

PROJECT NO. 23116  
HOSSACK ARCHITECTS

**ADDENDUM NO. 3****Issued by email Wednesday September 25, 2024**

The following additions, deletions, modifications and clarifications issued herein are hereby an integral part of the Tender and Contract Documents. Minor Typographic or spelling mistakes in the Contract Documents which do not significantly affect the meaning of the sentence or phrase in which they occur may not necessarily be corrected by Addenda.

**GENERAL**

1. Ensure that all parties submitting bids are aware of this **Addendum No.3** and its contents.
2. **Contents:** Addendum No. 3 - in its entirety consists of the following:
  - .1 Two (2) typed pages of instructions, dated: September 25, 2024 by Hossack Architects.
  - .2 Electrical Addendum No. 2 dated Sept. 24/24 (51 pages incl. five (5) typed pages of instructions, six specification sections and two (2) full size electrical drawings.
  - .3 Functional Servicing and Storm Water Management Report, 60 pages, dated September 10, 2024 issued by MGM Consulting Inc.
  - .4 Arborist Report by Burnside (25 pages)

**AMENDMENTS TO SPECIFICATIONS – BINDER A****Item 1: Section 00 00 10 Table of Contents:**

- .1 DELETE section “05 31 23...Steel Roof Decking...6”.

**Item 2: Section 00 11 00 General Instructions and Summary of Work:**

- .1 REVISE item 1.34.8.11 to read: “Security equipment, including **wiring**, card readers and cameras **supply and installation. (GC to include supply and install of conduit, power supplies and coordination in base contract).**”.
- .2 REVISE item 1.34.8.21 to read: “PA System equipment **and wiring supply**, installation and tone generator. **(GC to include supply and install of pathways and wiring in base contract).**”

**Item 3: Section 09 67 23 Epoxy Flooring System:**

- .1 REVISE item 2.1.3.3 to read: “Refer to Room Finish Schedule for Base”.

**Item 4: Section 10 11 25 Manufactured Specialties:**

- .1 REVISE item 2.1.4.7 to read: “Location Janitor Closet 106”.

**Item 5: Section 32 33 00 Site Furnishing:**

- .1 DELETE item 2.5 “~~Tactile Warning Plates~~”.  
Specification section ‘31 23 10 Detectable Warning Panels’ to be used.

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**ADDENDUM NO. 3**

**Issued by email Wednesday September 25, 2024**

**AMENDMENTS TO DRAWINGS**

**Item 6: Drawing A05 Reflected Ceiling Plans:**

.1 DELETE the drawing and wording: “Phenolic Panel Type B” from the RCP Legend in the titleblock.

**Item 7: Drawing A12 Interior Elevations:**

.1 DELETE the label and stipple graphics on 21/A12: “Painted Gyp. Bd. Above” the two door openings.

**CIVIL**

.1 Functional Servicing and Storm Water Management Report, 60 pages, dated September 10, 2024 by MGM Consulting Inc. provided.

**LANDSCAPE**

.1 Arborist Report by Burnside (25 pages) dated July 2024 provided.

**ELECTRICAL**

.1 Electrical Addendum No. 2 dated Sept. 24/24, 51 pages including five (5) typed pages of instructions, six specification sections and two (2) full size electrical drawings.

**End of Addendum No. 3**



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## Electrical Addendum No. 02

**EXP Project No.:** ALL-23003797-A0

**Project:** Mississauga New Fire Station 124

**Date:** September 24, 2024

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**Prepared By:** EXP Services Inc.

### **Requirements:**

The addendum forms part of the Contract Documents and amends the original Specifications and Drawings, as noted below.

Ensure that all parties submitting bids are aware of all items included in this Addendum.

This Addendum consists of **51** pages.

Bidder Question:

### 1. **ADDENDUM 03 QA**

- .1 **QUESTION #3:** In reference to electrical drawing E-601, please provide conduit and wiring details from the Service Entrance Switchboard to the Solar Photovoltaic entrance.

**ANSWER #3:** Per VCT drawing E-201, feeder from main switchboard to solar PV entrance to be 4C-#1/0 AWG + GND, AL, ACWU (120A at 75deg C as per OESC Table #4).

- .2 **QUESTION #4:** Please provide the specifications for the (1) Transformers, and (2) Metering as they seem to be missing in the Specification Binder B

**ANSWER #4:** Refer to attached updated electrical specification sections for distribution transformers and metering.

- .3 **QUESTION #7:** Alternatives for M1 and M2 light fixtures - In reference to lighting schedule shown on drawing E-102, please advise if the attached alternate light fixtures are acceptable in lieu of M1 and M2 wall mounted light fixtures. Reference: E-102 and attached alternate. Please see attached Appendix to this Question attached

**ANSWER #7:** For exterior lighting alternates, we would require a photometric submission to verify that minimum illumination targets are maintained with substituted fixtures. We cannot comment on these fixtures without photometrics.

- .4 **QUESTION #8:** Paging and Public Address System - Specification section "PAGING AND PUBLIC ADDRESS SYSTEMS" 27 51 13 references a company called "Hamilton Video and

## Electrical Addendum No. 02

MISSISSAUGA NEW FIRE STATION 124  
EXP Project No. ALL-23003797-A0  
SEPTEMBER 24, 2024

Sounds Ltd.” It seems that this company primarily does school system paging systems and doesn’t provide fire department paging systems. It looks like this spec might not be applicable to this project as it references demo work as well. Could you please confirm if this is the correct spec, and if these are the required sole spec providers? Reference: Spec sec 27 51 13

**ANSWER #8:** Section 27 51 13 to be removed, as PA system is being covered under a cash allowance. Further details to be provided during construction.

- .5 **QUESTION #17:** Security - Card Reader Contact - In the security/electrical drawings, some doors with card readers do not have a contact or Rex. Is that by design or in error. Please provide clarification. Reference: E-401

**ANSWER #17:** Section 27 51 13 to be removed, as PA system is being covered under a cash allowance. Further details to be provided during construction.

- .6 **QUESTION #18:** Security drawing - clarification needed - In the security/electrical drawings, there is no indication as to where head ends are going. We assume IT room or mechanical room but need clarification please. Reference: E-401

**ANSWER #18:** Head end equipment is located in IT Room 112.

- .7 **QUESTION #28:** Question related to Solar Panels  
Appendix G page 636, 2.07 Power Wire/Cable, part C, point b:

All PV Wire shall be contained within the PV array and mechanically protected and fully enclosed between rows, arrays, and to inverters. Use of PVC for mechanical protection within the array, between rows only, is permitted. PVC DC conduits are not permitted outside of the array edge instead ARC must be used as noted previously.

Please clarify What is meant by ARC must be used as previously noted? We are unable to find a reference to ARC except for when referring to ARC flash.

**ANSWER #28:** ARC refers to aluminum rigid conduit to ensure proper mechanical protection. PVC outside of the arrays will not be accepted.

- .8 **QUESTION #48:** On electrical drawing E-101, it is unclear as to where each ductbank cross section applies to on the site plan. Please clearly number the cross sections and apply the numbered cross sections on the site plan so that we can allow for proper application of each cross section.

**ANSWER #48:** Refer to updated drawing E-101 being issued as part of this addendum.

- .9 **QUESTION #49:** On drawing E-101, what is the 11 inch layer in below cross sections? Is this concrete encasement or sand?

Non Drivable Area - Feeder Trench Detail, Drivable area - Future EV Charger Feeder Trench Detail, Communication and Future Conduit - Below ground Trench Detail, Secondary Ductbank Section.

**ANSWER #49:** See below for confirmation for each detail:

Non Drivable Area - Feeder Trench Detail – Sand

Drivable area - Future EV Charger Feeder Trench Detail - Sand

Communication and Future Conduit - Below ground Trench Detail - Sand

Secondary Ductbank Section – Concrete Encasement

.10 **QUESTION #50:** Please clarify below questions received from Electrical trade.

1. Are alternates to Longi 600 PV modules accepted? We can offer Thornova 610s & 580s as alternates and these are cheaper than Longi 600.

2. We have to get a custom quote for the racking system as this is a ballasted system. We will need the following information for racking:

- Preferred Module Tilt (5 or 10 ° manufactured in North America, 13° imported from Germany)?

- Module Orientation (South or East/West)?

- What is most important - Achieve panel count, preferred tilt or preferred orientation?

- Height of Building (ft)?

- Height of Parapet (in)?

- Roof pitch (up to 5° fully ballasted, 5-10° additional anchors are necessary)?

- Layout attached? CAD file preferred, displaying all obstructions

GENERATOR QUESTION

1. Toromont does not make a 550kW Natural gas generator. They have to quote G3512 model which is rated 750-1250kW and will be overpriced for this tender, so they will have to pass unless the rating could be changed to 500kW. Please let us know if that will be possible.

Electronic Safety & Security

1. Please provide specifications for security devices, please let us know if you want a burglar system and provide specifications.

**ANSWER #50:** See responses below:

Solar PV Questions:

1. Please provide as an alternate, including credit for consideration. Base bid to be using Longi 600.

2. Please refer to module layout and building drawings for all information requested in this question. Racking can be sourced using the provided layout.

Generator Questions:

1. Generator sizing to remain as per contract documents.

Electronic Safety & Security

1. Security devices are to be covered under a Cash Allowance.

.11 **QUESTION #63:** Cabling Manufacturer - Belden - Please can you please confirm that the only cable manufacturer approved will be Belden in accordance with the City of Mississauga Network Cabling Standards? There is conflicting information provided in the specifications for more cabling options as per the attached extracted screenshots. Please see attached

Appendix to this Question. (Reference: Communication Specifications 27 10 00)

**ANSWER #63:** Confirming only Belden will be accepted in accordance with the City of Mississauga Network Cabling Standards. Electrical specification to be revised to remove alternates.

- .12 **QUESTION #64:** Equipment Manufacturer - Cable Talk - Please can you please confirm that the only acceptable equipment manufacturer will be Cable Talk in accordance with the City of Mississauga Network Cabling Standards? There is conflicting details provided in the specifications for this scope as per the attached extracted screenshots. Please see attached Appendix to this Question. (Reference: Communication Specifications 27 10 00)

**ANSWER #64:** Confirming only Cable-Talk will be accepted in accordance with the City of Mississauga Network Cabling Standards. Electrical specification to be revised to remove alternates.

- .13 **QUESTION #65:** Communications - Cabinet and racking requirements - Could you kindly provide detail regarding the cabinet and racking requirements? There is no communications riser or details available in the documents. Reference: Communication drawings & specifications

**ANSWER #65:** Confirmation of IT Room layout to be confirmed via post-tender addendum. Contractor to allow for the following in base-contract

- Equipment rack including passive equipment/accessories
- Refer to electrical specification section 27 10 00 "Structured Cabling".

- .14 **QUESTION #66:** DAS scope - Please advise if you are looking for DAS scope to be priced. Reference: Communication drawings & specifications

**ANSWER #66:** Yes, refer to drawings and electrical specification Section 27 40 10 "Distributed Antenna System (DAS)".

- .15 **QUESTION #67:** Clock scope - Please can you confirm that there is no clock scope. Reference: Communication drawings & specifications

**ANSWER #67:** Locations of battery operated clocks added to drawing E-401. Associated specification section to be updated to delete references to Master Wireless GPS Clock System, Master Wireless Network Clock System and Master Wired Clock System.

- .16 **QUESTION #69:** Please clarify Question on Truck EV Charger:

The specifications are not clear. Is this a Lvl 2 or Lvel 3 charger? Per info in Dwg E-202 appear to be suspended from ceiling/roof structure.

Pls provide preferred make, Lvl or kW rating etc. or provide detailed, clear specs.

**ANSWER #69:** Per single line diagram, the truck EV charger is not in contract.

- .17 **QUESTION #72:** Please confirm that the network cabling scope of work (telecommunications, audio-visual) on drawing E-401 is to be carried under cash allowance.

**ANSWER #72:** Both are base scope.

**Amendments to Specifications**

1. Section 26 22 00 "Distribution Transformers" added
2. Section 26 27 13 "Metering" added.
3. Section 27 10 00 'Structured Cabling' revised to remove manufacturers from acceptable manufacturers lists, aside from those which align with City of Mississauga Cabling Standards.
4. Section 27 51 13 "Paging & Public Address System" revised for the following:
  - .1 clarifications on base contract scope versus scope to be covered under cash allowances.
  - .2 Updating specification to align with City of Mississauga standards.
5. Section 27 53 13 "Master Clock" revised to leave only battery operated standard clocks.
6. Section 28 13 33 "Integrated Access Controls" revised to capture the following:
  - .1 update pre-qualified authorized re-sellers
  - .2 add clarification on base contract scope versus scope to be covered under cash allowances.

**Amendments to Drawings**

7. **Drawing E-101 'Electrical Site Plan'**
  - .1 **Add** section callouts for trenching details as shown.
  - .2 **Add** numbering to detail headers.
8. **Drawing E-401 'Ground Floor – Security And Systems Plan'**
  - .1 **Add** battery operated clocks at locations shown.
9. **Drawing E-601 'Single Line Diagram'**
  - .1 Drawing is issued with this Addendum. Modifications include but are not limited to the following:
    - .1 **Modify** Generator size to 500kW/625Kva, 600Y/347V.
    - .2 **Modify** Generator panel breaker size from 2X 800A-3P to 2X 600A-3P.
    - .3 **Modify** breaker feeding ATS from 800A-3P to 600A-3P.
    - .4 **Revise** feeder schedule.
    - .5 **Revise** drawing notes as shown.

## Part 1 - General

### 1.1 SUBMITTALS

- .1 Submit shop drawings for products specified in this Section.

## Part 2 - Products

### 2.1 DISTRIBUTION TRANSFORMERS

- .1 Hammond Power Solutions, dry type transformers as per drawing schedule, CSA approved and/or ULC listed and labelled, constructed and factory tested in accordance with latest requirements of following:
  - .1 CSA Standard C9;
  - .2 CAN/CSA C22.2 No. 47;
  - .3 CAN/CSA-C802.2
  - .4 UL 1561;
  - .5 NEMA TP1;
  - .6 Local governing authority codes and standards.
- .2 Dry type transformers to be complete with:
  - .1 minimum NEMA 3R enclosure with a rigid end frame, removable plates, a terminal compartment; ventilation louvres designed to prevent penetration of water spray from activated sprinklers onto live parts, and gasketed doors and component openings;
  - .2 Class "H", 220°C class, silicone type coil insulation, such that winding temperature rise to not exceed 150C°(270F°) and enclosure temperature rise not exceed 65C°(117F°) under full load in a 40°C (104°F) ambient temperature;
  - .3 top mounted factory painted drip shield;
  - .4 bottom mounted drip tray for wall/ceiling mounted transformers.
- .3 Features for each transformer include:
  - .1 copper windings;
  - .2 core construction consisting of stacked laminations of high permeability silicone steel;
  - .3 vacuum impregnated polyester or epoxy resin;
  - .4 lugs or pressure type terminals to suit primary and secondary conductors;
  - .5 four (4) 2-1/2% full capacity taps; two (2) above normal and two (2) below normal; taps located on primary winding;
  - .6 an integral vibration dampening system with anti-vibration pads used between core and enclosure;
  - .7 seismic restraint requirements to suit local governing authority requirements and codes;
  - .8 unless otherwise noted, sound level and basic impulse level to meet CSA C9 requirements; unless otherwise noted, transformers 300 kVA and larger to have noise level 3 dB below CSA C9 requirements;
  - .9 efficiency meeting or exceeding CSA C802.2;
  - .10 factory painted with an ANSI grey enamel finish;
  - .11 aluminum nameplate indicating impedance rating, weight, connection diagram, style and serial number, riveted to front of enclosure.
- .4 Additional features include:

- .1 K factor 13 rating as per ANSI/IEEE C57-110.
- .5 Acceptable manufacturers are:
  - .1 Hammond Power Solutions;
  - .2 Delta Group;
  - .3 Schneider Electric;
  - .4 REX Power Magnetics;
  - .5 Bemag Transformer;
  - .6 Siemens;
  - .7 STI Power.

### **Part 3 - Execution**

#### **3.1 INSTALLATION OF DISTRIBUTION TRANSFORMERS**

- .1 Locate transformers into position. Ensure adequate clearance is provided as per code requirements and as required for access for operation and maintenance. Comply with Manufacturer instructions and recommendations.
- .2 Secure transformers 75 KVA and larger to a concrete housekeeping pad on Vibro-Acoustics Ltd. type "RSR" vibration isolation pads.
- .3 Secure transformers smaller than 75 KVA in place on an angle wall mounting bracket support assembly located approximately 300 mm (12") below ceiling. Provide support assembly and adequately secure to wall and/or ceiling construction.
- .4 Provide seismic restraints as required by local governing codes.
- .5 Ensure that transformers are equipped with lugs or connections suitable for primary and secondary connections. Isolate primary and secondary connections from transformer enclosures by means of 300 mm - 450 mm (12" to 18") of liquid-tight flexible conduit.
- .6 Ground and bond equipment to ground electrode grids as per local governing electrical code and inspection authority requirements. Refer also requirements of Section titled - Grounding and Bonding.
- .7 Provide alarm/communications circuits as required. Include for provision of conduits, boxes and control/signal wiring for interconnection to BAS. Coordinate with Mechanical Divisions BAS Contractor on location of BAS panel to be used for monitoring points and extend wiring in conduit from electrical equipment to location. Terminate in junction box leaving 3 m (10') of slack length of wiring (exact length to be coordinated between Mechanical and Electrical trades), for extending and termination to BAS panel by Mechanical Division BAS Contractor. Properly identify wiring and junction box.
- .8 Provide engraved Lamacoid nameplates and warning signs with nomenclature reviewed with Consultant.
- .9 When installation is complete, test and check secondary voltages. Make all required adjustments and submit to Consultant a test report indicating secondary voltage readings and any adjustments made to achieve proper voltages. Furthermore, when building is in normal use, re-check voltages and make any required adjustments.
- .10 Refer to testing, coordination and verification requirements in Section titled Electrical Work Analysis and Testing and include applicable requirements.

END OF SECTION

## **Part 1 - General**

### **1.1 SUBMITTALS**

- .1 Submit shop drawings for products specified in this Section.

## **Part 2 - Products**

### **2.1 UTILITY METERING**

- .1 Type NEMA 3R weatherproof enclosure, 4 jaw meter base with maximum 200A, 600V ratings, Peerless meter seal rings and manufactured to CSA C22.2.
- .2 Confirm exact model number with local governing electrical utility.
- .3 Acceptable manufacturers are Microelectric and Eaton Cutler Hammer.
- .4 Provide conduit and fish cord in accordance to requirements of local electrical utility.

### **2.2 UTILITY METERING CABINETS & BASES**

- .1 Surface wall mounting, NEMA 2 or 12, with sprinkler proof provisions, enamelled steel meter cabinets complete with gasketting, and padlocking provisions, in accordance with local governing electrical utility requirements. Cabinet to be approved by local governing electrical utility.
- .2 Exterior weatherproof, enamel painted steel meter base and socket as approved by local electrical Utility for mounting of utility meter. Base to be wall mounting with suitable mounting hardware.
- .3 Provide conduit and fish cord in accordance to requirements of local governing electrical utility.

### **2.3 SUB-METERING**

- .1 Provision of microprocessor based CSA approved Power Measurement PML ION 7300 digital sub-metering system to measure and display voltage, current, frequency and time, and calculate and display kW, kWh, kW demand, ampere demand, kVA, kVA demand, kVAR and kVARh.
- .2 An LCD/LED display screen to be provided on unit.
- .3 System to include required inputs/outputs, contacts, RS232/Ethernet interface for communications to remote printer, LAN or building automation system (BAS), current transformers, potential transformers and control wiring as required.
- .4 Metering to be suitable for operation on 120/208 VAC and 600 VAC. Refer to single line diagram.
- .5 Meters to be installed in locations as shown on drawings. Mount in locations, connect, and test for proper operation. Comply with Manufacturer installation instructions.

## **Part 3 - Execution**

### **3.1 INSTALLATION OF METERING PROVISIONS**

- .1 Install meter enclosure with base and accessories in accordance with Manufacturer instructions and as per local electrical utility's requirements. Connect complete.
- .2 Coordinate and arrange for local governing electrical utility's incoming service work.
- .3 Obtain required inspections, approvals and certificates.

### 3.2 **INSTALLATION OF UTILITY'S METERING CABINETS & BASES**

- .1 Provide approved metering cabinets and conduit and install in accordance with local governing electrical utility requirements. Install cabinet in locations and install into locations and connect complete. Ensure adequate clearance is provided as per code requirements and as required for access for operation and maintenance. Provide required supporting hardware. Extend empty conduit from cabinets to metering compartments of switchboard or to main disconnect or to meter base as required.
- .2 Mount meter base with socket in location as approved by local governing electrical utility and coordinated with Consultant.
- .3 Coordinate installation with local governing electrical utility who to install meter equipment, and connect from meters to metering compartments of switchboard or to meter base. Confirm exact location of metering cabinet with local governing electrical utility.

### 3.3 **TRAINING**

- .1 Manufacturer trained technician to perform onsite training of each user (including the provision of user guides) prior to project completion to ensure that users are properly trained in the operation and maintenances of system.
- .2 Refer to Instructions to Owner specified in Section titled Electrical Work General Instructions.

END OF SECTION

## Part 1 - General

### 1.1 SUBMITTALS

- .1 Submit shop drawings for products specified in this Section.
- .2 Include data sheets for cabling, faceplates, terminal cabinets, racks, etc., and proposed cabling testing sheets.
- .3 Submit following:
  - .1 proof that final installation drawings have been reviewed by a Registered Communications Distribution Designer (RCDD);
  - .2 samples of each type of data/voice jack complete with faceplate;
  - .3 samples of patch-cord;
  - .4 sample of proposed labelling of components and wiring;
  - .5 sample of proposed test sheet;
  - .6 copy of tester calibration certificate;
  - .7 written confirmation that telecommunication system vendor is Manufacturer valid certified system vendor for at least duration of contract work and is in good standing at time of Bid submission;
  - .8 copy of system Manufacturer warranty;
  - .9 as-built drawings, including the following:
    - .1 provide an As-Built drawing of the cable installations for all drawings included in this specification with any changes due to site conditions;
    - .2 cable routes and outlet locations;
    - .3 numbering, icons, and drawing conventions used shall be consistent throughout all documentation provided;
    - .4 Contractor shall annotate the base drawings provided by the Owner and return a hard copy (same plot size as originals) and 1 (one) electronic copy in Adobe Acrobat PDF format;
    - .5 All documentation shall be submitted to the Customer within 10 working days of the completion of the project.

### 1.2 REFERENCE STANDARDS

- .1 Comply with latest editions of following, as applicable for project:
  - .1 ANSI/TIA-568-C family of Telecommunications Standards, including:
    - .1 ANSI/TIA-568-C.0 - Generic Telecommunications Cabling for Customer Premises;
    - .2 ANSI/TIA-568-C.1 - Commercial Building Telecommunications Cabling Standard;
    - .3 ANSI/TIA-568-C.2 - Balanced Twisted-Pair Telecommunication Cabling and Components Standard;
    - .4 ANSI/TIA-568-C.3 - Optical Fiber Cabling Components Standard;
    - .5 Issued addenda.
  - .2 ANSI/EIA/TIA 568A - Commercial Building Telecommunications Cabling.
  - .3 ANSI/EIA/TIA-569-C (CSA T530) - Commercial Building Standards for Telecommunications Pathway and Spaces;
  - .4 ANSI/EIA/TIA 606-B (CSA T528) - Administration Standard for Telecommunications Infrastructure of Commercial Buildings;

- .5 ANSI/EIA/ TIA-607-B (CSA T527) - Grounding and Bonding Requirements for Telecommunications in Commercial Buildings;
  - .6 ANSI/EIA/TIA 607-Commercial Building Grounding and Bonding Requirements for Telecommunications (CSA T527).
  - .7 ANSI/EIA/TIA TSB 67-Performance Specification For Field Testing Of Unshielded Twisted Pair Cabling Systems.
  - .8 CSA C22.2 No. 214 -Communication Cables.
  - .9 CENELEC EN 50173 -Performance Requirements for Generic Cabling Schemes.
  - .10 NEMA WC 63 -Performance Standard For Field Testing OD Unshielded Twisted Pair Cabling System.
  - .11 All UTP. (Unshielded twisted pair) products are to be produced from a single manufacturer unless otherwise stated.
  - .12 Latest Building Industry Consulting Service International (BICSI) standards;
  - .13 Applicable local Building Codes.
- .2 Work to be installed by system manufacturers certified system installers/vendors who are certified and experienced in implementing selected data cabling system and to perform related testing programs.
  - .3 System final installation layout to be designed and/or reviewed by a RCDD. Submit shop drawings verifying this requirement.

### 1.3 APPLICATION SUPPORT

- .1 Structured cabling system serves as a vehicle for transport of data, video, and voice telephony signals throughout network from designated demarcation points to outlets located at various desk, workstation, and other locations as indicated on drawings and described herein. Applications standards supported include, but be not limited to:
  - .1 IEEE 802.3;
  - .2 10BASE-T;
  - .3 IEEE 802.5;
  - .4 4 Mbps;
  - .5 16 Mbps (328 ft [100 m], 104 Workstations);
  - .6 TP-PMD.
- .2 In addition, these links/channels to be capable of supporting evolving high-end applications such as:
  - .1 100 Base-T;
  - .2 52/155 Mbps ATM;
  - .3 77 Channel Analogue Broadband Video out to 550 MHz.
- .3 Gigabit cable performance to be capable of supporting existing and evolving applications including:
  - .1 AES/EBU Digital Audio;
  - .2 270 Mbps Digital video;
  - .3 622 Mbps 64-CAP ATM;
  - .4 1000 Base-T Gigabit Ethernet;
  - .5 1.2 Gigabit ATM.

#### 1.4 WARRANTY

- .1 System manufacturers to provide a minimum twenty (20) year full parts, labour, and performance warranty on all passive components including structural cabling system. These warranties to be provided in written certificate form and that guarantee following:
  - .1 passive system components, e.g. patch panels, UTP cable and outlet jacks, are free from manufacturing defects in material or workmanship;
  - .2 approved cabling systems exceed specifications of TIA-EIA 568B.2.1 standards for specified category, in particular for attenuation and near-end cross-talk, loss and bandwidth requirements;
  - .3 installation supports applications for which it was originally designed as well as future versions of system performance specifications and any future applications using TIA/EIA 586B.2.1 component and cabling standards;
  - .4 replacement or repair of any originally installed registered system component to be completed at no cost for parts and labour to Owner during warranty period. Any components repaired or replaced to be warranted for remainder of warranty.
- .2 System manufacturers to provide in writing to Owner that in event of demise or failure or change in approved status of installing certified system installer/vendor, manufacturer to be responsible for providing another certified system installer/vendor to fulfil remainder of warranty conditions.
- .3 Claim for repair procedure to comprise of contractor being notified of a problem and who will conduct necessary tests and repairs to correct problem. Should contractor be unable to resolve problem, contractor to contact system supplier who will take necessary action and provide any technical support to correct problem.
- .4 Initial response time to a repair claim for a registered system to be within four (4) hours from time Contractor was notified of system fault.
- .5 Ensure that selected network cabling component manufacturer includes a system warranty that is a true "end-to-end" structured cabling system warranty from a single manufacturer, which includes data/voice communications outlet and patch cord at workstation, horizontal copper cabling, and patch panel and patch cords at LAN room. In addition, this warranty is to be valid with selected fibre optic cabling solution.

#### 1.5 SCOPE OF WORK

- .1 This document describes the products and execution requirements related to the installation and maintenance of the IT Network cable distribution systems for wireless, workstation, voice (VoIP) and data. This Section provides minimum standards for provision of a structured cabling system to network computer systems for complex. Requirements for network electronics are responsibility of Owner Network Integrator. Work includes but is not to be limited to following:
  - .1 Supply, install and test a complete Horizontal and Riser telecommunications system as specified herein and shown on the drawings provided.
  - .2 The data cabling system shall comprise of the following subsystems, supplied unless noted otherwise.
    - .1 Termination of new horizontal cabling on a patch panel in the network closet.
    - .2 Provision of modular jacks and faceplates at the work area outlets.
    - .3 Electrical grounding of network rack, as per code.
    - .4 Physically secure the network rack to the floor or wall.
    - .5 Labeling and testing of all cabling systems as specified.

- .6 Provision of all specified system documentation. (i.e. As-built drawings)
- .7 Supply and installation of horizontal cable distribution system using J-Hooks or approved equivalent cable supporting structure (as required) beyond conduit system already installed.
- .8 Provide Cat 6 Modular Patch Panels for termination (new install).
- .9 Rack and Racking accessories to be installed.
- .10 Install UPS into base of rack.
- .3 coordination of system requirements and integration requirements with integrated systems.
- .2 The local area network system must be "protocol neutral" and provide users access into a variety of resources from any location within the Complex. An Ethernet backbone shall be utilized for the system with intelligent network switches coordinating and managing data flow. The wiring configuration is based on a "physical star" topology in which cabling runs emanate in a radial pattern from the main data communications room in which the intelligent switches are located.
- .3 Technical features of the structural cabling plan include:
  - .1 use of Category 6 cabling to each data/voice outlet;
  - .2 use of modular Category 6 jacks at workstation ends of data/voice cabling run;
  - .3 backward compatibility to categories 5e, 5 and 3.
- .4 The network cabling system vendor shall coordinate with Electrical Contractor to ensure that properly sized conduits, back boxes outlet boxes, junction boxes and floor boxes are provided of sufficient size as per EIA/TIA Standards to accommodate CAT 6 system wiring and devices, with particular emphasis on bending radii of cabling. Conduit and boxes not meeting Cat 6 standard requirements must be replaced.
- .5 System to be designed to support minimum 802.11a/b/g/n/ac standards.

#### 1.6 SYSTEM SUPPLIER QUALIFICATIONS

- .1 System supplier qualifications include:
  - .1 being an established communications and electronics contractor that has and currently maintains a locally run and operated business for at least five years and holds applicable provincial and local licenses;
  - .2 be an Authorized Distributor or established franchisee for manufacturer of product/system proposed with full Manufacturer warranty privileges and be capable of providing post warranty service;
  - .3 employ technicians who have attended and successfully completed Manufacturer technical certification classes for proposed system;
  - .4 show satisfactory evidence, upon request, that they maintain a fully equipped service organization capable of furnishing adequate inspection and service to system on a 24-hour/7-day basis;
  - .5 maintain at their facility necessary spare parts in proper proportion as recommended by manufacturer to maintain and service equipment being supplied.
  - .6 The Contractor will be responsible for cable installations at the new facility. Installations must conform to Belden IBDN Certified System Vendor (CSV). <http://www.belden.com/resourcecenter/prutnerportal/certifiedsvstemvendor/Ce1tified-System-Vendor.cfm>
  - .7 All cables and related terminations and support shall be furnished, installed, wired, tested, labeled, and documented by the Contractor as detailed in this document.

- .8 The Contractor shall have access to professional staff with an R.C.D.D. designation (The Registered Communications Distribution Designer) to review drawings to ensure that they conform to the wiring standards as indicated in this Document.
- .2 Submit written evidence of qualifications to Consultant for approval.

## **Part 2 - Products**

### **2.1 HORIZONTAL CABLING**

- .1 For all new applications a UTP cable shall be used.
- .2 This cable shall consist of #24 AWG (CAT 6) solid conductors, formed into four individually twisted pairs and enclosed in a thermoplastic jacket.
- .3 The cable shall be rated CMP FT-6 Belden/CDT.
- .4 Performance shall comply with the latest draft of ANSI EIA/TIA 568-A.
- .5 Cat 6 Data cable jacket to be Yellow in colour.

### **2.2 OUTLETS**

- .1 GigaFlex PS6+ modules jacks AX IOI 065 (White).
- .2 Wall faceplates shall be provisioned accordingly for single or multi-port outlets, Belden/CDT (White).
- .3 Furniture outlet adapters shall be MDVO Side Entry boxes A0645273 (White).
- .4 Furniture outlet adapters to be determined for Floor Monuments. Where applicable, MDVO (Mobile Dynamic Virtual Organizations) blank inserts shall be used in empty ports in wall and furniture jacks.
- .5 Jacks colours and faceplate colours to be different to distinguish different systems as per Owner requirements. Confirm exact colour finishes and T568 pinning arrangement with Consultant prior to ordering.
- .6 Quantity of jacks and configuration of faceplates are as detailed on drawings.
- .7 Provide snap-in plastic dust covers on blank outlets and unused outlets. Blank covers to match faceplate colours.

### **2.3 PATCH PANELS**

- .1 482 mm, 19" Rack Mountable, 48 / 24 port, 8 position RJ45 style, High Density patch panel (Belden/CDT)
- .2 Category 6 Cables - Horizontal and Riser Terminations: GigaFlex PS6+ Belden/CDT, 2U, 48 Port, Black AX101458 GigaFlex PS6+ Belden/CDT, IU, 24 Port, Black AX101456
- .3 Pinout Termination Sequence is T-568-A.
- .4 Patch panel system to include required accessories such as bezels, harnesses, pigtails, connectors, jumpers, and retaining rings, interlay racking panels, horizontal wire managers etc., to provide for patch cord management.

### **2.4 PATCH CORDS & CABLES**

- .1 Patch cables to be supplied/procured by Vendor or General Contractor for use in the Network Closet only.
- .2 All Patch cables should be Belden/CDT brand.

- .3 Patch cable quantity should be equal to quantity of all ethernet cabling installed.
- .4 City staff will be responsible for patch cable installation.
- .5 Each patch cable should be Category 6 Ethernet cabling - Ultra thin 28AWG - length should be 7 feet.
- .6 Outer jacket for all patch cables should be black in color.
- .7 Patch cords to be of different colours to distinguish different systems as per Owner requirements. Confirm exact colour finishes with Consultant prior to ordering.

## 2.5 CATEGORY 6 VOICE TERMINATIONS

- .1 Category 6, 96 and 288 pairs punch down block bases for termination of UTP cabling and cat 6 connecting blocks; finished in white; can be interlocked and stacked to accommodate system capacity; of types to be either rack mounted or panel mounted to suit application and room requirements.
- .2 Category 6 cross connect jumper wire.
- .3 110 connecting tool, designation strips, labels and wiring distribution rings.
- .4 Cable HUB harness or pigtails as required.

## 2.6 OPEN EQUIPMENT RACKS

- .1 Open type, equipment racks to be heavy duty type, standard EIA 19" free standing racks, complete with but not limited to following requirements to be supplied by the Cabling Contractor:
  - .1 steel or aluminum construction;
  - .2 minimum 1800 mm in height, with 4 posts design for racks containing servers and other active head end equipment;
  - .3 polyurethane finish or enamel painted finish;
  - .4 double sided 12/24 tapped holes;
  - .5 heavy duty base with provision for bolting to floor;
  - .6 high capacity cable organizer channel with snap on cover;
  - .7 full height vertical cable channels 150 mm x 150 mm (6" x 6") on both sides of rack;
  - .8 horizontal cable management channel - minimum one for each patch panel;
  - .9 front and rear cable management provisions (typically only last 150 mm (6") of cabling to connector to be loose and not in channel);
  - .10 rack mounted multi- outlet power strips with surge protection, integral breaker, pilot light and power cord with twist lock type plug and receptacle provisions; number of outlets to be same as number of active devices mounted on racks;
  - .11 required mounting hardware, label kits, velcro style fasteners and ancillary devices.
- .2 Each rack to include grounding provisions to meet previously listed standards, which include but are not limited to following provisions:
  - .1 copper ground strip mounted on side rail extending full height of rack;
  - .2 equipment jumper kits, to bond network equipment to rack ground strip;
  - .3 common bonding network to rack jumper kit, to bond rack to room common bonding network;
  - .4 hardware including, copper compression HTAPS, paint piercing washer kits, bonding screws and electrostatic discharge port kits.

- .3 Racks to be of size and quantity to accommodate respective number of patch panel ports to suit number of required drops, quantity of network electronic components as directed by Owner network integrator, uninterruptible power supply unit and an additional 20% spare capacity for future expansion.
- .4 Wall mounted equipment racks to be provided where required and with similar applicable features as per specified floor mounted products, but sized to suit application and complete with wall mounting hardware and hinged feature to allow access to rear of rack.
- .5 Within LAN rooms, provide flexible steel type wire basket tray to manage cabling to and from racks. Refer to cable tray section for tray requirements.
- .6 New Communication racks shall be:
  - .1 Mandatory:
    - .1 Cable Talk CTR-1977C-P48-B (4-post rack w/ Vertical Cable Management) or approved equivalent by the City/Owner
    - .2 CableTalk CTR-1977-DS-B (2-Post Rack w/ Vertical Cable Management) or approved equivalent by the City/Owner.
    - .3 Cable Talk CTR-CMS-16-B vertical cable manager or approved equivalent by the City/Owner.
    - .4 CableTalk CTPBV-1277-SD-B 15 amp. Vertical power bar "switch disabled" or approved equivalent by the City/Owner.
    - .5 Cage nuts NUT-CAGED-10-32K (100 pack) for 4-post racks
  - .2 Optional: (if requested by the City)
    - .1 Cable Talk CTRS-F-1812-B (Single sided fixed shelf) or approved equivalent by the City/Owner.
    - .2 Cable Talk CTRS-F-1820-B (Centre Mounted shelf) or approved equivalent by the City/Owner.

## 2.7 EQUIPMENT CABINETS

- .1 Enclosed type, equipment cabinets to be heavy duty type, complete with but not be limited to following requirements:
  - .1 steel construction frame work with steel or aluminum construction sides, backs, tops and bottom panels;
  - .2 ventilation fans and louvers;
  - .3 minimum 1800 mm (70") in height;
  - .4 polyurethane finish or enamel painted finish to Consultant's approval;
  - .5 double sided 12/24 tapped holes;
  - .6 sized and spaced for standard EIA 19" racking;
  - .7 heavy duty base with provision for bolting to floor;
  - .8 high capacity cable organizer channel with snap on cover;
  - .9 full height front and back hinged lockable doors with handle operators with locks and keys; keys to be keyed alike as per Owner direction;
  - .10 full height vertical cable channels 150 mm x 150 mm (6" x 6") on both sides of rack;
  - .11 horizontal cable management channel - minimum one for each patch panel;
  - .12 front and rear cable management provisions (typically only last 150 mm (6") of cabling to connector to be loose and not in channel);

- .13 rack mounted multi- outlet power strips with surge protection, integral breaker, pilot light and power cord with twist lock type plug and receptacle provisions; number of outlets to be same as number of active devices housed in equipment enclosure;
- .14 required mounting hardware, label kits, Velcro style fasteners and ancillary devices.
- .2 Include grounding provisions for each cabinet, to meet previously listed standards, which include but are not limited to following provisions:
  - .1 copper ground strip mounted on side rail extending full height of rack;
  - .2 equipment jumper kits, to bond network equipment to rack ground strip;
  - .3 common bonding network to rack jumper kit, to bond rack to room common bonding network;
  - .4 hardware including, copper compression HTAPS, paint piercing washer kits, bonding screws and electrostatic discharge port kits.
- .3 Wall mounted equipment enclosures to be provided where required with similar applicable features as per specified floor mounted products, but sized to suit application and complete with wall mounting hardware and hinged feature to allow access to rear of cabinet.
- .4 Cabinets to be of size and quantity to accommodate respective number of patch panel ports to suit number of required drops, quantity of network electronic components as directed by Owner network integrator, uninterruptible power supply unit, and an additional 20% spare capacity for future expansion.
- .5 Acceptable manufacturers are:
  - .1 Cable-Talk;

## 2.8 WIRELESS LAN INFRASTRUCTURE

- .1 Provisions for a wireless LAN infrastructure to be provided with 100% coverage of entire complex, utilizing structured network cabling system as a rough-in for future wireless access points (WAP) located in ceiling spaces. Generally, quantity of outlets to be identified on drawings, but Electrical Divisions contractor to perform a site signal survey/audit of coverage areas and confirm if additional rough-in jacks are required. Prepare audit immediately after structure of concrete and metal studs are in place. Submit copy of audit to Consultant to review.
- .2 Locations may generally be shown on drawings, however, following criteria to be followed:
  - .1 back-of-house above accessible ceiling tile or high up in open ceiling areas as confirmed with Consultant;
  - .2 public spaces priority:
  - .3 in service areas adjacent public areas;
  - .4 in light cove if WAP is hidden;
  - .5 with access panel (location identified).

## 2.9 ACCEPTABLE NETWORK CABLING SYSTEM MANUFACTURERS

- .1 Horizontal network copper cabling infrastructure is to be end-to-end solution from a single manufacturer, which includes data communication outlets and patch cords at workstations, and patch panels and patch cords at LAN/Telecommunication rooms. To this horizontal network is integrated fibre optic cabling infrastructure from same manufacturer or approved listed herein, maintaining full warranty requirements for systems comprising this Section.

- .2 Acceptable network cabling system manufactures for provision of horizontal network copper cabling infrastructure are:
  - .1 Belden/CDT;

### 2.10 ACCEPTABLE CONTRACTORS

- .1 Contractor selected for installation of structured cabling system to provide confirmation of following:
  - .1 detailed knowledge and experience in fibre optic cabling and category grade rating copper UTP wiring installations;
  - .2 detailed knowledge and experience in installation of Intelligent HUB equipment;
  - .3 experience in troubleshooting and problem solving in data communication networks.
  - .4 ability to provide system Manufacturer certified warranties;
  - .5 certified and valid proof of being system Manufacturer authorized vendor.
- .2 Refer also to supplier requirements specified in Part 1.

## Part 3 - Execution

### 3.1 INSTALLATION OF NETWORK CABLING - GENERAL

- .1 Installation shall conform to the applicable codes and standards (as listed in 1.2.) manufacturer's recommendations, and best industry practices.
- .2 Grounding of each distribution rack to the communications ground bus system shall be performed by the structured cabling contractor. Mounting and fastening of the distribution rack (where applicable) to the floor shall be performed by the cable contractor.
- .3 Cables shall be installed in trays and or conduits as provided by the electrical contractor.
- .4 No splicing of any structured cabling will be permitted.
- .5 Properly handle and install structured network cabling in accordance with Manufacturer specifications. Avoid undue pulling tension, abrasion, or rough handling to ensure that cables will permit transmission up to required category rating design speed for cables. Install cables without splices or cuts to ensure elimination of reflections, discontinuities, impedance mismatches, etc. maximum horizontal length of copper cabling from workstation to network switch is not to exceed 90 m (295') or less if recommended by system manufacturer to meet required category grade rating performance standards. Maximum length of patch cables (either cross connects or interconnecting with electronic equipment to connect devices at work area outlet), to be a total of 10 m (30'). Maintain system Manufacturer minimum channel lengths as confirmed with system manufacturer. Provide cable loops in accordance with Manufacturer instructions.
- .6 Unless otherwise noted or where cable tray is shown for such use, run cabling in conduit. Install pull cords for future use, in conduits extending between floors.
- .7 Generally, no more than two (2) 90-degree changes in direction are recommended for cable installed in conduit without pull boxes and not more than 40% fill ratio. Confirm exact conduit bending radii restrictions and fill ratios with system manufacturer and comply with those standards.
- .8 With consideration in minimizing alien crosstalk to levels as per BICSI standards and Manufacturer standards, dress cables in a neat and orderly fashion from entrance of communications closet to relay racks using vertical and horizontal cable management trays and paths. Do not exceed Manufacturer distance limitations to maintain required category rating performance standards.

- .9 Care to be taken to ensure that during installation, nicks, abrasions, burning and scuffing of cable is prevented. Replace cables found to be damaged regardless of whether cable passes category grade rating or fibre performance testing standards.
- .10 Secure bundled cables transitioning between floors via ladder cable tray, to vertical ladder sections with Velcro wraps. Use waterfall (rounded transition) fittings for cable changing from a horizontal path to a vertical one. This is to maintain minimum bend radius for cabling system. Support cables running through risers between floors such that they are properly supported for their weight, especially in situations with high pair count cables and large bundles.
- .11 Electrical Contractor and telecommunication system vendor to provide coordination of structured cabling system with other systems as required.
- .12 Required necessary drilling and anchoring components to be installed before any horizontal cable is installed.
- .13 Route horizontal cable into equipment racks/enclosures and neatly bundle with Velcro cable ties. Maximum number of cables per bundle to be 25.
- .14 Securely mount fire retardant plywood on wall in each telecommunications room or closet.
- .15 Review installation of conduits and boxes and advise Electrical Contractor where products do not comply with CAT 6A Standards. Ensure that products are replaced as required to meet standards.
- .16 Cables wraps are to be Velcro type and are not to be over tightened.
- .17 Provide grounding and bonding requirements as specified in Section titled Grounding and Bonding.

### 3.2 DATA CABLES

- .1 All New LAN Data cable is to be Category 6 and is to be terminated on Category 6 connecting hardware at the wall termination for each location, and rack mounted patch panels in the communication closet.
- .2 Label and test all cabling as detailed in this specification.

### 3.3 HORIZONTAL DISTRIBUTION SYSTEM

- .1 Cabling contractor to supply and install a horizontal distribution system using J-hooks or approved equivalent supporting structure, beyond provided tray/conduit, as per provided drawings.
- .2 Supporting cable structure is to be installed into steel support structure or concrete above.
- .3 Distribution system to be designed and installed according to consultation with Customer.
- .4 Cable distribution to be designed according to best practices and to maintain a clean ceiling space.
- .5 J-Hooks distribution to be designed with cable spans not to exceed 4 Feet between Zone conduit and J-Hook or J-Hook to J-Hook where applicable.

### 3.4 ACCESS POINT INSTALLATION

- .1 Termination of cable for Access Point on SMB (Surface mount box) with 10 feet service slack in ceiling, or secure to supporting structure (in case of no ceiling).

- .2 Install Cisco access points by patching to installed SMB from rack in network closet via patch cable.
  - .1 Cabling for Wi-Fi Access Points shall be CAT6A, Plenum rated (FT6), jacket color shall be yellow.
  - .2 Cabling for Wi-Fi 33 Access Points shall be terminated at the end of the patch panel, separate from the data jack cables. (i.e. on a 48-port patch panel, data jacks terminated on ports #1-40, AP's terminated on ports #41-48).

### 3.5 INSTALLATION OF PATCH PANELS & ACCESSORIES

- .1 Provide patch panels onto racks in locations. Provide terminating hardware and connectors to suit incoming and outgoing cabling. Clearly identify each port. Provide patch cords as required. Install devices in accordance with system Manufacturer requirements.
- .2 Terminate both data and voice horizontal cabling onto patch panel punch down using Manufacturer recommended tools. Bundle cabling in neat configuration and secure to patch panels and rack assemblies. Typically dedicated separate patch panels are required for data and voice.
- .3 Install rack enclosures on walls. Neatly bundle wiring within wiring management channels. Do not over tighten Velcro straps. Ground racks as required.

### 3.6 COPPER CABLE INSTALLATION

- .1 Run horizontal, UTP cables continuous from end to end with no splices. Install horizontal cables in Star topology, emanating from rack mounted patch panel(s) and terminating on data outlet faceplates in rooms or other workstation locations. maximum length for horizontal cables to not exceed 90m (295'). Maximum length for patch cords at patch panel to not exceed 3m (10').
- .2 Install conductors in cable tray and conduit runs designated for data and voice conductors. Do not fasten conductors and conduit to suspended ceiling support systems. Support conduit to building structure slab independent of other support.
- .3 Terminations to involve as little outer jacket removal as possible and cable pairs "untwisting" is to not exceed 6 mm (1/4").
- .4 Provide slack cable to allow for minor workstation relocations. Provide a coil of slack cable of an approximate 2 m (6') length for each workstation outlet run.
- .5 Where conduits and/or cable tray is not being provided, conductors within accessible ceiling spaces to be properly bundled using "Velcro" type wraps and supported with "J" hooks. Secure "J" hooks to ceiling slab structure. Install conductors following building lines. Do not fastened conductors to suspended ceiling support systems. Obtain Consultant's approval in use of "J" hooks. Unless otherwise noted, drops down from ceiling spaces to consist of cabling installed in vertical conduits running down within walls to outlet boxes and terminating onto jacks.
- .6 For main voice backbone cabling from main telecom room, provide 110 connectors and mounts on hardwood backboards on walls, as required. Design system layout to best suit incoming and outgoing cables. Properly punch down cabling with Manufacturer required tool and label each connector as required.
- .7 Run interconnect cables neatly secured and bundled across connectors and between banks of mounts. Use D-rings to their full advantage. Neatly bundle pigtails and secure to BIX/110 connectors.
- .8 Align mounts in straight formations to provide a neat installation and to minimize interconnect wiring lengths.

- .9 Coordinate with Owner network integrator to determine exact requirements for telephone service interconnections.
- .10 Provide jumpers/pigtails to interconnect backbone wiring to rack mounted voice patch panels where horizontal voice cabling is terminated.
- .11 For horizontal copper backbone cabling, multi-pair conductor cabling is preferred. If available only in limited number of pair cabling, provide multiple runs to provide quantity as identified on drawings, and increase conduit diameters to suit exact number requirements, in accordance with standards and codes.

### 3.7 PENETRATION THROUGH FIREWALLS

- .1 Provide a conduit sleeve where horizontal cables penetrate firewalls. Size conduit sleeve at 40% fill ratio with a plastic bushing at both ends.
- .2 After conduit sleeve is installed, fill opening around conduit with firestop and smoke seal materials.

### 3.8 INSTALLATION OF OUTLETS

- .1 Connect each data/voice outlet with a 4-pair, UTP cable. Test and identify each outlet and faceplate. Wire and connect data/voice jacks back to respective dedicated racks in LAN/TEL rooms. As detailed, extend voice cabling from voice patch panels to wall mounted 110 connectors, using patch cords, cross connects/jumpers, etc. as required.
- .2 Provide outlet jack/faceplate configuration as detailed on drawings.
- .3 Drawings identify data jacks for wireless access point receivers (antennae). These locations are approximate. Confirm exact locations during onsite radio frequency studies. Allow for jacks to be repositioned up to 4m (15') to suit results of studies. Perform studies after completion of construction of interior structures. If studies are not performed at discretion of Owner, obtain direction from Consultant to leave slack coiled length of cable on each run, allowing for repositioning.

### 3.9 SEPARATION OF DATA COMMUNICATION CABLES FROM SOURCES OF ELECTROMAGNETIC INTERFERENCE

- .1 Separate data communication cables from sources of electromagnetic radiation in accordance with TIA Standard Proposal SP-2072 and following:
  - .1 FT-6 rated data cabling raceway and power conductors (2 kVA power circuits) raceway require 125 mm (5") clearance;
  - .2 clearance increases up to 600 mm (24") for power circuits over 5 kVA.
  - .3 for large motor, transformers, power panels, etc., required clearance is 1m (39");
  - .4 route cables to avoid direct contact with steam piping, hot water piping or other heat sources to avoid thermal degradation.

### 3.10 INSTALLATION OF RACKS

- .1 Provide racks and secure to floor with bolts and concrete anchors.
- .2 In locations where more than one rack is required, butt multiple racks together. Provide wiring channel interconnection such that wiring from rack to another is not exposed.
- .3 For open racks, provide metal raceway chimney channel for conductors extending down from ceiling, such that wiring is not exposed. Secure channel to rack and ceiling.

- .4 Run wiring neatly bundled within wiring management channels. Do not over tighten Velcro tie wraps such that they deform cable jacket. Velcro straps to easily slide along length of cable. Velcro tie wraps used in plenum spaces to be CMP/FT-6 rated.
- .5 Protect cable from any obstructions using appropriate grommeting in roof of rack.
- .6 Properly ground and bond rack and equipment to room ground bus as per specifications and to standards of TIA/EIA 607.

### 3.11 INSTALLATION OF EQUIPMENT ENCLOSURES

- .1 Provide equipment enclosures and secure to wall/floor/ceiling as required with suitable anchors.
- .2 In locations where more than one enclosure is required, butt multiple enclosures together. Provide wiring channel interconnection such that wiring from enclosure to another is not exposed.
- .3 Provide metal raceway chimney channel for conductors extending down from ceiling, such that wiring is not exposed. Secure channel to enclosure and ceiling.
- .4 Provide suitable power supply to cabinets having fans and other active components or designated as such.
- .5 Run wiring neatly bundled within wiring management channels. Do not over tighten Velcro tie wraps such that they deform cable jacket. Velcro straps to easily slide along length of cable. Velcro tie wraps used in plenum spaces to be CMP/FT-6 rated.
- .6 Protect cable from any obstructions using appropriate grommeting in roof of enclosure.
- .7 Properly ground and bond enclosure and equipment to room ground bus as per specifications and to standards of TIA/EIA 607.

### 3.12 SYSTEM IDENTIFICATION

- .1 Provide a complete identification system that clearly designates following:
  - .1 horizontal cable;
  - .2 workstation (or faceplate);
  - .3 horizontal/passive patch panel port;
  - .4 switch/active patch panel port;
  - .5 patch cords;
  - .6 switch rack.
- .2 Obtain Owner approval of identification format, prior to start of work. Format to comply with Owner standards. Submit proposed identification system and nomenclature with shop drawing submission.
- .3 Provide adhesive cable labels to meet the legibility, defacement, and adhesion requirements specified in UL 969 (Ref. D 16). In addition the labels shall meet in the general exposure requirements in UL 969 for indoor use.
- .4 Self-laminating vinyl construction cable labels with a white printing area and a clear tail that self laminates the printed area when wrapped around the cable. The clear area should be of a sufficient length to wrap around the cable at least one and a half times.
- .5 Mechanically print labels using a printer and follow guideline in ANSJ/TIA/EIA 606 for colour codes. Hand written labels shall not be permitted.
- .6 All cables shall be labeled at the following locations:
  - .1 Each end of data cable lines;

- .2 Front of Patch Panel- Data patch panels;
- .3 Front of End User faceplates - All work area outlets;
- .4 All Data and Analog Line horizontal UTP cables shall be labeled identically using the format as shown below
  - .1 C6-XX- AAA.
  - .2 C6 identifies Cat 6 cable.
  - .3 XX - identifies the floor and particular Comm. Room, where applicable (ex. 4N - floor, North side, 3W - floor 3, west side)
  - .4 AAA identifies the incremental cable number (i.e. 001, 002, 003 etc....).

### 3.13 CABLE TESTING & SYSTEM CERTIFICATION

- .1 Structured cabling system certification to include 100% cable testing and verification for an EIA/TIA required category grade rating solution.
- .2 Perform verification of each cable and document on a cable testing sheet forming part of hard and soft copy documentation supplied at end of installation. Testing sheets to list detailed performance test measurements as requested and as required to prove compliance with referenced standards. Also include summary sheet of passes, failures and rectified failures. Submit sample of test sheet with shop drawings.
- .3 Comply with system Manufacturer testing and certification procedures.
  - .1 Horizontal distribution shall be tested and certified in accordance with ANSJ/EIA/TIA and BICSI standards.
  - .2 Copper cable testing equipment testing Cat 6 cable shall be performed in accordance with ANSI/BIA/TIA 568A standard, using level 3, Category 6 cable testers. All testing software shall be the latest version, and licensed.
  - .3 Tests shall include Wire Map, Leogt1, Insertion Loss (Attenuation), NEXT, (pair to pair), PSNEXT, ELFNEXT (pair to pair) PSELFEXT, RETURN Loss, ACR, PSCAR, Propagation Delay, Delay Skew. Test results shall be recorded.
  - .4 100% of cables must be tested. Up to 5% of test may be redone in the presence of the Owner.
  - .5 Any failures shall be corrected expeditiously and retested. Record of test shall be submitted in both printed and soft copy. (MS Word or Excel Format only).
  - .6 Replace cable not passing testing procedure, in its entirety. No splicing is permitted in repair of any defective cable.
- .4 Reports:
  - .1 Cabling contractor shall submit test results in hard copy binder form which are to be left in the Communication closet. Electronic copies of the results are to be provided to the Customer in MS Excel, .pdf or Word format
  - .2 Cabling contractor to produce a cable test summary report based on the cable schedules.
  - .3 The report should indicate for each cable when it was tested successfully, the result and the length.
  - .4 The entire report must be signed by an authorized person for the cabling contractor and the end of the project.
  - .5 The test result documentation must be submitted to the owner for review no later than 10 working days following the completion of the installation.

**3.14 SYSTEM TRAINING & INSTRUCTIONS**

- .1 Provide training of Owner designated staff on principles of connections and operations to system. Clearly instruct on procedures of disconnections and reconnections to accommodate changes and relocations of connected equipment.

**END OF SECTION**

## **Part 1 - General**

### **1.1 RELATED REQUIREMENTS**

- .1 Section 26 05 00 - Common Work Results for Electrical
- .2 Section 27 00 00 - General Systimax Standards & Guidelines

### **1.2 SUBMITTALS**

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings shall include project specific riser diagrams including:
  - .1 Paging Control Equipment
  - .2 Amplifiers
  - .3 Zone Wiring Topology
  - .4 Speakers and Horns
  - .5 Rack, Rails
  - .6 Microphones
  - .7 UPS

### **1.3 WORK BY OTHERS**

- .1 All equipment, associated cabling, terminations, testing, programming, integration and commissioning of the paging and public address system shall be supplied and installed by the pre-qualified authorized re-seller noted in Article 1.6 below under the associated cash allowance.
- .2 The Electrical Subcontractor shall coordinate with successful subcontractor(s) to provide conduit pathways and power supplies for the installations as necessary.

### **1.4 ACCEPTABLE MANUFACTURERS**

- .1 The system specified herein is based on equipment listed under section 2.1.
- .2 Alternate manufacturers equipment shall be considered as approved, provided all functions and operations are provided as specified.
- .3 Proposed systems may differ from that specified herein and indicated on the Drawings provided that complete documentation of the system is submitted to the Consultant during Shop Drawing review. This Division shall assume all changes in costs that may flow from the design changes proposed.
- .4 Acceptable manufacturers are:
  - .1 TOA Electronics, Inc;

### **1.5 SYSTEM OPERATION**

- .1 The system shall be zoned paging system with input interface suitably designed and selected to accept Owners input signal.
- .2 Paging Zones: as per drawings

**1.6 QUALITY ASSURANCE**

- .1 System supply, installation and support shall be carried out by one of the following pre-qualified authorized re-sellers.:
  - .1 Underwriter Security Controls Incorporated  
 27-172 Bullock Drive  
 Markham ON L3P 7M9  
 Contact: Paul  
 Email: paulg@purnrg.ca  
 Phone: (416) 410-7733

**Part 2 - Products**

**2.1 Equipment**

- .1 The equipment shall consist of the following:
  - .1 Program Audio Loudspeakers
  - .2 Multi Zone Amplification
  - .3 Cables, Plates and Terminations
  - .4 Connections to Mach Fire Station alerting system
  - .5 A/V Equipment Rack and Fit Up
  - .6 Racks shall house rack mounted sound equipment as specified.
  - .7 All unused rack spaces shall be covered by Middle Atlantic metal rack panels, finished with a baked-on, scratch-resistant BL finish to match equipment rack.
  - .8 No individual blank plate shall be greater than two rack units (2RU) in height.
  - .9 Rack layouts showing all devices, labelling, and blank panels are to be submitted during shop drawings phase for approval by the City of Mississauga.
- .2 Equipment Model List

Item	Description	Model	Qty
A1	240W digital mixer/amplifier (8 channel input, Misc./Line/two optional module slot), incl. 1Mic./Emergency, DSP, EQ	A-824D 3CUE00	1
A2	10W, ceiling mount 8" speaker, round, 25V/70V, (ULC S541, UL 1480 & 204 3) HY-BC580U Back box.	PC-580RU AM	32
A3	Back box for PC-580RU & PC-580RVU speakers	HY-BC580U AM F00	32
A4	Mounting support channels for ceiling speakers (min 10 pairs/1 carton)	Q-HY-TB2	4
A5	25W Decora-Style Volume control, input 25V/70V/100V	AT-025 AM QV	16
A6	Volume Control Attenuator	AT-100 AM QV	1

A7	30W Paging horn, 25/70V, incl. bracket, UL/ULC	SC-630TU	6
A8	Desk-top paging Misc., push-to-talk button, w/lock.	PM-660U	1
B1	18-4C STR BC LSPVC FOIL SHD LSPVC JKT NAT CMP 75C 1000' BOX	B6302FE-U1000	1
C1	Misc Install Supplies	Misc Install	1
D1	Onsite Installation of PA Solution as per Design Layout Diagrams.	Services	1

### Part 3 - Execution

#### 3.1 INSTALLATION

- .1 Install all major components, speakers and miscellaneous devices where indicated on Drawings.
- .2 Mount amplifiers on wall on backboard.

#### 3.2 WIRING

- .1 Type of wiring is to be as recommended by System Supplier and shall be installed by Electrical Contractor, but connected by the Equipment Supplier.
- .2 All speaker cable must be 2 conductor 16 AWG plenum rated.
- .3 All wiring is to run in concealed EMT conduit. Conduits shall be sized to cable being supplied.
- .4 Lacing bars & cable tie saddles, and cable management straps as required to secure cable bundles.
- .5 Cover knock-outs with Protective Grommets or Gland Grommets to block dust & control airflow in the rack.
- .6 All line level cables must be balanced and shielded. (Belden 9451 or equivalent.) If line level cable is to be run through a plenum it must be plenum rated.

#### 3.3 TESTING

- .1 All lines shall be tested for continuity, grounds and shorts. An impedance test shall be done on each and every speaker and a report shall be submitted to the Engineer.
- .2 The Supplier shall test the system to ensure proper operation and make changes/corrections to the system if any defects occur.
- .3 The Contractor shall include in his Tender price, all costs required for the Supplier's Technician's visit and testing.
- .4 Demonstration & Training
- .5 Demonstrate operation system to customer by walking the space.

- .6 Demonstrate functionality of the system to the customer or customer's representative.
- .7 Train customer employee to maintain system as required.

**3.4 OPERATING INSTRUCTIONS & MANUALS**

- .1 Engage the System Supplier to provide adequate instructions in the total operation of the System to all persons assigned by the Owner. These instructions shall be to the Owner's satisfaction.
- .2 Provide two (2) copies of complete operating manuals of each system installed.

**END OF SECTION**

## **Part 1 - General**

### **1.1 SUBMITTALS**

- .1 Submit shop drawings for products specified in this Section.

### **1.2 SOFTWARE NOMENCLATURE REPROGRAMMING**

- .1 Include additional costs for system manufacturer to make necessary on site final changes to applicable system/equipment software. Make such changes after successful testing and verification of systems, but prior to turn over to Owner. After successful final verification of work, confirm and obtain approval of final nomenclature in writing from Owner and Consultant. Software revisions to incorporate final room names/area names/building names and equipment identification.

### **1.3 SYSTEM SUPPLIER/INSTALLER QUALIFICATIONS**

- .1 Supplier/installer of system to be an established communications and electronics contractor that has and currently maintains a locally run and operated business for at least 5 years and holds applicable provincial and local licenses.
- .2 Supplier/installer to be a valid authorized distributor for product/system proposed with full manufacturers warranty privileges.
- .3 Supplier/installer to employ technicians who have attended and successfully completed manufacturers technical certification training for proposed system.
- .4 Supplier/installer to show satisfactory evidence, upon request, that they maintain a fully equipped service organization capable of furnishing adequate inspection and service to system. Supplier/installer to maintain at their facility necessary spare parts in proper proportion as recommended by system manufacturer to maintain and service equipment being supplied.

## **Part 2 - Products**

### **2.1 BATTERY OPERATED STANDARD CLOCKS**

- .1 GE model 24A716, ULC listed and labelled, 300 mm (12") round faced, battery operated standard clocks as follows:
  - .1 stand alone, analogue type with quartz movement;
  - .2 surface mounting;
  - .3 12/24 hour display;
  - .4 black minute and hour hands and red seconds hand;
  - .5 high impact polycarbonate housing;
  - .6 polycarbonate lens;
  - .7 wire guard where noted;
  - .8 alkaline batteries.
- .2 Acceptable manufacturers/vendors:
  - .1 SimplexGrinnell;
  - .2 GE/Chubb Edwards;
  - .3 Rauland;
  - .4 Siemens.

**Part 3 - Execution**

**3.1 INSTALLATION OF BATTERY OPERATED STANDARD CLOCKS**

- .1 Install clocks in accordance with manufacturers instructions to suit application.
- .2 Provide backbox suitable for wall installation.
- .3 Confirm clock face 12 or 24 hour display requirements and finishes with Consultant prior to ordering.
- .4 Check and test operation.

**END OF SECTION**

## **Part 1 - General**

### **1.1 GENERAL PURPOSE**

- .1 To establish the technical, functional, jurisdictional, or regulatory and quality requirements for security and access control systems; which are required to be purchased from vendors. Approved technical specifications define the supply and installations of all security and access control systems and identify approved manufacturers and models.
- .2 The security system shall consist of implementing an integrated networked Access Control and Video Assessment System (ACAMVAS) that shall control personnel access, provide real time intrusion detection alarm monitoring and provide alarm driven video surveillance for the designated buildings and operations in accordance with the requirements and specifications prescribed in these documents and the approved drawings. The security system shall include the following, where applicable:
- .3 Seamless integration of a digital video management system that will allow system operators to control and maintain the security of the facilities from multiple designated client workstations.
- .4 Seamless integration of video surveillance systems that provides alarm driven assessment for the intrusion detection equipment at designated facilities.
- .5 Seamless integration with wireless networked locksets from Assa Abloy or Salto to provide doors with a battery powered solution for access control without the need to pull multiple wiring cables to the door.
- .6 Commissioning and testing of the systems and equipment installed as required to meet manufacturers' specifications and documented installation procedures, and to the satisfaction of the Owner.
- .7 Training of the Owner's personnel to: fully operate, and perform routine maintenance on the systems and equipment installed.
- .8 Provide all associated documentation for the security system upgrades.

### **1.2 REFERENCE STANDARDS**

- .1 Underwriters' Laboratories of Canada (ULC)
- .2 American National Standards Institute (ANSI) Standards
- .3 Ontario Building Code
- .4 CANASA (Canadian Alarm and Security Association)
- .5 CFAA (Canadian Fire Alarm Association)
- .6 All products comply with the Canadian certifications listed above.

### **1.3 WORK BY OTHERS**

- .1 All equipment, associated cabling, terminations, testing, programming, integration and commissioning of the integrated access controls system shall be supplied and installed by the pre-qualified authorized re-seller noted in Article 1.4 below under the associated cash allowance.
- .2 The Electrical Subcontractor shall coordinate with successful subcontractor(s) to provide conduit pathways and power supplies for the installations as necessary.

#### 1.4 QUALITY ASSURANCE

- .1 System supply, installation and support shall be carried out by one of the following pre-qualified authorized re-sellers.
  - .1 Securitas Technology  
Address: 2495 Meadowpine Blvd, Unit #1, Mississauga, ON L5N 6C3  
Contact: Gerry Hegarty  
Email: [Gerry.hegarty@securitas.com](mailto:Gerry.hegarty@securitas.com)  
Phone: (416) 205-0454

### Part 2 - Products

#### 2.1 SECURITY COMPONENTS

- .1 Listed below are the security components that shall be supplied and installed. A detailed specification of each of the security components included in this list is also included.

#### 2.2 ACCESS CONTROL AND ALARM MONITORING SYSTEM

- .1 General System Specifications: The access control and alarm monitoring system shall be the RBH Access Technologies AxiomV Enterprise system and meets the following design and performance specifications:
  - .1 The system shall be a modular, networked access control and alarm monitoring system, comprised of proven commercial off the shelf components, capable of handling large proprietary corporations with multiple remote sites, alarm monitoring, video imaging, badging, paging integration, CCTV integration, interactive guard tour, mapping, visitor management, email notification, third party monitoring, BAS integration and asset management. The system shall assure long time performance, cost effective upgrade capability and allow for easy expansion or modification of inputs, outputs and remote control stations.
  - .2 The system control at the central computer location shall be under a single software program control, shall provide full integration of all components, and shall be alterable at any time, depending upon the requirements. Reconfiguration shall be accomplished online through system programming, without hardware changes.
  - .3 The Access Control Software system shall utilize Microsoft SQL Server 2008/2012/2016 for data storage and be written expressly for Microsoft SQL Server 2008/2012/2016.
  - .4 The system shall have the capability to be networked via a LAN/WAN connection utilizing industry standard TCP/IP communication protocol. The system shall provide encryption via the TCP/IP connection
  - .5 The system shall incorporate the use of bi-directional 485 communications and/or Class "A" TCP/IP redundant connections for redundancy and reliability.
  - .6 The system shall incorporate "High Availability" Communications so that multiple communication paths are available to all controllers. High availability shall be defined as, "an existing alternate controller shall take over communications in the event the main controller fails. The controller must be located in a separate location to the first."
  - .7 The system shall support both manual and automatic responses to alarms entering the system. Each alarm shall be capable of initiating a number of different actions, such as camera switching, activation of remote devices and door control.

- .8 The system shall provide unlimited levels of emergency codes to allow the system to operate in different security levels depending on local threat level e.g. code black = bomb threat and building locks down.
  - .9 The system shall provide both supervised and non-supervised alarm point monitoring. Upon recognition of an alarm, the system shall be capable of switching CCTV cameras and automatically creating a popup window for video for the associated alarm. The system shall be capable of arming or disarming alarm points both manually and automatically, by time of day, and by day of week.
  - .10 Access control functions shall include validation based on time of day, day of week, holiday scheduling, site code verification, automatic or manual retrieval of card/tagholder photographs, and access validation based on positive verification of card/tag, card/tag/PIN, card/tag and video.
  - .11 The system programming shall be user friendly, and capable of being accomplished by personnel with no prior computer experience. The programming shall be menu driven and include online "Help" with the use of F1 hotkey to automatically call the proper help information to the screen. The software shall utilize drop boxes for all previously entered system required data.
  - .12 After installation, the Owner shall be able to perform basic hardware configuration changes. These hardware configuration changes shall include, but not be limited to, door open time, door contact shunt time, point and reader names, when and where a card/tagholder is valid, and the ability to add or modify card/tag databases as desired without the services of the Manufacturer or Manufacturers Dealer.
  - .13 Equipment repair shall be able to be accomplished on site, by module replacement, utilizing spare components. All equipment shall have pluggable connectors for easy replacement.
  - .14 All control components shall include the ability to download operating parameters to any control panel, thus allowing the control panel to provide full operating functions independent of any other system component.
  - .15 The system shall be designed in such a way that it does not require enrolment of authorized personnel at each building.
  - .16 The system shall provide seamless integration to multiple manufacturers of DVR's and NVR's at the same time.
  - .17 The system shall provide seamless integration with external building control systems (BAS), personal safety systems, remote paging and email systems.
  - .18 All system events, operator actions and maintenance information shall be stored on the computer hard disk to maintain a permanent record of system activity. The system shall have the capability for manual and automatic back-up of set-up and system events to either local removable media (optical/magnetic) or remote network resource.
  - .19 All workstations shall be configurable to act as Alarm monitoring centre for the system. All alarms shall be configurable by schedule and workstations will have the ability to acknowledge and clear alarms as a two step process.
  - .20 All workstations shall have the ability to define alarm routing with an unlimited number of Routing levels available to the system.
- .2 Interactive Mapping and Graphics: The system shall support an unlimited number of user programmable colour graphic map displays capable of showing the floor plan, location of alarm device, and alarm instructions. Floor plans shall be created in an approved format and shall be capable of being imported from other systems. All of the graphic maps shall be displayed on the CPU monitor. Systems requiring separate display monitors or PC's shall not be acceptable. Maps shall be interactive with dynamic real-time status so that the operator can control all device functions from the map.

- .3 Information Storage: All programmed information as well as transactional history shall be automatically stored onto the hard disk for later retrieval.
- .4 Information Backup/Retrieval: The CPU shall be capable of transferring all programmed data and transactional history to thumb drive or any logical disk drive. All programmed data shall be restorable from disk in case of system hardware failure.
- .5 Communication Rates: The system shall have bi-directional communications and communicate up to 2.5mb/s.
- .6 Printers: The system shall support all system printers configured under and supported by the Windows operating system.
- .7 Pointing Device: The system shall use the pointing device configured under and supported by the Windows operating system.
- .8 Communication Ports: The system shall support an unlimited number of either serial or TCP/IP ports.
- .9 Workstations: The system shall support an unlimited number of active remote workstations. These stations shall be capable of monitoring alarms and changing the database and retrieving transaction records in real time without affecting the other stations.
- .10 Networking: The system shall operate with the standard Windows networking software.
- .11 Database: The database shall be Microsoft SQL Server 2008/2012/2016.
- .12 Software Capacities:
  - .1 The System server shall have the following minimum requirements. Server 2008/2012, Windows 7, 8.1 and 10 pro, with 2.2 GHz clock speed, 2gig Ram, 40 gig hard drive, CD Rom, Pointing device and video graphics card with 512 on board ram.
  - .2 System software and language development software shall be existing, industry accepted, and of a type widely used in commercial systems. The solutions operating system requirements shall be as identified in 2.2.3. The application software shall have been written in a standard, industry accepted language. All System functions shall be accessible via Windows operating systems compliant menu accessed screens. Systems requiring command string control or complex syntax shall not be acceptable. Systems shall not be dependent upon external input other than keyboard.
  - .3 The system software shall include the following features and be configured as a minimum:
    - .1 Unlimited reader expansion
    - .2 Unlimited card/tagholders in software
    - .3 Unlimited simultaneous client PCs
    - .4 Unlimited time zones
    - .5 365 user-definable holidays
    - .6 Unlimited Access levels
    - .7 Access levels for each card/tagholder
    - .8 Unlimited alarm input points
    - .9 Unlimited output control points
    - .10 Unlimited operator passwords with definable privilege levels
    - .11 Audible alarm annunciation at the CPU
    - .12 Unlimited colour graphic maps displayed on the CPU monitor

- .13 TCP/IP or RS232 interface capability to a CCTV system, which provides automatic, alarm actuated camera switching.
  - .14 True 32/64 bit operation
  - .15 Operator activation/cancellation dates
  - .16 Employee activation/cancellation dates
  - .17 Optional Video Imaging/Badging & bar code imprinting
- .13 System Administrators shall have the following abilities as a minimum:
- .1 To change any station settings from whatever station they are working on.
  - .2 To establish Station Names. Station names shall be user-definable.
  - .3 The Station Status dialog shall be available. It shall display a list of stations and their on line/offline status, along with the names of the logged-on operators.
  - .4 Report Printers: Reports as requested by the operators are sent to printers that may reside anywhere on the network.
- .14 Alarm Window Description: The system shall facilitate the processing of alerts by using a pop-up alarm window. The Window shall list the system alarms and allow the operator to acknowledge and clear by right-clicking on the event. The alarm window shall indicate time of alarm and response time by the operator. The alarm shall incorporate programmable instruction messages to instruct the operator what he is to do. The alarm will also have an operator action window to log an action into history for the alarm.
- .15 Bulk Acknowledgment of Alarms: The system shall provide a means to bulk-acknowledge alarms, so that all alarms can be acknowledged with a single operator action.
- .16 Station Routing: The system shall support the routing of alarms to any or all stations. Time schedules can be used to determine which station an alarm is routed to at what time. An alarm may be routed to one station or group of stations during a time schedule and re-routed to another station or group of stations during another time schedule.
- .17 Operator Routing: The system shall support the routing of alarms to particular operators, regardless of which station the operator is logged onto.
- .18 Menu Configurations: The system software shall allow for the configuration and programming of the controller panel through the use of a simple graphical user interface (GUI). All devices and functions shall be right click configurable for easy operation.
- .19 Memory: memory within each controller panel shall be automatically configured by the system.
- .20 Database Updates: The system software shall download/upload information to the controller panels automatically while the controller panels are in communication with the host CPU. A data download may also be initiated manually.
- .21 Reporting: The system software shall have the capability to report selectable data by type and by time zone. The system software shall allow the user to generate a report to screen, to printer or to save to a file. The reports shall be exportable to over 30 different file formats. The system shall incorporate the use of an automatic report generator.
- .22 Workstations: The system software shall have the capability to report selectable data by type and by time zone to any combination of the system workstations simultaneously.
- .23 Serial Ports: All serial ports shall be configured from an easy to follow menu. Systems requiring in depth knowledge of the operating system or CMOS setup for port configuration shall not be acceptable.

- .24 Time Zones:
  - .1 The system software shall have the capacity for a minimum of 255 user-definable time zones. Each time zone shall allow for a minimum of 16 individual time intervals.
  - .2 The time zones shall be assignable to:
    - .1 Card/tagholders
    - .2 Outputs
    - .3 Alarming reporting functions
    - .4 TCP/IP and RS232 message ports
    - .5 Doors
    - .6 Reports
    - .7 Printer operation
    - .8 Workstations
- .25 Holidays: The system software shall support a minimum of 365 holidays. Holidays shall be considered H1 or H2 designation so that there are three distinct holiday times. A holiday shall be capable of starting at any time/hour during a 24-hour day. Systems requiring holiday start time of midnight shall not be acceptable.
- .26 Door Descriptions: Each door in the system shall be identified using logical tagging format and approved by the Owner. Each door description shall be assigned user-definable text of up to 50 characters.
- .27 Access Control Modes: Each door may be programmed to switch automatically based on a user defined time schedule between the following modes of operation:
  - .1 "CARD/TAG ONLY"
  - .2 "CARD/TAG + PIN" - Dual authentication shall be provided for access points requiring the user to use their credential and enter a four digit PIN number.
  - .3 "PIN ONLY" - Keypad readers shall be used at doors to prevent access by Alzheimer residents.
  - .4 "HIGH SECURITY"
  - .5 "TWO PERSON" - To add additional security two people must be required to present cards (or any other credentials) in order to access a secure area.
  - .6 "FREE ACCESS"
- .28 Duress: If the reader is operating in the "CARD/TAG + PIN" mode or "PIN ONLY" mode, a duress feature shall allow an alternate code to be entered into the keypad for access. The system shall generate an alert and may be linked to control relays for notification of the alarm.
- .29 Door Alarms: Each door may be programmed to generate "FORCED DOOR" and "DOOR HELD OPEN" alarms. These alarms shall have the ability to have a user-definable time delay.
- .30 Door Alarm Annunciation: In addition to generating an alarm message, the following conditions may activate an output for annunciation:
  - .1 FORCED DOOR
  - .2 DURESS
  - .3 DOOR HELD OPEN (DOOR AJAR)
  - .4 VOID CARD/TAG
  - .5 DENIED CARD/TAG
  - .6 ANTI-PASSBACK VIOLATION

- .7 INPUT DOOR ALARM
- .8 TAMPER
- .9 ALARMS
- .31 Alarm Description: Each alarm point may be defined with a plain text description of up to 50 characters.
- .32 Alarm Enabling: Alarm points shall be enabled during user-definable time zones and may be manually enabled/disabled from any workstation.
- .33 Additional Alarms: The system must also generate alarms for the following:
  - .1 Enclosure tampering
  - .2 Controller panel communication loss
  - .3 Channel 1 Fail /Channel 2 Fail
  - .4 Battery Failure
  - .5 AC Failure
  - .6 Reader Fuse
  - .7 Auxiliary Fuse
  - .8 Lock Fuse
  - .9 Alarm tampering (supervised)
- .34 Alarm Supervision: When using supervised alarm points, the system must monitor for "OPEN", "SHORT", in addition to "NORMAL/ABNORMAL" conditions.
- .35 ASCII Output: Alarm points shall output an ASCII via RS232 or TCP/IP text command for integration to any other IP commandable device. This command/output shall be an optional, user-definable and transmitted on alarm points going into abnormal state, returning to a normal state, or both.
- .36 Outputs:
  - .1 Shunt relays: User definable outputs may be assigned as shunt relays, allowing access doors to be monitored by third party alarm systems.
  - .2 Relay "on" time: Outputs assigned to control doors shall be user-definable from 1-127 seconds or minutes.
- .37 Encryption: the passwords shall be encrypted in the operator database using encryption, to facilitate confidentiality of individual operator passwords.
- .38 Operator Access Levels: The system shall provide unlimited operator access levels for the system. All operator actions will be recorded within the system database.
- .39 Password Security: The Operator password shall be encrypted to prevent operators from seeing passwords. Passwords shall be up to 20 alphanumeric characters and be case sensitive. Operators must have the right to edit their own password for secrecy.
- .40 Partitioning: The System shall incorporate true database partitioning by operator. An operator shall logon anywhere on the system and have the same functionality at any workstation. Operators will be limited to see and control of the system by their operator Access level.
- .41 Operator Access Levels: The system shall have the ability to define unlimited user roles. As a minimum, the user roles shall be:
  - .1 General Administrator
  - .2 Supervisor
  - .3 General User

- .4 Privilege levels shall be assignable to, but not limited to the following menu functions:
  - .1 View
  - .2 Edit
  - .3 Edit of any field within the menu
  - .4 Select
- .42 Operator Activity: All operator activity including specific changes to the database shall be stored for later retrieval and Operators shall be assigned a time zone for the purpose of logging in.
- .43 Audit Trail of Database Changes:
  - .1 The system shall record changes to the database, including the date, time, operator name and description of the record changed.
  - .2 The audit trail event messages shall record additions, deletions and revisions. The record shall contain a date/time stamp for the change, the logged on operator's name, the table name, a character identifying the change, and a description based upon the Name field from the record, such as the user name, operator name, panel name, reader/door name.
  - .3 The system shall do a full restore or partial depending on operator selection of the data or history files during the back-up process.
  - .4 The system shall allow for viewing of the audit trail.
  - .5 The system shall NOT allow The Audit Trail table to be edited.
- .44 Employee Definitions:
  - .1 Card Entering: Card entering shall be easy so that minimal training is required. Card input and changes shall be allowed through direct interface with the event viewer screen. Cards shall have the ability to have multiple access levels or assigned special access levels. Cards may be inactivated from the system while the data remains for reactivation at a later date.
  - .2 Card/tag Data: The system software shall allow for card/tag numbers up to 18 digits.
  - .3 Employee records: Employee records shall consist of a minimum of the following:
    - .1 Card/tag Number
    - .2 Issue level
    - .3 Two (2) groups of access level and time zone
    - .4 User-definable PIN code
    - .5 Facility code
    - .6 Anti-passback location and status
    - .7 Expiration date
    - .8 High Security
    - .9 Lock/Unlock privilege
    - .10 Code Links
    - .11 Track status
    - .12 Last door accessed
    - .13 22 user definable searchable text and data fields
    - .14 Duration use
    - .15 Escort
    - .16 Extended shunt (for ADA compliance)

- .17 Passback override
- .4 Batch Loading: The system software shall allow groups of card/tags to be input through the use of a card/tag number range or by a batch load employee field.
- .45 Reports
  - .1 Data Storage: All programmed and transactional history is automatically stored to the hard disk for later retrieval.
  - .2 System Function: The system software shall be capable of generating reports without affecting the real-time operation of the system.
  - .3 Media: Reports shall be generated from the hard disk, or removable media and exportable to over 30 file formats.
  - .4 Search Criteria: The database shall be structured such that the operator shall determine the search parameters based on variables available on the individual report menu. Systems requiring the user to type complicated search strings shall not be acceptable.
  - .5 Report Types: User-definable data reports shall be available for the following information:
    - .1 Card/tagholder data
    - .2 Door groups
    - .3 Time zones
    - .4 Doors
    - .5 Inputs
    - .6 Relays
    - .7 Links
    - .8 Controller panels
    - .9 Operators
    - .10 System hardware configuration
    - .11 System settings configuration
  - .6 Transaction Reports: Transaction reports shall be available for the following:
    - .1 Card/tag transactions
    - .2 Alarm transactions
    - .3 Event transactions
    - .4 Operator activity
    - .5 Time and Attendance
  - .7 Report Scheduling: The system software shall have the ability to batch reports to any of: screen report, report to a network printer or save a report to a file without operator initiation.
- .46 System Guides:
  - .1 On Line Help: The system software shall have on line help available at any point requiring operator input. The help screen shall be accessible by using the standard Windows help systems. These help screens shall contain context sensitive information that shall allow the operator to enter correct data without consulting the manual. The help menu shall be accessible to the exact point in software by using the "F1" hotkey.
- .47 System Status:
  - .1 Real Time Status: The operator shall be able to monitor via graphical screens, the status of the following in real time:
    - .1 Inputs

- .2 Outputs
- .3 Doors
- .2 Alarm Monitor: A screen shall be available to monitor alarms and view, at minimum, 99 of the most recent events. The operator shall also have the ability to view additional detail of any event through the use of a single keystroke or click of the mouse.
- .48 Graphics:
  - .1 Graphics File Format: The floor plans shall be configured in AutoCAD, JPEG or Bitmaps.
  - .2 Programming: The system software shall be able to import floor plans produced in AutoCAD.
  - .3 Operation: Upon activation of a selected input or door alarm the map shall pop-up and display the alarmed device with an alarmed icon. The operator shall be able to click on the map and clear the alarm or control the device from the graphical interface. Mapping shall be real-time and interactive.
- .49 Video Badging:
  - .1 The system shall have the capability to permit Video Imaging and Badging, which shall, when used in conjunction with the system software, function as an integrated Video Imaging/Badging and access control system. The system shall utilize a single PC to input data for both access and video Badging. The system shall not require the operator to enter data more than once. Badge information including name, card/tag number, signature, fingerprint, user text, bar coding and up to five data fields shall be available for each card/tag. The system shall provide for user definable backgrounds. These backgrounds may be a "captured" image or a colour background. The system shall be capable of supporting Windows 2000/XPPRO/WIN7PRO compliant video printers.
  - .2 Badges may be created in both horizontal and vertical configurations. In order to change a card/tagholder's badge, a new background may be selected from the background table. A new picture capture is not required. The system shall allow any input or reader to be programmed such that an event at that location is captured by a remote camera and displayed while being stored in the database for later viewing or printing. Events at the reader shall display in real time and store a "split screen" showing the stored card/tagholder image next to the "captured" image. Camera control shall be accomplished via an RS232 interface from the system to a video switcher. The programming of the camera switcher for the individual inputs and readers shall not require exiting from the access control program.
  - .3 Additional Badging and/or alarm PC stations may be added via a local area network (LAN).
- .50 Video Imaging
  - .1 The system shall have the capability to import images of employees and store them in the database. These images may be recalled and displayed by the operator.
    - .1 The system shall have the ability to capture pictures and save from IP Video Cameras.
    - .2 The system shall provide for the backing up and restoral of captured pictures.
- .51 DVR and NVR Integration:

- .1 The system shall be able to integrate seamlessly via TCP/IP to multiple manufacturers DVR's and NVR's simultaneously. The operator shall have the option to associate any camera with a device and through a common video window, control, and operate any device with real time viewing. Video shall be accessible from any device via a right mouse click.
- .2 Video history of any event shall be accessible via a right mouse click.
- .3 The video window shall automatically pop-up upon activation of the associated device's alarm. Video shall be common to all manufacturers systems so that the operator only sees one view.
- .4 Non-proprietary servers shall be used with provision for fail-over and redundancy.
- .5 VMS shall be available in multiple languages including French.
- .6 The VMS (video management software) shall be compatible to ONVIF compliant cameras and many other IP cameras.
- .52 Interactive Guard tour: The system shall incorporate an interactive guard tour module to provide real time status of the Guards progression. Failure to complete a tour shall activate alarms on site and off-site for life safety operations.
- .53 Asset Management: The system shall incorporate an asset management module so that owners are assigned to equipment or vehicles to prevent theft. Upon alarm the system shall notify via alarm, CCTV interface, and email status the improper event.
- .54 System Tools:
  - .1 Copy Wizard -The system shall provide a copy wizard to quickly copy any device parameter to any other single or group of devices.
  - .2 Back-up Scheduler- The system shall have a backup scheduler for automatic backup of data
  - .3 Custom Cardholder fields - The system shall have the ability to custom design the cardholder data by adding new fields at will.
- .55 Biometric/Fingerprint Enrollment: The software shall have an integrated tab in the cardholder screen to enable the operator to enroll fingerprints/ biometrics directly from the software. Programs that open third party software are unacceptable.

## 2.3 **HARDWARE - AXIOMV CONTROLLER PANELS**

- .1 **UNC500 TCP/IP CONTROLLER**
  - .1 The controller panel shall be a 32 bit microprocessor controlled solid-state electronic device and shall include a real time clock/calendar on board. Boards shall be made of gold plated construction (Copper or leaded will not be accepted) and incorporate flashware technology. Communication shall Two channel TCP/IP standard LAN/WAN windows environment protocol. A subset of the system database sufficient to support access and alarm functions for its designated readers and points shall be stored at the controller panel. In event of communication loss, the controller panel shall continue to function without degradation of operation and shall provide storage of a least 10,000 events. These stored events shall be uploaded to the CPU automatically upon restoration of the communications. The system shall be capable of performing all system functions indefinitely without the computer.
  - .2 The controller must be FCC, CE, RoHS and UL listed.
  - .3 The controller must have 8mb Ram available on board
  - .4 The controller must have 65,000 offline event buffer
  - .5 The controller must have 3 programmable RS485 ports

- .6 The controller must have 2 on board Wiegand reader ports to accept any Wiegand format and 5 Wiegand formats simultaneously.
- .7 The controller must have 8 fully supervised inputs capable of individual configuration for EOL (single and dual EOL), N.O, N.C. operation.
- .8 The controller must have 8 outputs. 4-form 'C' relay outputs rated at 10A-30VDC and 4-open collector 100ma outputs.
- .9 The controller must have two on board TCP/IP LAN connections capable of configuration in LAN switch mode or dual LAN operation for Class 'A' Communication configurations.
- .10 The Controller must have separate tamper input
- .11 Input voltage 12vdc or 30w P.O.E. maximum current draw 500ma
- .12 The controller must have internal charging circuit for 12vdc gel cell standby battery. The controller shall be capable of recharging a standby battery from either P.O.E. source or 12v local power supply.
- .13 The controller shall be configurable in the following methods. Edge device, Wall mount controller or Rackmount.
- .14 Edge device deployment shall be POE and operate continuously even if POE is lost. Edge controller shall operate 1 or 2 doors as desired.
- .15 Rackmount configuration shall be 2 UNC500 controllers or 4 doors in a standard 1U-19inch rack configuration. LAN connections shall be front facing as standard Network configuration. All device connections shall be independent and removable from the rear of rack for quick disconnect and easy troubleshooting. All rackmount cabinets shall have optional rails for slide out configuration. All rackmount cabinets shall have top removable panel to access control panels.
- .16 The controller when configured in switch mode shall allow LAN looping from one standard windows device to another as any standard network switch allows without the use of external switches or special LAN cabling.
- .17 The controller must accept and control up to 7 slave reader controllers and 16 I/O controllers simultaneously.
- .18 Links are defined as any action causing any reaction on the system. Each controller shall be capable of initiating 'Links' regardless of the computer status.
- .19 Readers shall have the ability to initiate s swipe and or 4 swipe commands based on user card programming to initiate a different sequence of events depending on the need.
- .20 The controller panel shall be capable of storing up to eight (25) custom card/tagcard/tag/tag formats and reading 5 formats simultaneously. The controller panel shall be able to read the format of most Magnetic Stripe, Bar Code, Proximity or Wiegand Effect encoded card/tagcard/tag/tags and shall allow an operator to specify parity, start sentinels, stop sentinels, field separators, facility code bits, issue level bits, and card/tagcard/tag/tag number bits.
- .21 The controller panel shall be capable of reading card/tag numbers up to eighteen (18) digits.
- .22 The controller panel shall have the capacity to store up to 128 time zones with each time zone consisting of up to 16 intervals of time. Each interval of time shall consist of a range of days (seven days of the week, in addition to a Holiday Schedule) as well as a range of time. The controller panel shall automatically manage time zones based upon its internal clock.
- .23 The controller panel shall allow for the definition of up to 365 Holidays. Holidays shall be defined according to day of year and time of day. All holidays shall be automatically incorporated into Time Zone definitions.

- .24 Each card/tag reader/keypad shall have the ability to independently operate in up to six different modes: Card/tag reader only, PIN only, Common Code only, Card/tag Reader plus PIN, High Security and Free Access. These modes of operation shall be programmed from the system host computer and shall automatically change by time zone assignment.
  - .25 The system shall support interlock groups for Man -trap operation.
  - .26 The controller panel shall allow for the support of anti-passback operation, in which card/tagholders must follow a proper in/out sequence.
- .2 UNC100 CONTROLLER
- .1 The controller panel shall be a 32 bit microprocessor controlled solid-state electronic device and shall include a real time clock/calendar on board. Boards shall be made of gold-plated construction (Copper or leaded will not be accepted) and incorporate flashware technology. Communication shall One channel TCP/IP standard LAN/WAN windows environment protocol. A subset of the system database sufficient to support access and alarm functions for its designated readers and points shall be stored at the controller panel. In event of communication loss, the controller panel shall continue to function without degradation of operation and shall provide storage of a least 10,000 events. These stored events shall be uploaded to the CPU automatically upon restoration of the communications. The system shall be capable of performing all system functions indefinitely without the computer.
  - .2 The controller must be FCC, CE, RoHS and UL listed.
  - .3 The controller must have 2mb Ram available on board
  - .4 The controller must have 50,000 offline event buffer
  - .5 The controller must have 1 programmable RS485 ports
  - .6 The controller must have 2 on board Wiegand reader ports to accept any Wiegand format and 5 Wiegand formats simultaneously.
  - .7 The controller must have 4 fully supervised inputs capable of individual configuration for EOL (single and dual EOL), N.O, N.C. operation.
  - .8 The controller must have 4 outputs. 2-form 'C' relay outputs rated at 10A-30VDC and 2-open collector 100ma outputs.
  - .9 The Controller must have separate tamper input
  - .10 Input voltage 12vdc or 30w P.O.E. maximum current draw 500ma
  - .11 The controller must have internal charging circuit for 12vdc gel cell standby battery. The controller shall be capable of recharging a standby battery from either P.O.E. source or 12v local power supply.
  - .12 The controller shall be configurable in the following methods. Edge device, Wall mount controller.
  - .13 Edge device deployment shall be POE and operate continuously even if POE is lost. Edge controller shall operate 1 or 2 doors as desired.
  - .14 The controller must accept and control up to 7 slave reader controllers and 16 I/O controllers simultaneously.
- .3 RBH-IOC-16 Input Output Controller
- .1 Additional inputs and outputs shall be available by adding IO boards. Each expansion board shall have a minimum of sixteen (16) supervised inputs or outputs. The inputs shall incorporate full supervision of 7 circuit types and the outputs shall be form "C". Up to sixteen (16) expansion boards shall be available for each controller panel.
  - .2 The IO board shall be independently powered and have its own back up power supply and charging circuit for a minimum 4 hour standby operation.

- .4 RBH- ENCL2 Wall Cabinets :
  - .1 The controller panel enclosure shall have a hinged cover with key lock. A control panel input point shall monitor an enclosure tamper switch.
  - .2 The cabinet shall be 22" X 18" X 4" with ½ and ¾ inch knockouts. The back of the cabinet shall have key mounts for easy mounting.
  - .3 The cabinet shall hold any two of the following controllers UNC500, NC100, RC2, IOC16
- .5 NC100 Controller Panel Firmware Features
  - .1 The controller panel shall have the ability to store up to 7000 card/tagcard/tag/tag/pin codes expandable to 500,000 and buffer up to 10,000 transactions expandable to 500,000.
- .6 CARD/TAG READERS & CARD/TAGS
  - .1 The system shall employ a proximity access control/identification technology that utilizes radio frequency (RF) circuits in microchip form. The microchips are encoded and transmit the encoded information when activated.
  - .2 The readers shall be any Wiegand output or equivalent proximity/iclass/mifare type. It shall read the identification number of the card/tag or tag when presented to the surface of the reader without physical contact.
  - .3 Single piece window/door frame reader, which shall mount directly on a standard 1.75" (4.5cm) metal mullion/door frame. The reader can be mounted indoors or outdoors on virtually any surface, including metal. The reader shall operate between 5 volts and 14 volts DC to allow for ease and flexibility in installation. Read range with a standard proximity card/tag shall be up to 4" (up to 10cm) when installed according to manufacturer's specifications. Maximum dimensions of the reader shall be 5.5" (14.0cm) High x 1.6" (4.1cm) Wide x 0.75" (1.9cm) Thick.
  - .4 A single piece wall switch reader, which shall mount directly on a standard metal or plastic single-gang electrical box, or on a flat wall or metal surface, and shall operate indoors or outdoors. The reader shall operate between 5 volts and 14 volts DC to allow for ease and flexibility in installation. Read range with a standard proximity card/tag shall be up to 4" (10cm) when installed according to the manufacturer's specifications. Maximum dimensions of the reader shall be 4.6" (11.7cm) High x 2.9" (7.6cm) wide x 0.5" (1.3cm) Thick.
  - .5 A single piece reader, which shall mount to any surface, including metal, or can be concealed behind most building materials, except metal. Read range with a standard proximity card/tag shall be up to 7" (17cm) when installed according to manufacturer's specifications. Maximum dimensions of the reader shall be 4.6" (11.7cm) High x 5.5" (14cm) Wide x 1.4" (3.6cm) Thick.
  - .6 A medium range reader, which shall mount to most surfaces, except directly on metal, or can be concealed behind most building materials, except metal. Read range with a standard proximity card/tag shall be up to 21" (42cm) when installed according to manufacturer's specifications. Maximum dimensions of the reader head shall be 8.8" (22.4cm) High x 8.8" (22.4cm) Wide x 1.14" (2.9cm) Thick.
  - .7 The card/tag or tag shall be read when presented in any orientation or at any angle to the surface of the reader within the proper read range
  - .8 The reader shall power the card/tag or tag, process the encoded data, and output the data to the access system in less than 110 milliseconds.
  - .9 There shall be no removable plate or cover, which allows access to the reader electronics.

- .10 A red/green LED on the front surface of the reader shall indicate to the user that the card/tag or tag was read (internal/reader controlled) and an access decision was made (system controlled). The LED may be configured in either single line mode or dual line mode (allowing an "off" state) as required by the host system, and the reader may be switched between modes by presenting a programming card/tag to the face of the reader.
- .11 The reader shall have an audio "beep" tone feature to indicate to the user that the card/tag or tag was read (internal/reader controlled) and an access decision was made (system controlled). The audio tone must be independently controllable and not tied to the status or colour of the LED. The internal control of the LED and beeper may be enabled/disabled via programming card/tags so as not to require the setting of switches internal to the reader.
- .12 The reader shall have a built-in diagnostics, which indicate to the installer that upon power up the reader has performed an internal test and is functioning properly.
- .13 The reader shall have a built-in diagnostic feature, which allows a single technician to test the continuity of the data lines independent of the door controller. The reader may be placed into the line diagnostic mode via a programming card/tag, and the technician can then measure the pulses at the end of the line without the need of a second technician at the reader presenting card/tags.
- .14 Electrical connections between the reader and the controller shall be via colour coded, multiconductor; #22 AWG shielded cable. No coaxial cable or special connectors shall be required. The output shall be in the form of Wiegand data stream.
- .15 Wiring from the reader assembly to the system interface or CPU shall be run inside metal conduit or EMT, as may be required by electrical codes. All junction boxes are to be concealed and not normally accessible to the public. Utilization of PVC conduit is not acceptable.
- .16 Accidental or intentional transmission of radio frequency signals into the reader shall not compromise the system.
- .17 The reader shall function in the access control system's normal or anti-passback mode without changes to the reader.
- .18 The reader operating temperature range shall be -40° to +50° C
- .19 Damage or vandalism to the reader shall not damage any other part of the system.
- .20 Tampering with the reader shall have no effect on the door security.
- .21 The system readers shall have the capability to accept codes from any of the following proximity devices:
  - .1 A standard molded plastic credit card/tag sized card/tag having maximum dimensions of 3.41" (8.7cm) x 2.14" (5.4cm) x 0.09" (0.23cm), and a weight of not more than 0.48 oz. (13.5g). A punched slot shall be provided for a strap or clip. The card/tag shall be capable of having multi-colour custom graphics and permanently marked numbers printed directly onto both sides.
  - .2 A tag having maximum dimensions of 2.2" (5.6cm) x 1.3" (3.3cm) x 0.25" (0.6cm), and weight of 0.36 oz. (9.9g). A brass eyelet shall be provided for attachment to a key ring.
  - .3 A credit card/tag sized card/tag made of PVC, having maximum thickness of .036", and the capability of accepting direct print video imaged graphics and photographs and able to carry a high coercivity magnetic stripe.

- .4 A credit card/tag sized card/tag having maximum thickness of .048", and capable of accepting a photograph and graphics via a customer laminated flap.
- .22 The card/tag shall be a polycarbonate-based card/tag that cannot be run through direct card/tag printers. The card/tag shall be a PVC dual technology card/tag that employs proximity sensor technology. It shall comply with ISO standards for thickness (30 mil).
- .23 The card/tag or tag shall be made of robust ABS plastic to provide maximum protection for the circuitry inside and provide minimal flexing which could cause damage to the card/tag.
- .24 The presence of small metal objects, such as keys or coins near the card/tag or tag shall not alter the code read by the reader, nor prevent the code from being read by the reader.
- .25 The card/tag shall be of a proprietary format to be controlled by the Owner.
- .26 Card/tags or tags shall be sequentially numbered. The user may specify codes or numbers.
- .27 The card/tag must have the ability to have the encoded number permanently marked on the outside surface.
- .28 The card/tag or tag shall be a passive device with no internal battery, but shall contain a semiconductor element, which is energized when brought within the operating range of the reader causing transmission of the code from the card/tag or tag to the reader. Card/tags requiring an internal battery or energy cell shall not be acceptable.
- .29 Card/tags and tags may be used interchangeably and shall be compatible with all readers in the system, regardless of the reader's physical size or style, and without any code matching or memory devices in the reader.
- .30 The card/tag and tag operating temperature range shall be -40° to +50° C

#### 2.4 ACS VMS INTEGRATION

- .1 Integration must be through TCP/IP (relay and or RS232 connections are not acceptable).
- .2 All devices within the ACS system must have a tab to associate a video camera from the VMS system to the device. This association must allow the camera to be called into the ACS GUI upon the following conditions. A) Any Incoming event from specified device B) Any incoming alarm from the specified device. The camera if PTZ must also be called to its pre-designation preposition.
- .3 The ACS must be able to connect to the VMS system and display the VMS's default video window as a native VMS viewing client.
- .4 The ACS must have the ability to pop-up any video event designated for pop-up without operator intervention.
- .5 The ACS must have the ability to manually call video by clicking on the event anywhere it appears in the ACS.
- .6 The ACS must have the ability to dynamically place the cameras from the VMS system on its maps and call video from the maps directly.
- .7 The ACS must have the ability to report all events tagged with video and play back directly from the report within the ACS GUI.

## 2.5 ALARM KEYPADS

- .1 The system shall incorporate alarm keypads that link directly to the system for advanced alarm operation. Operators can arm, disarm, send messages and monitor any alarm on the keypad. In addition the keypads shall have entry exit zones and the ability to initiate commands on the system by entering a code or command. The keypads will have the ability to arm or disarm any group of inputs on the system creating a seamless alarm intrusion panel.

## 2.6 ALARM MONITORING INTEGRATION

- .1 The system shall allow for annunciation of intrusion detection alarms. Intrusion detection alarms shall report just like any other access control alarm and shall have the same annunciation and display properties as access control alarms.
- .2 Alarms from the alarm keypad shall be displayed in the alarm monitoring window and any signal can be sent out via TCP/IP or message port.
- .3 The system shall support an Alarm Details description that shall show the 'Alarm Description', 'Time/date', 'Controller', 'Device', and 'Area' associated with the alarm. The information shall also display the user.
- .4 The system shall support tracing of intrusion detection devices and areas.
- .5 The system shall be able to report status information for the intrusion detection devices.
- .6 On alarm, the system shall automatically switch to the map that displays the alarm, the icon that represents that alarm point will flash and an audible alert will be generated on the computer sound system. The operator shall have to acknowledge the alarm before processing the alarm.
- .7 In operator alarm mode processing, the system shall allow the operator to:
  - .1 clear alarm, tamper, and diagnostic alarms
  - .2 observe CCTV camera views, individually or in groups, that are associated with an alarm (requires video switcher option)
  - .3 In operator normal mode processing, the system shall allow an operator to:
    - .4 view a list of activity information, and select and tag any event
    - .5 view site maps
    - .6 perform a test of testable devices/sensors
    - .7 change the state of sensors to access or secure
    - .8 review the last 1000 events/actions performed on the system
- .8 In maintenance processing, the system shall allow the maintenance technician to:
  - .1 assign passwords and function access to individual users
  - .2 examine the input/output point states
  - .3 adjust the sensitivity of the sensors
  - .4 access the operating system to diagnose system problems
  - .5 set the calendar clock's date and time (in Windows)
  - .6 change the format of the displayed date (in Windows)
  - .7 set the communication parameters for system devices
  - .8 shut down the system

## 2.7 WIRELESS LOCKSET INTEGRATION

- .1 The system shall support the integration of SALTO SALLIS wireless locksets with the security management system. The wireless system and components shall offer as a minimum:
  - .1 Wireless Radio Frequency based on IEEE 802.15.4 at 2.4 GHz.
  - .2 Wireless communication shall incorporate AES 128bits encryption.
  - .3 Reading time shall be less than 150 milliseconds.
  - .4 Card reader ID technologies for the locks shall be able to read one of these: Mifare, Mifare plus, DESfire, DESfire EV1, HID iClass.
  - .5 Powering by standard non-proprietary, commercially available batteries. Renewal of batteries shall only be permissible from the secure side of any door with access to the battery compartment only achievable by the use of non-commercially available tool sets provided exclusively by the manufacturer.
  - .6 All electronic locking devices must be able to be temporarily activated by an appropriate device in the event of total battery failure.
  - .7 The access control system shall have a comprehensive battery management reporting system to allow for the viewing of the battery status of any locking device in the system at any time.
  - .8 The locking devices themselves shall provide, upon activation by a credential or other means, a distinguishable and audible signal when any battery is reduced to its last 1,000 usable cycles.
  - .9 The system shall support more than 500 remote locksets; each UNC100 controller configuration shall be rated for the number of locksets it can support.
  - .10 Once a lockset is installed and registered with the controller, it shall appear in the AxiomV software as a traditional access point, which can be enabled and configured to work with the controller.
  - .11 When a wireless lockset is networked to the AxiomV software, the operator shall be able to lock or unlock in real-time, the lock, under 2 seconds.
  - .12 All locksets connected to the AxiomV software shall be treated as an online lockset and assigned the Default (Online) lockset profile.
  - .13 Locksets can be assigned to locations.
  - .14 Locksets shall be added and managed in floorplans.
  - .15 Locksets can be unlocked momentarily via event actions or from the AxiomV client, the AxiomV mobile app, the Monitoring Desktop, or a floorplan within one minute.
  - .16 Activity associated with a lockset shall be viewed in real time in the Activity Log.

## Part 3 - Execution

### 3.1 INSTALLATION

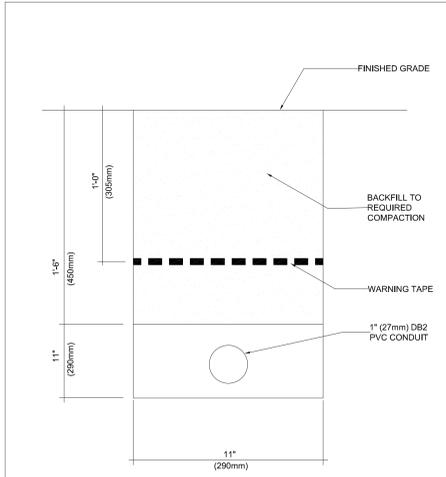
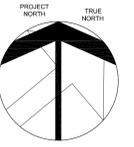
- .1 The contractor shall install all system components in accordance with the manufacturer's instructions, and shall furnish all necessary interconnections, services, and adjustments required for a complete and operable system as specified and shown. Power, control, signal and communications, and data transmission lines plus all required grounding shall be installed as necessary to preclude ground loops, noise, and surges from adversely affecting system operation. Provide mounting hardware as required.
- .2 All products, software, programming tools, etc. shall be registered to The Owner and will be surrendered upon successful completion of the project.

- .3 All low voltage wiring outside the control console, cabinets, boxes, and similar enclosures, shall be plenum rated where required by code. Cable shall not be pulled into conduits or placed in raceways, compartments, outlet boxes, junction boxes, or similar fittings with other building wiring.
- .4 All inputs shall be protected against surges induced on device wiring. Outputs shall be protected against surges induced on control and device wiring installed outdoors. All communications equipment shall be protected against surges induced on any communications circuit. All cables and conductors, except fibre optics, which serve as communications circuits from security console to field equipment, and between field equipment, shall have surge protection circuits installed at each end.
- .5 No wiring or cabling shall be exposed; all wiring and cabling must be fully enclosed in threaded metallic conduit, which shall be installed underground, in walls or metal structures unless physically impossible. Any conduit that is exposed shall be fully enclosed within an expanded metal protective cage that is vandal resistant and is equipped with a tamper alarm. All equipment mounting is to be such that the equipment cannot be removed or tampered.

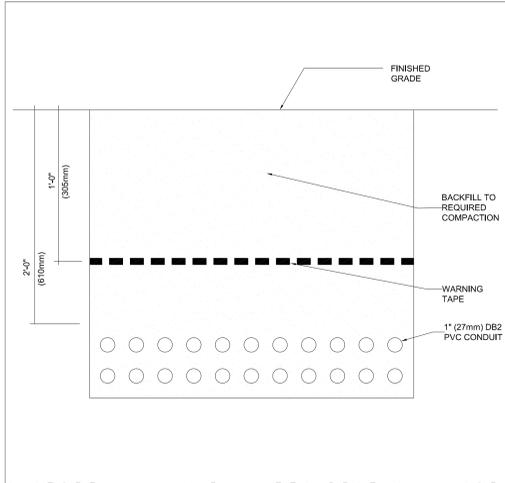
### 3.2 CARD READERS

- .1 The access control shall only utilize readers supplied HID Global. The readers will support multi card formats and be available in multiple form factors and transmit power ratings.
  - .1 Support for iClass, iClass Seos, MIFARE Classic, MIFARE DESFIRE EV1 @ 13.56 MHz transmit frequency.
  - .2 Support for HID Prox, Indala Prox, EM4102 Prox at 125 KHz transmit frequency.
  - .3 Support an operating voltage range of 5-16 VDC.
  - .4 Support OSDP SC over RS485 for panel communications and reader firmware updates.
  - .5 Support an operating temperature range -35° C to +65° C.
  - .6 Support a storage temperature range of -35° C to +65° C.
  - .7 Support an operating humidity range of 5% to 95% relative humidity.
  - .8 Carry an IEEE IP55 rating, IP65 with optional gasket, part #IP65GSKT.
  - .9 Carry the following industry certifications: UL294/cUL and Industry Canada.
  - .10 Carry a limited lifetime warranty.

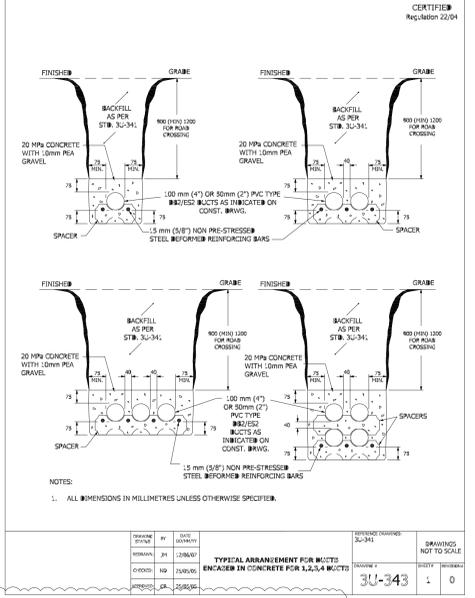
**END OF SECTION**



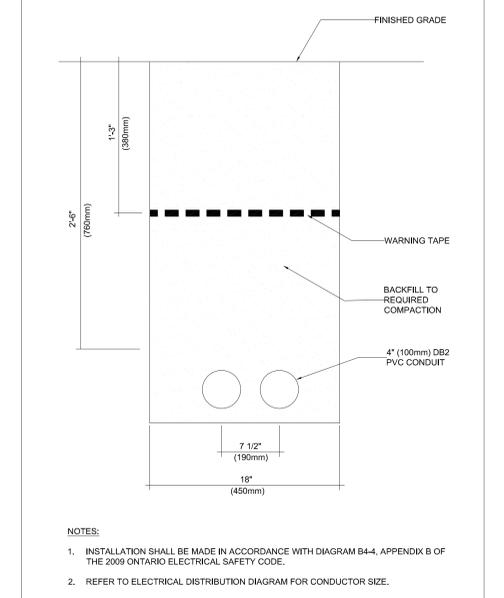
**1 NON DRIVABLE AREA - FEEDER TRENCH DETAIL**  
E-101 N.T.S.



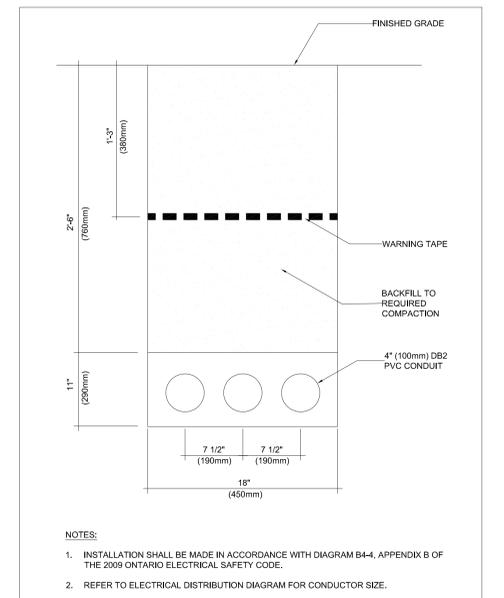
**2 DRIVABLE AREA - FUTURE EV CHARGER FEEDER TRENCH DETAIL**  
E-101 N.T.S.



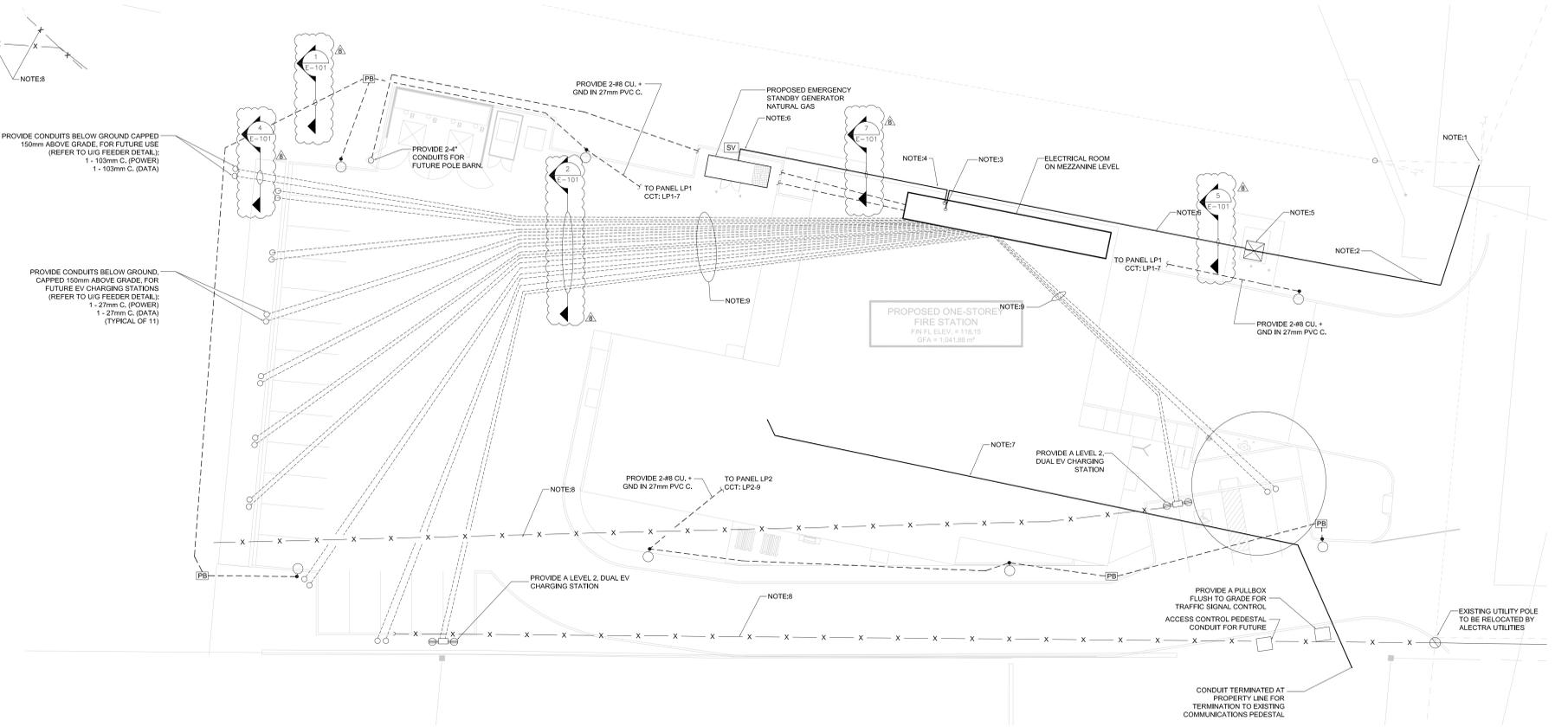
**3 PRIMARY DUCTBANK SECTION**  
E-101 N.T.S.



**4 COMMUNICATION AND FUTURE CONDUIT - BELOW GROUND TRENCH DETAIL**  
E-101 N.T.S.

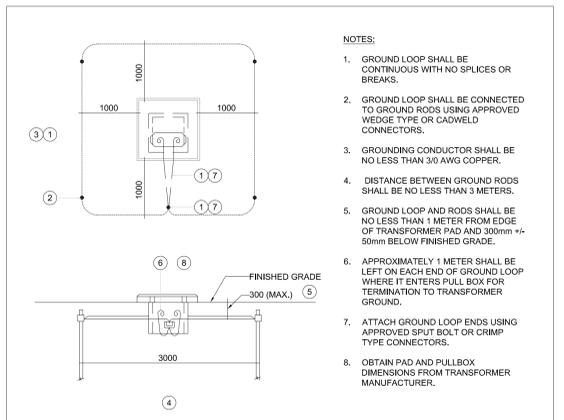


**5 SECONDARY DUCTBANK SECTION**  
E-101 N.T.S.

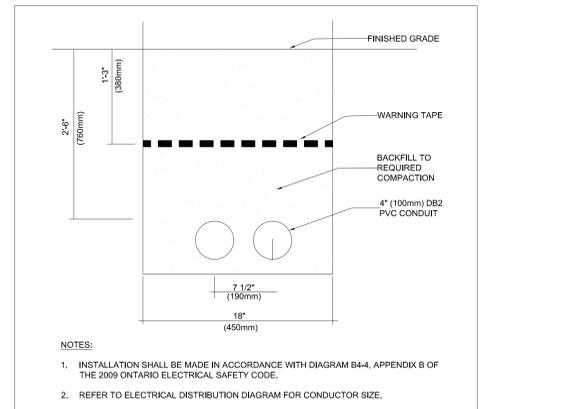


**ELECTRICAL POWER AND SYSTEMS SITE PLAN LAYOUT**  
SCALE: 1:200

- NOTES:**
- SERVICE FEED THROUGH EXISTING HYDRO POLE #P12289.
  - NEW 4X103MM(4") CONDUITS FOR ALCTRA UTILITIES PRIMARY FEEDERS @900mm DEPTH. REFER TO THE PRIMARY TRENCH DETAIL (3U-343) ABOVE. PROVIDE UNDERGROUND DUCTBANK TO PROPERTY LINE. AT LOCATION CONFIRMED BY ALCTRA UTILITIES. WORK BEYOND PROPERTY LINE TO POLE IS BY ALCTRA UTILITIES. PRIMARY CONDUCTORS TO BE SUPPLIED AND INSTALLED BY ALCTRA UTILITIES AND TERMINATED AT TRANSFORMER.
  - SERVICE CONDUCTORS TO BE CONCRETE-ENCASED WITHIN BUILDING ON GROUND FLOOR, UP TO BOTTOM-FEED SWITCHGEAR ENTRANCE LOCATED IN THE ELECTRICAL ROOM. UP IN THE MEZZANINE ABOVE. COORDINATE LOCATION WITH LAYOUT OF MAIN SWITCHGEAR ABOVE.
  - GENERATOR CONDUCTORS TO BE CONCRETE-ENCASED, SIMILAR TO SERVICE CONDUCTORS.
  - NEW PROPOSED ALCTRA/HORIZON UTILITIES PAD MOUNT TRANSFORMER. THIS CONTRACTOR TO SUPPLY AND INSTALL CONCRETE VAULT, GROUNDING GRID AND BOLLARDS TO ALCTRA UTILITIES STANDARDS.
  - PROVIDE NEW SECONDARY SERVICE FEEDERS. REFER TO THE SECONDARY DUCT BANK DETAIL IN THIS DRAWING.
  - PROVIDE ONE (1) 103MM(4") CONDUIT FOR COMMUNICATIONS AT MINIMUM 600mm BELOW GRADE OUTSIDE OF BUILDING. WITHIN BUILDING ENVELOPE, CONDUIT TO BE INSTALLED BELOW CONCRETE SLAB MINIMUM 50MM THICK.
  - DISCONNECT AND REMOVE THE EXISTING ABANDONED BELL SERVICES AND BOXES. OVERHEAD ELECTRICAL UTILITY SERVICES AND POLES.
  - UNDERGROUND CONDUIT ROUTING FOR EV CHARGERS (INCLUDING FUTURE) FROM ELECTRICAL MEZZANINE IS APPROXIMATE. DETERMINE BEST ROUTING ON SITE.
  - PROVIDE NEW GENERATOR FEEDERS. REFER TO 'GENERATOR DUCTBANK SECTION' DETAIL IN THIS DRAWING.



**6 UNIT PAD MOUNT TRANSFORMER GROUNDING DETAIL**  
E-101 N.T.S.



**7 GENERATOR DUCTBANK SECTION DETAIL**  
E-101 N.T.S.

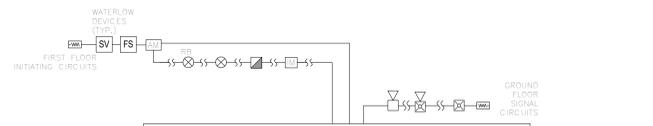
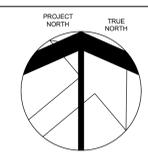
NO.	DESCRIPTION	DATE
8	ISSUED FOR ELEC. ADDENDUM #2	08/24/24
7	ISSUED FOR ADDENDUM #1	08/05/24
6	ISSUED FOR TENDER	08/15/24
5	RE-ISSUED FOR PERMIT COMMENTS	08/05/24
4	ISSUED FOR PERMIT	03/15/24
3	50% REVIEW SET	02/21/24
2	10% REVIEW SET	01/25/24
1	PROGRESS SET	12/20/23

PRC004616 - Construction Services for New Fire Station 124

LEGAL DESCRIPTION:  
PART OF LOT 11, CONVESSION 1, SOUTH OF DUNDAS STREET, CITY OF MISSISSAUGA, REGIONAL MUNICIPALITY OF PEELE

**ELECTRICAL SITE PLAN**

SCALE	PROJECT
AS NOTED	ALL-23003797
DATE	21 March, 2024
DRAWN	DRAWING
CHECKED	<b>E-101</b>
PRINT DATE	21 March, 2024



ZONE / CIRCUIT	INITIATION	ALARM	SIGNAL	AUXILIARY	TROUBLE	DESCRIPTION
Z1	o	-	-	-	-	GROUND FLOOR / MEZZANINE
Z2	o	-	-	-	-	MAIN SPRINKLER FLOW SWITCH
Z3	o	-	-	-	-	SPRINKLER FLOW SWITCH
Z4	o	-	-	-	-	SPRINKLER FLOW SWITCH
Z5	o	-	-	-	-	BACKFLOW PREVENTER FLOW SWITCH
Z6	o	-	-	-	-	SPARE
Z7	o	-	-	-	-	SPARE
Z8	o	-	-	-	-	SPARE
Z9	o	-	-	-	-	SPARE
S1	-	o	-	-	-	MAIN SPRINKLER VALVE
S2	-	o	-	-	-	SPRINKLER VALVE SUPERVISORY
S3	-	o	-	-	-	SPRINKLER VALVE SUPERVISORY
S4	-	o	-	-	-	BACKFLOW PREVENTER VALVE SUPERVISORY
S5	-	o	-	-	-	GENERATOR VALVE SUPERVISORY
S6	-	o	-	-	-	GENERATOR VALVE SUPERVISORY
X1	-	-	o	-	-	GENERATOR RUNNING
X1	-	-	o	-	-	GENERATOR TROUBLE

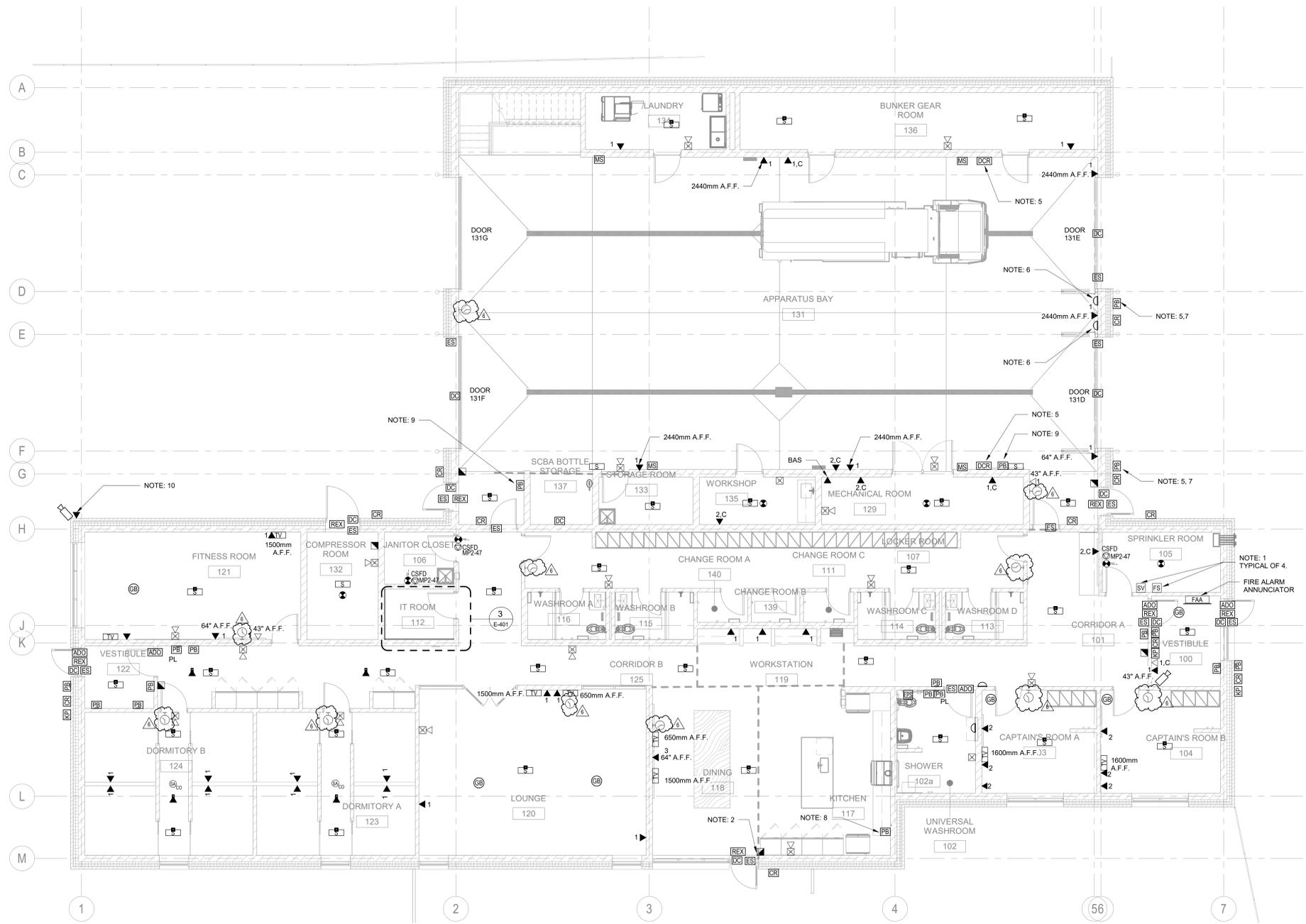
**2 FIRE ALARM RISER**  
1:1

**FIRE ALARM NOTES:**

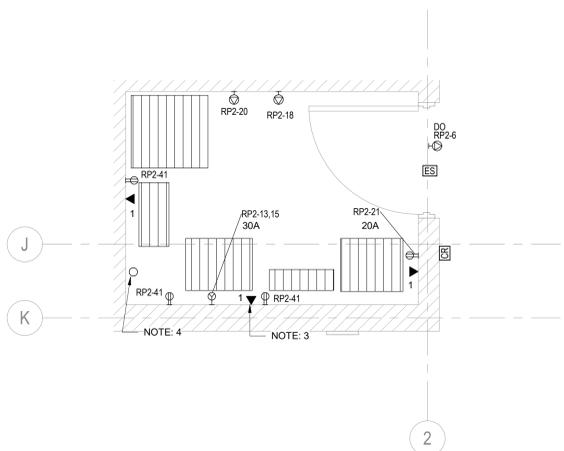
- FIRE ALARM SYSTEM IS SINGLE STAGE, ADDRESSABLE.
- ADDRESSABLE INDICATING DEVICES ARE TO BE ON A CLASS "A" WIRING LOOP. NOTIFICATION APPLIANCE CIRCUITS (NAC) ARE TO BE ON CLASS "B" WIRING CIRCUITS.
- NOT ALL DEVICES SHOWN. REFER TO PLANS FOR DEVICE QUANTITIES AND LOCATIONS.
- ALL PULL STATIONS TO BE MOUNTED ON LATCH SIDE OF DOOR UNLESS OTHERWISE SHOWN ON PLANS.
- FIRE ALARM IS TO BE MONITORED WITH ULC LISTED EQUIPMENT AND BY A ULC LISTED MONITORING COMPANY IN ACCORDANCE TO DIV 8.3.2.4.9 OBC.
- FIRE ALARM DEVICES TO BE INSTALLED PER CAN/ULC-S524. "INSTALLATION OF FIRE ALARM SYSTEMS".
- VERIFICATION OF FIRE ALARM DEVICES IS TO BE PERFORMED PER CAN/ULC-S537. "VERIFICATION OF FIRE ALARM SYSTEMS".
- BUILDING IS TO BE PROVIDED WITH SPRINKLERS IN LIEU OF HEAT DETECTORS.
- THIS CONTRACTOR SHALL ARRANGE FOR TESTING OF INTEGRATED FIRE PROTECTION AND LIFE SAFETY SYSTEMS VIA THIRD PARTY. A TESTING PLAN SHALL BE PROVIDED WITH EQUIPMENT SHOP DRAWINGS FOR CONSULTANT AND AHJ REVIEW. FOR TESTING TO BE CARRIED OUT PRIOR TO OCCUPANCY PER CAN/ULC-S101. "INTEGRATED SYSTEMS TESTING OF FIRE PROTECTION AND LIFE SAFETY SYSTEMS". ACCEPTABLE THIRD PARTY: CAMBIUM, EXP SERVICES INC., FIRECUBE, GUARDIAN FIRE CONSULTING GROUP, IGNIS BUILDING SOLUTIONS.

**DRAWING NOTES:**

- EXACT QUANTITY AND LOCATION OF SPRINKLER FLOW SWITCHES, SUPERVISED VALVES, ETC., TO BE CONFIRMED WITH SPRINKLER DRAWINGS.
- COORDINATE PULL STATION INSTALLATION WITH MILLWORK.
- PROVIDE A 3/4" X 8" FIRE TREATED PLYWOOD BACKBOARD IN THE IT ROOM FOR EQUIPMENT MOUNTING.
- PROVIDE A 2" CONDUIT THROUGH CEILING SPACE TO ROOF. REFER TO DRAWING E-202 FOR MORE DETAILS. COORDINATE EXACT REQUIREMENTS WITH DOOR HARDWARE SUPPLIER.
- PROVIDE COMPLETE ROUGH-IN FOR THE OVERHEAD, FOUR-FOLD DOOR CONTROLLER. COORDINATE EXACT REQUIREMENTS WITH DOOR HARDWARE SUPPLIER.
- PROVIDE COMPLETE ROUGH-IN FOR THE DOOR POSITION INDICATING LIGHTS. COORDINATE EXACT REQUIREMENTS WITH DOOR HARDWARE SUPPLIER.
- PROVIDE PUSH TO CLOSE. PUSH BUTTON FOR OVER HEAD DOORS. COORDINATE EXACT REQUIREMENTS WITH DOOR HARDWARE SUPPLIER. PUSH BUTTON TO BE EXTERIOR MUSHROOM STYLE.
- PROVIDE PUSHBUTTON TO RESET THE CONTACTOR CONTROLLED LOADS. LABEL AS 'COOKING LOAD RESET'.
- PROVIDE A PUSH BUTTON FOR EACH OF THE FOLLOWING ITEMS. COORDINATE EXACT REQUIREMENTS WITH DOOR HARDWARE SUPPLIER.
  - TRAFFIC PRE-EMPTION
  - TURN OUT TIMER
  - FOUR FOLD DOOR CONTROL
- PROVIDE ONE DATA PER CAMERA (TYP.), REF. SPEC FOR COLOUR OF DATA CABLING (IT REQUIRES YELLOW, OUTDOOR RATED BLACK FOR EXTERIOR)
- "DUCT-TYPE SMOKE DETECTORS TO BE LOCATED DOWNSTREAM OF COMBINATION SMOKE/FIRE DAMPER (SFD), WITHIN 1.5m OF DAMPER (SEE EXACT LOCATIONS ON MECHANICAL PLAN M400). DAMPERS TO CLOSE VIA SMOKE DETECTOR ALARM SIGNAL."



**1 GROUND FLOOR - SECURITY & SYSTEMS LAYOUT**  
1:75



**3 ENLARGED IT ROOM - SECURITY & SYSTEMS LAYOUT**  
1:25

NO.	DESCRIPTION	DATE
6	ISSUED FOR ELEC. ADDENDUM#2	09/24/24
5	ADDENDUM#1	09/20/20
4	ISSUED FOR TENDER	07/17/24
3	RE-ISSUED FOR PERMIT COMMENTS	06/05/24
2	50% REVIEW SET	09/21/24
1	10% REVIEW SET	01/26/24

DRAWINGS ARE NOT TO BE SCALED. CONTRACTOR MUST CHECK AND VERIFY ALL DIMENSIONS AND CONDITIONS ON THE PROJECT AND REPORT ANY DISCREPANCIES TO THE CONSULTANTS BEFORE PROCEEDING WITH THE WORK. THE USE OF THIS DRAWING OR PART THEREOF IS FORBIDDEN WITHOUT THE WRITTEN APPROVAL OF THE CONSULTANTS.

**PRC004616 - CONSTRUCTION SERVICES FOR NEW FIRE STATION 124**

LEGAL DESCRIPTION:  
PART OF LOT 11, CONCESSION 1, SOUTH OF DUNDAS STREET, CITY OF MISSISSAUGA, REGIONAL MUNICIPALITY OF PEELE



**GROUND FLOOR - SECURITY AND SYSTEMS PLAN**



SCALE	PROJECT
As Indicate	ALL-23003797-A0
DATE	Issue Date
DRAWN	DRAWING
CHECKED	Author
PRINT DATE	Checker
REVIT FILE	E-401
	9/24/2024 10:48:48 AM
	1:20232311602/Rev1.RVT