 Heat detectors.
 - .3 Open-area smoke detectors.
 - .4 Duct smoke detectors.
 - .5 Alarm bells.
 - .6 Alarm horns.
 - .7 Visible appliances.
 - .8 Valve tamper switches.
 - .9 Wiring.
 - .10 Conduit.
 - .11 Outlet boxes.
 - .12 Fittings for conduit and outlet boxes.
 - .13 Mark data which describe more than one type of item to indicate which type will be provided.
 - .14 Submit 1 original for each item and clear, legible, first-generation photocopies for remainder of specified copies.
 - .2 Design data: Power Calculations:
 - .1 Submit design calculations for existing system to substantiate that battery capacity exceeds supervisory and alarm power requirements.
 - .2 Show comparison of detector power requirements per zone versus control panel smoke detector power output per zone in both standby and alarm modes.
 - .3 Show comparison of notification appliance circuit alarm power requirements with rated circuit power output.

- .3 Test Reports:
 - .1 Preliminary testing:
 - .1 Final acceptance testing.
 - .2 Submit for inspections and tests specified under Field Quality Control.

1.4 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer: company or person specializing in fire alarm system installations approved by manufacturer with experience.
 - .2 Provide services of representative or technician from manufacturer of system, experienced in installation and operation of type of system being provided, to supervise installation, adjustment, preliminary testing, and final testing of system and to provide instruction to project personnel.
 - .3 System:
 - .1 Subject to Fire Commissioner of Canada (FC) approval.
 - .2 Subject to FC inspection for final acceptance.
 - .4 Extra Materials:
 - .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Include:
 - .1 5 spare glass rods for manual pull box stations if applicable.
 - .5 Maintenance Service:
 - .1 Provide one year's free maintenance with two inspections by manufacturer during warranty period. Inspection tests to conform to CAN/ULC-S536. Submit inspection report Consultant.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.
 - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

Part 2 Products

2.1 MATERIALS

- .1 Equipment and devices: ULC listed and labelled and supplied by single manufacturer.
- .2 Audible signal devices: to CAN/ULC-S525.
- .3 Visual signal devices: to CAN/ULC-S526.
- .4 Manual pull stations: to CAN/ULC-S528.
- .5 Thermal detectors: to CAN/ULC-S530.

- .6 Smoke detectors: to CAN/ULC-S529.

2.2 SYSTEM OPERATION

- .1 Existing Edwards EST-3.

2.3 MANUAL ALARM STATIONS

- .1 Match Existing.

2.4 AUTOMATIC ALARM INITIATING DEVICES

- .1 Match Existing

2.5 ALARM INITIATING DEVICE SPACING AND LOCATION

- .1 Detector spacing and location: in accordance with manufacturer's recommendations and requirements of NFPA 72.
- .2 Provide at least 2 detectors in rooms of 54 square meters or larger.
- .3 Spacing: not to exceed 9 m by 9 m per detector, and 9 linear m per detector along corridors.
- .4 Locate detectors minimum 0.9 1.5 m from air discharge or return grille, and not closer than 300 mm to lighting fixtures.
- .5 In areas without finished ceilings, mount detectors at underside of deck above unless otherwise indicated.

2.6 DUCT SMOKE DETECTORS

- .1 Not Required.

2.7 AUDIBLE SIGNAL DEVICES

- .1 Match Existing.

2.8 END-OF-LINE DEVICES

- .1 Match Existing

2.9 VISUAL ALARM SIGNAL DEVICES

- .1 Match Existing.

2.10 ELECTRO-MAGNETIC DOOR HOLDER-RELEASES

- .1 Provide as indicated shown.
- .2 Mount armature portion on door. Armature complete with adjusting screw for setting angle of contact plate.
- .3 Mount electro-magnetic release on wall or in wall recess behind door.
- .4 Activation of fire alarm system to release doors on circuit to close.
- .5 Total projection of door holder-release not to exceed 100 mm.
- .6 Door holders: not require battery backup power.

2.11 VALVE TAMPER SWITCHES

- .1 Provide switches to monitor open position of valves controlling water supply to sprinkler systems.
- .2 Switch contacts to transfer from normal position to off-normal position during first two revolutions of hand wheel or when stem of valve has moved not more than one-fifth of distance from its normal position.
- .3 Provide switch with tamper resistant cover.
- .4 Removal of the cover to cause switch to operate into off-normal position.

2.12 WIRING

- .1 Manufactures Recommended wiring requirements.

2.13 ANCILLARY DEVICES

- .1 Remote relay unit to initiate fan shutdown.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 INSTALLATION

- .1 Install systems in accordance with CAN/ULC.
- .2 Locate and install manual alarm stations and connect to alarm circuit wiring.
- .3 Locate and install detectors and connect to alarm circuit wiring. Do not mount detectors within 1 m of air outlets. Maintain at least 600 mm radius clear space on ceiling, below and around detectors. Locate duct type detectors in straight portions of ducts.
- .4 Connect alarm circuits to main control panel.
- .5 Locate and install bells, horns and connect to signalling circuits.
- .6 Connect signalling circuits to main control panel.
- .7 Install end-of-line devices at end of alarm and signalling circuits.
- .8 Locate and install door releasing devices.
- .9 Locate and install remote relay units to control fan shut down.
- .10 Sprinkler system: wire alarm and supervisory switches and connect to control panel.

3.3 FIELD QUALITY CONTROL

- .1 Site Tests:
 - .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical and CAN/ULC-S537.
- .2 Manufacturer's Field Services:

- .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.
- .3 Verification requirements in accordance with Section 01 47 17 - Sustainable Requirements: Contractor's Verification, include:

3.4 TRAINING

- .1 Arrange and pay for on-site lectures and demonstrations by fire alarm equipment manufacturer to train operational personnel in use and maintenance of fire alarm system.

3.5 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION