



Smith + Andersen

1100 – 100 Sheppard Ave. East, Toronto ON, M2N 6N5

416 487 8151 f 416 487 9104 smithandandersen.com

ELECTRONIC SAFETY AND SECURITY SPECIFICATION

PROJECT NAME:

DECOMMISSION CAFETERIA AND GREAT HALL MILLWORK
YORK REGION ADMINISTRATION CENTER

YORK REGION PROJECT NUMBER:

RFTC-1131-23-C22020

DATE:

MAR 15, 2024

ISSUED / REVISION:

FOR CONSTRUCTION

SECTION	NUMBER	NAME	PAGES
	28 00 00.00	Index	1
	28 00 05.10	General Instructions for Electronic Safety and Security Sections	8
	28 00 05.20	Definitions and Abbreviations	7
	28 00 05.30	Codes, Standards and Regulations	4
	28 00 05.60	Administrative Requirements	3
	28 00 06.00	Fire Stopping and Water Proofing	4
	28 01 10.00	Operation and Maintenance of Electronic Safety and Security	1
	28 05 00.00	Common Work Results for Electronic Safety and Security	3
	28 05 03.00	Record Drawings	3
	28 05 04.00	Submittals/Shop Drawings	2
	28 05 13.00	Conductors and Cables for Electronic Safety and Security	4
	28 05 26.00	Grounding and Bonding for Electronic Safety and Security	2
	28 05 28.00	Pathways for Electronic Safety and Security	3
	28 05 53.00	Identification for Electronic Safety and Security	3
	28 13 00.00	Access Control	7
	28 16 00.00	Intrusion Detection	-
	28 23 00.00	Video Surveillance	4
	28 26 00.00	Electronic Personal Protection System	-
	28 40 00.00	Electronic Safety and Security Systems Integration	-
	28 51 00.00	Intercom System	-

END OF SECTION 28 00 00.00

1. General

1.1. WORK INCLUDED

- 1.1.1. Bidders, will be responsible for reviewing the bid documents, and ensuring their subcontractors, Product and material Suppliers review the Bid Documents, prior to submitting a bid to ensure they have an overall understanding of the entire Project's scope of work. Electrical Subcontractors are specifically instructed to review non-electrical parts of the Bid Documents for additional information and details related to their trades.
- 1.1.2. Conform to the requirements of the Region, which apply to and form part of all sections of the work.
- 1.1.3. Where there is a conflict between the requirements outlined in this Electronic Safety and Security specifications document and requirements indicated in the Region more stringent and/or more onerous requirement shall apply.
- 1.1.4. Read and comply with all sections of this document.
- 1.1.5. The Specification is divided into Sections which are not intended to identify contractual limits between Sub-Contractors nor between the Contractor and Sub-Contractors. The requirements of any one Section apply to all Sections. Refer to other Divisions and Sections to ensure a complete and operational system.
- 1.1.6. Provide Electronic Safety and Security components and accessories which may not be specifically shown on the Drawings or stipulated in the Specifications, but are required to ensure complete and operational systems.
- 1.1.7. Provide all labour, materials, tools, and equipment required for the complete installation, commissioning and start-up of Electronic Safety and Security systems called for in all sections of the Contract Documents.

1.2. QUALIFIED CONTRACTORS

1.2.1. HONEYWELL EBI SECURITY SYSTEM INSTALLERS

- 1.2.2. Security Control System design (riser layouts), electrical/IT requirements are to be provided and reviewed by Honeywell's Project Manager who can be contacted as follows:

Honeywell
Account Executive: Marc Kingsbury
85 Enterprise Blvd
Markham, Ontario L6G 0B5
(289) 333-1333 fax
(416) 895-7926 Mobile

- 1.2.3. Installation and integration of the Honeywell EBI security system(s) shall be completed by, one of the installers listed herein.

1.2.4. Approved EBI System Installers (alphabetical order)

- .1 Ontario Electric Construction Company Limited
7 Compass Court
Scarborough, Ontario
M1S 5N3
Contact: Ryan Charlton – Chief Estimator
ryancharlton@onelec.com
Phone: 416-363-5741 x 266
- .2 Plan Group
27 Vanley Cres.
North York, Ontario
M3J 2B7
Contact: Tom Nanou – Project Manager
tnanou@plan-group.com
Phone: 416-678-7353
- .3 T.C. Securities Corp.
313 Albert Street
Oshawa, Ontario
L1H 4R9
Contact: Dondi Keough
Dondi@tcsecure.ca
Phone: 416-429-7180
- .4 OZZ Electric Inc.
20 Floral Parkway
Concord, Ontario
L4K 4R1
Contact: Mr. Paul Sheppard, Service/Cabling Manager
psheppard@ozzelectric.com
Phone: 416-678-3029
- .5 Symtech
35 Riviera Drive, Unit 9&10
Markham, Ontario
L3R 8N4
Contact: Adrian Masci-Account Executive
Adrian.masci@symtech.com
Phone: 416-559-5063

1.3. SECTIONS AFFECTED

- 1.3.1. These instructions apply to and form a part of all Electronic Safety and Security Sections.

1.4. SCOPE OF WORK

- 1.4.1. Include all necessary wiring, cabling, labor, tools, equipment, and ancillary materials required to furnish and install complete and operational Electronic Safety and Security Systems.
- 1.4.2. This specification includes a general description as well detailed functional and technical requirements for the Electronic Safety and Security Systems.
- 1.4.3. This specification provides all information necessary to produce a complete proposal for scalable multi-user, multi-tasking Electronic Safety and Security Systems. The Electronic Safety and Security Systems shall include all computer hardware and software, controllers, interfaces, card readers/keypads, credentials, video recorders, cameras, alarm sensing devices, communication devices, electric door locking hardware, power supplies, cable/wire, conduit, raceways, enclosures, mounting hardware, and all other equipment as indicated on contract drawings and as specified herein. Except where noted to reuse existing, all materials shall be new, commercial grade and of good quality.
- 1.4.4. This project consists of the **complete supply, installation and commissioning** of the following Electronic Safety and Security systems:
- .1 Access Control Additions
- 1.4.5. All Electronic Safety and Security systems supplied and installed shall be turnkey complete and fully operational. All Electronic Safety and Security systems shall be integrated as per the contract drawings and specifications.
- 1.4.6. The Electronic Safety and Security Systems shall be installed based on the drawing documents provided herewith.
- 1.4.7. All cables for the Electronic Safety and Security Systems shall be installed via conduits and or cable tray.
- 1.4.8. Conduit shall be supplied and installed as indicated drawings unless otherwise noted.
- 1.4.9. The scope of work shall include but shall not be limited to:
- .1 Decommission and remove all existing redundant cabling and existing redundant devices as indicated on contract drawings.
- .2 Where existing devices are to remain, provide all wiring, active and passive devices as required and as indicated on contract drawings to facilitate connectivity and complete operation of said existing devices.
- .3 Supply and installation of cable supports for all cabling. Co-ordinate on site for interferences and with other disciplines / trades. All cable supports shall be installed following building lines, and in accordance with the building's requirements / guidelines.
- .4 Supply and installation of all active and passive hardware and cables as specified within this document to support the Electronic Safety and Security Systems.
- .5 Where active and passive hardware and cabling is not specified but are required to make the Electronic Safety and Security Systems turnkey and to meet the intent, supply and install such active and passive hardware and cabling at no extra cost.
- .6 Supply and installation of equipment cabinets, complete with all accessories.
- .7 Supply and installation of backboards.

-
- .8 Supply and installation of all fire stop materials / mechanisms for all penetrations.
- 1.4.10. While every attempt has been made to ensure all information is correct at the time of publication, the products specified are available and that the part numbers identified are correct, verify all part numbers and to report any errors and/or omissions in this Specification with their bid submissions.
- 1.4.11. This document and all related drawings shall be read in conjunction with the project related Door Schedule and Door Hardware Schedule.
- 1.4.12. Dimensions shown on Contract Drawings are approximate. Verify dimensions by reference to shop drawings and field measurements.
- 1.4.13. Quantities or lengths indicated in any of the Contract Documents are approximate only and shall not be held to gauge or limit the work.
- 1.4.14. Include in bid all labour, materials, plant, transportation, storage costs, training, equipment, insurance, temporary protection, permits, reviews, bonding, taxes and all necessary and related items required to provide a complete and operational Electronic Safety and Security Systems.
- 1.5. INTENT
- 1.5.1. The Specifications are an integral part of the accompanying Drawings. Any item or subject omitted from one or the other, but which is either mentioned or reasonably implied, shall be considered as properly and sufficiently specified.
- 1.5.2. Be completely responsible for the acceptable condition and operation of all systems, equipment and components forming part of the installation or directly associated with it. Promptly replace defective material, equipment and repair related damages. The replacement of equipment and repair to damages shall be coordinated with other trades completed in a timely fashion so as not to affect the complete construction of the Electronic Safety and Security Systems and/or work by other.
- 1.6. BIDDER INQUIRIES
- 1.6.1. Left blank intentionally.
- 1.7. BID FORM AND SUBMISSION OF BIDS
- 1.7.1. Left blank intentionally.
- 1.8. PROGRESS DRAWS
- 1.8.1. Left blank intentionally.
- 1.9. HOLDBACK
- 1.9.1. Left blank intentionally.
- 1.10. SCHEDULE
-

-
- 1.10.1. Left blank intentionally.
- 1.11. LABOUR
- 1.11.1. Comply with all project job-site requirements for the duration of the project.
- 1.11.2. Do not assign or sub-contract any work without the prior **written consent** of the Project Manager. A list of sub-Contractors shall be submitted with the Tender response.
- 1.11.3. For all work related to this project, use only tradesmen who are fully trained, qualified and experienced on the installation and commissioning of the Electronic Safety and Security Systems.
- 1.11.4. DRAWINGS, CHANGES AND INSTALLATION
- 1.11.5. The drawings are intended to show the general character and scope of the work and not the exact details of the installation. The installation shall be complete with all accessories required for a complete and operative installation.
- 1.11.6. The location, arrangement and connection of equipment and material as shown on the drawings represent a close approximation to the intent and requirements of the contract. The right is reserved by the Electronic Safety and Security Engineer's Representative to make reasonable changes required to accommodate conditions arising during the progress of the work, at no extra cost.
- 1.11.7. Certain details indicated on the drawings are general in nature and specific labelled detail references to each and every occurrence of use are not indicated, however, such details shall be applicable to every occurrence on the drawings.
- 1.11.8. The location and size of existing services shown on the drawings are based on the best available information. Verify the actual location of existing services in the field before commencing work.
- 1.11.9. At no extra cost, make all changes and modifications necessary to ensure co-ordination and to avoid interference and conflicts with other trades, or to accommodate existing conditions.
- 1.11.10. Leave areas clear where space is indicated as reserved for future equipment, and equipment for other trades.
- 1.11.11. Leave adequate space and provisions for removal of components and servicing of equipment, with minimum inconvenience to the operation of systems.
- 1.11.12. Where equipment is shown to be 'roughed in only' obtain accurate information from the Electronic Safety and Security Engineer's Representative before proceeding with the work.
- 1.11.13. Location of outlets, luminaires, diffusers, grilles, registers, thermostats, sprinklers and all other equipment shown on drawings (if shown) is diagrammatic.
- 1.11.14. Remedy any work not installed in correct location. Mark-out work and fully co-ordinate with all other trades. Review with Electronic Safety and Security Engineer's Representative prior to rough in. Prepare dimensioned layouts of each room prior to rough in for review by Electronic Safety and Security Engineer's Representative. Do not proceed with any work until the Electronic Safety and Security Engineer's Representative has reviewed and approved the layout drawings.

- 1.11.15. Conform to the York Region's Standards, Wiring and Tagging Standards, where applicable.
- 1.11.16. Approved Equal
- 1.11.17. Wherever the term "or approved equal" and or "approved equivalent" is used herein, it is to be understood that reference to the specified trade name, brand name, manufacturer's name, model number and/or catalogue number has been made solely for the purpose of indicating the minimum standard of quality required in material, workmanship and service. Any proposed alternate shall be submitted for review and acceptance prior to procurement and installation. The review and acceptance shall be at the sole discretion of The Region and their Engineer's Representatives.
- 1.12. SUBSTITUTIONS
- 1.12.1. Proposed substitutions in order to be assessed must include the following:
- .1 Description of proposed substitution;
 - .2 Respective cost of items originally specified and the proposed solution;
 - .3 Compliance with the applicable Building Codes and the requirements of jurisdictional authorities;
 - .4 Compliance with the applicable standards;
 - .5 Affect concerning compatibility with and interface with adjacent building materials and components;
 - .6 Compliance with the intent of the Contract Documents;
 - .7 Reasons for the request.
- 1.12.2. The Electronic Safety and Security Engineer's Representative's decision regarding the acceptance or rejection of the proposed substitution shall be final. Substitutions may be accepted if the delivery of the component or item is such that it will not jeopardise the construction schedule. Otherwise substitution will not be allowed.
- 1.13. CONFLICTING REQUIREMENTS
- 1.13.1. In the case of conflict or discrepancy in the requirements indicated in the contract documents the more stringent and/or more onerous requirement shall apply.
- 1.14. EQUIPMENT AND MATERIALS MINIMUM REQUIREMENTS
- 1.14.1. Materials and equipment supplied by this Division shall be new and free from defects.
- 1.14.2. All equipment and material for which there is a listing service shall bear a UL/ULC and/or CSA label.
- 1.15. CO-OPERATION WITH OTHER DIVISIONS
- 1.15.1. Electronic Safety and Security cabling shall not touch or be supported from piping, ductwork, conduits, ceiling supports or any other structure / equipment. Electronic Safety and Security cabling shall be supported by ladder tray (where provided) or shall be installed within conduit (where provided).

-
- 1.15.2. Supply all items to be built in ample time for rapid progress of the work. Schedule and proceed with work as required to satisfy the construction schedule.
- 1.16. EXISTING SERVICES AND EQUIPMENT
- 1.16.1. All changes and connections to existing services shall be made only in a manner and at a time approved by the Safety and Security Engineer's Representative and/or The Region so as to avoid any interruption of such services during normal working hours. If necessary, changes and connections to existing services shall be made outside of normal working hours, at no extra cost to the Contract.
- 1.16.2. Where connections are made to existing services, existing fire stopping shall be made good under this Division.
- 1.17. METRIC CONVERSIONS
- 1.17.1. Particular care shall be taken with imperial versus S.I. metric conversions. This applies to all services including, but not limited to, equipment, material and site services in both new and existing installations.
- 1.18. SCHEDULE, ACCESS, PROTECTION AND CLEAN-UP
- 1.18.1. The construction schedule places restrictions on the duration of construction within areas and the duration of shut-down of equipment. Refer to the General Conditions for all requirements.
- 1.18.2. Refer to the General Conditions and conform to all requirements.
- 1.18.3. Refer to the security and protection requirements in the General Conditions and conform to all requirements. There shall be no smoking, and the site shall be kept clean at all times.
- 1.19. CUTTING, PATCHING AND REPAIRING
- 1.19.1. Perform all cutting, patching, repair and making good related to the Electronic Safety and Security Systems work including any penetrations through walls or floors.
- 1.19.2. Allow for all cost associated with cutting, patching, repair and making good related to the Electronic Safety and Security Systems work including any penetrations through walls or floors.
- 1.19.3. Paint all visible Electronic Safety and Security systems conduit to match existing.
- 1.19.4. Coordinate the color and location of all conduits, security devices and their housing with architect and architectural drawings on site prior to installation.
- 1.20. HOISTING FACILITIES
- 1.20.1. Provide all hoisting required to perform all work.

2. Products

2.1. ELECTRONIC SAFETY AND SECURITY SYSTEMS

2.1.1. Provide all materials as required for complete turnkey, end to end Electronic Safety and Security Systems.

2.1.2. All new equipment is to be supplied and installed by the Contractor unless existing equipment is verified to be functional and The Region has approved reuse of existing equipment.

2.1.3. Fasteners

- .1 Provide security tamperproof fasteners for all visible exposed devices, equipment and components in all areas. Coordinate fastener type with the YORK REGION.

3. Execution

3.1. PRODUCT DELIVERY REQUIREMENTS

3.1.1. Unload materials from delivery trucks in such a manner as to protect the materials from damage. In particular, reels of cable shall not be unloaded by dropping them off the vehicle.

3.2. PROTECTING INSTALLED SYSTEMS AND CONSTRUCTION

3.2.1. Be responsible for the assembly of above equipment/materials and protection of the above equipment and related items until project cut over. For any liable any damage to equipment. All damage shall be repaired or at The Region's request, the equipment shall be replaced at no extra charge to The Region.

3.3. ELECTRONIC SAFETY AND SECURITY SYSTEMS

3.3.1. Supply and install complete turnkey, end to end Electronic Safety and Security Systems.

3.4. WARRANTY MAINTENANCE SERVICES

3.4.1. Provide Warranty for the completed work to be free of defects in workmanship and materials for a period of two (2) years from the date of system acceptance and shall provide all necessary material required to replace defective products during this period.

3.4.2. If the workmanship or materials is found to be defective or not in accordance with the contract documents during the warranty period, correct it promptly with factory certified technicians at no cost. Provide all labor and materials to facilitate correction.

3.4.3. Warranty shall cover all installation for the Electronic Safety and Security Systems including but not limited to all hardware, hardware configurations, software, software configurations, wiring/cabling, conduit, pathways, and all active and passive components.

3.4.4. Provide maintenance at no extra cost during warranty period. The maintenance shall include but not limited to:

- .1 Execute system health check every 6 months during warranty period on all systems component including devices, cabling all passive and active hardware all software and firmware. Correct all defects and make all corrections to components and software to ensure the entire system is functioning optimally and according to manufacturer's recommendations.

3.4.5. General Requirements

- .1 Provide all services required and equipment necessary to maintain all operations of the installed Electronic Safety and Security Systems during the period of the warranty.

3.4.6. Software

- .1 Provide all available software and firmware updates during the period of the warranty and verify operation in the system. All updates shall be accomplished in a timely manner, fully coordinated with The Region's representatives, shall include training for the new changes/features enabled, and shall be incorporated into the operations and maintenance manuals, and software documentation.

3.4.7. Description of Work

- .1 Provide respective systems manufacturer's required scheduled and unscheduled maintenance and all other work necessary to keep the system at its maximum performance.

3.4.8. Personnel

- .1 Service personnel shall be factory certified in the maintenance and repair of the system equipment installed under this specification. The Region shall be advised in writing of the name of the designated service representative, and of any change in personnel.

3.4.9. Records and Logs

- .1 Maintain records and logs of each task performed. Organize cumulative records for each component and for the complete system chronologically. A continuous log shall be maintained for all devices. The log shall contain all initial settings. Complete logs shall be kept and shall be available for inspection onsite, demonstrating that planned and systematic adjustments and repairs have been accomplished.

3.4.10. Work Requests

- .1 Rerecord separately each service call request on a service request form. The form shall include the model and serial number identifying the component involved, its location, date and time the call was received, specific nature of trouble, names of service personnel assigned to the task, instructions describing what has to be done, the amount and nature of the materials used, the time and date work started, and the time and date of completion. The Contractor shall deliver a record of the work performed within five (5) days after work is accomplished.

3.4.11. System Modifications

- .1 Make any recommendations for system modification in writing to The Region. No system modifications shall be made without prior approval of The Region. Any modifications made to the system shall be incorporated into the operations and maintenance manuals, and other documentation affected.

END OF SECTION

1. General

1.1. NOT USED

1.2. DEFINITIONS

1.2.1. Generally, the following definitions are used in this Division:

Addendum	-	Normative document used to provide additional requirements and recommendations to a published document (e.g., standards, contracts). When published, an addendum effectively becomes part of the document that it supports.
Bonding	-	The permanent joining of metallic parts to form an electrically conductive path that will ensure electrical continuity and the capacity to conduct safely any current likely to be imposed.
Bonding Conductor (BC)	-	A conductor used specifically for the purpose of bonding.
Building Entrance Facility	-	The room or space inside a building where telecommunications cables enter and leave the building.
Electronic Safety and Security Contractor	-	The successful bidder to this Specification responsible for the supply and installation of the Integrated Electronic Safety and Security Systems.
Change Notice	-	Normative document approved to provide additional requirements and recommendations that describes and authorizes the implementation of an engineering change to the product and its approved configuration documentation.
Electronic Safety and Security Engineer's Representative	-	Sal Ramo Smith + Andersen 4211 Yonge Street, Suite 500 Toronto, ON M2P 2A9
Contemplated Change Notice	-	Normative document to provide additional requirements and recommendations that describes the implementation of an engineering change to the product and its approved configuration documentation for the purposes of pricing. This document does not authorize the implementation of a change to the product and its approved configuration documentation.
Cut Over	-	The live date(s) when The Region will occupy the space as indicated by date and/or phasing.

Contract Documents	-	All Electronic Safety And Security Systems / Security, Electrical, Architectural, Mechanical and Structural Drawings and specifications and schedules issued in relation to this project including any future changes and revisions of said documents.
Contract Drawings	-	All Electronic Safety And Security Systems / Security, Electrical, Architectural, Mechanical and Structural Drawings issued in relation to this project including any future changes and revisions of said documents.
Grounded Conductor	-	A system or circuit conductor that is intentionally grounded.
Grounding System	-	A system of hardware and wiring that provides an electrical path from a specified location to an earth ground point.
Project	-	Supply and installation of a complete Integrated Electronic Safety and Security Systems as described in this document.
Provide	-	Supply, install and configure as per contract documents.
Shop Drawing	-	Drawings, diagrams, illustrations, schedules, performance charts, and other data prepared by the contractor which illustrate how specific portions of the work shall be installed. This includes but not limited to point to point high level integration diagram, riser diagram, termination diagram, panel layout, door types and product data sheet.

1.3. ABBREVIATIONS

1.3.1. Generally, the following abbreviations are used in this Division:

A	-	Ampere
ac	-	Alternating current
ACR	-	Attenuation to Cross-Talk Ratio
ADC	-	Analog to Digital Converter
ADSL	-	Asymmetric Digital Subscriber Line
A/E	-	Architect or Engineer
AFF	-	Above Finished Floor
AHJ	-	Authority Having Jurisdiction
ALPETH	-	Aluminum Polyethylene
AME	-	Architectural, Mechanical, Electrical
AN	-	Access Node
ANSI	-	American National Standards Institute
AP	-	Access Point
ARPAP	-	Resin-coated Aluminum, Polyethylene Aluminum, Polyethylene
ASCII	-	American Standard Code for Information Interchange
ASP	-	Aluminum Steel Polyethylene
ASTM	-	American Society for Testing and Materials
ATD	-	Asynchronous Time Division
ATDM	-	Asynchronous Time Division Multiplexing
ATM	-	Asynchronous Transfer Mode

Attn	- Attenuation
AV	- Audiovisual
AWG	- American Wire Gauge
BAS	- Building Automation System
BC	- Bonding Conductor
BCD	- Backbone Conduit
BCT	- Bonding Conductor for Telecommunications
BEF	- Building Entrance Facility
BER	- Bit Error Rate
BERT	- Bit Error Rate Test
BFOC	- Bayonet Fibre Optic Connector
BIC	- Building Industry Consultant
BICSI®	- Building Industry Consulting Service International
bit	- Binary Digit
BOM	- Bill Of Material
b/s	- Bit per Second
BWA	- Broadband Wireless Access
CA	- Cable
CACSP	- Coated Aluminum Coated Steel Polyethylene
CAD	- Computer Aided Design
CATV	- Community Antenna Television (Cable Television)
CCIA	- Computer Communications Industry Association
CCN	- Contemplated Change Notice
CCTV	- Closed Circuit Television
CD	- Compact Disc
CD	- Change Directive (same as Change Notice and Change Order)
CEC	- Canadian Electrical Code
CEF	- Cable Entrance Facility
cm	- Centimetre
CMP	- Communications Plenum
CMR	- Communications Riser
CN	- Change Notice (same as Change Directive and Change Order)
CO	- Change Order (same as Change Notice and Change Directive)
coax	- Coaxial Cable
CO-OSP	- Customer-Owned Outside Equipment
CP	- Consolidation Point
CPU	- Central Processing Unit
CPVC	- Chlorinated Polyvinyl Chloride
CSA	- Canadian Standards Institute
CSC	- Construction Specifications Canada
CSI	- Construction Specifications Institute
CT	- Cable Tray
Cu	- Copper
c/w	- Complete With
dB	- Decibel
dB/km	- Decibel per Kilometre
dBm	- Decibel milliwatt
dBmV	- Decibel millivolt
demarc	- Demarcation Point
D-ring	- Distribution Ring
DSL	- Digital Subscriber Line
EF	- Entrance Facility
EIA	- Electronics Industry Alliance
ELFEXT	- Equal Level Far-End Crosstalk
ESSS	- Electronic Safety and Security System/s
e-mail	- Electronic Mail

EMI	- Electromagnetic Interference
EMI/RFI	- Electromagnetic Interference / Radio Frequency Interference
ER	- Equipment Room
ESD	- Electrostatic Discharge
e/w	- Equipped With
FC	- Fibre Connector
FCC	- Federal Communications Commission
FDDI	- Fibre Distributed Data Interface
FEP	- Fluorinated Ethylene Propylene
FEXT	- Far-End Crosstalk
FOTP	- Fibre Optic Test Procedure
ft	- Foot / Feet
ft ²	- Square Foot / Feet
FTTD	- Fibre To The Desk
FT 1 / FT 3	- Fractional T 1 / Fractional T 3
G	- Giga
Gb	- Gigabit
GB	- Gigabyte
Gb/s	- Gigabit per Second
GC	- General Contractor
GHz	- Gigahertz
HC	- Horizontal Cross-connect
Hz	- Hertz
I	- Current
IC	- Intermediate Closet
IC	- Intermediate Cross-connect
ID	- Identification
ID	- Inside Diameter
IDC	- Insulation Displacement Connection
IDC	- Insulation Displacement Connector
IDC	- Insulation Displacement Contact
IDF	- Intermediate Distribution Frame
IEEE®	- Institute of Electrical and Electronics Engineers, Inc.®
IG	- Isolated Ground
in	- Inch
in ²	- Square Inch
I/O	- Input / Output (Device)
IOR	- Index Of Refraction
IP	- Internet Protocol
ISDN	- Integrated Services Digital Network
ISO	- International Organization for Standardization
IT	- Information Technology
kb	- Kilobit
kB	- Kilobyte
kg	- Kilogram
km	- Kilometre
kV	- Kilovolt
kVA	- Kilovoltampere
kW	- Kilowatt
kWh	- Kilowatt hour
LAN	- Local Area Network
laser	- Light Amplification by Stimulated Emission of Radiation
lb	- Pound
LED	- Light Emitting Diode
LO	- Laser Optimized
LSZH	- Low Smoke Zero Halogen

m	- Metre
m ²	- Square Metre
mA	- Milliampere
MAC	- Move, Add, or Change
MAN	- Metropolitan Area Network
Mb	- Megabit
MB	- Megabyte
Mb/s	- Megabit per Second
MB/s	- Megabyte per Second
MC	- Main Cross-connect
MDF	- Main Distribution Frame
MGB	- Main Grounding Busbar
MHz	- Megahertz
mi	- Mile
MIMS	- Mineral Insulated Metal Sheathed
min	- Minute
mm	- Millimetre
MM	- Multimode
MMF	- Multimode Fibre
MPP	- Modular Patch Panel
ms	- Millisecond
MSDS	- Material Safety Data Sheet
MUTO	- Multi-user Telecommunications Outlet
MUTOA	- Multi-user Telecommunications Outlet Assembly
mW	- Milliwatt
MW	- Megawatt
NBCC	- National Building Code of Canada
NESC	- National Electrical Safety Code
NEXT	- Near-end Crosstalk
NIC	- Network Interface Card
NIR	- Near-end crosstalk-to-Insertion loss Ratio
NRCC	- National Research Council of Canada
OD	- Outside Diameter
OEM	- Original Equipment Manufacturer
OF	- Optical Fibre
OSP	- Outside Plant
PBX	- Private Branch Exchange
PDU	- Power Distribution Unit
PSACR	- Power Sum Attenuation to Crosstalk Ratio
PSSELFEXT	- Power Sum Equal Level Far-End Crosstalk
PSNEXT	- Power Sum Near-End Crosstalk
PVC	- Polyvinyl Chloride
QA	- Quality Assurance
QC	- Quality Control
QoS	- Quality of Service
Qty	- Quantity
RCDD®	- Registered Communications Distribution Designer
RF	- Radio Frequency
RFI	- Radio Frequency Interference
RJ	- Registered Jack
rms	- Root Mean Square
RU	- Rack Unit (1.75")
RX	- Receive
RX	- Receiver
SAN	- Storage Access Network
SC	- Single Fibre Coupling Optical Fibre Connector

SCC	- Standards Council of Canada
SCS	- Structured Cabling System
ScTP	- Screened Twisted Pair
SFTP	- Screened Foiled Twisted Pair
SI	- International System of Units (Le Système International d'Unités)
SLA	- Service level Agreement
SM	- Singlemode
SMF	- Singlemode Fibre
SNMP	- Simple Network Management Protocol
SNR	- Signal-to-Noise Ratio
STALPETH	- Steel Aluminum Polyethylene
STP	- Shielded Twisted Pair
STP-A	- Shielded Twisted Pair A
T 1	- Trunk Level 1
TBB	- Telecommunications Bonding Backbone
TBBIBC	- Telecommunications Bonding Backbone Interconnecting Bonding Conductor
TC	- Telecommunications Closet
TDD	- Telecommunications Device for the Deaf
TGB	- Telecommunications Grounding Busbar
TGR	- Telecommunications Grounding Rod
TIA	- Telecommunications Industry Association
TMGB	- Telecommunications Main Grounding Busbar
TP	- Twisted Pair
TR	- Telecommunications Room
TS	- Technical Standard
TSB	- Telecommunications Systems Bulletin (formerly Technical Systems Bulletin)
TTY	- Teletypewriter / Text Telephone
TV	- Television
TX	- Transmit
TX	- Transmitter
UD	- Underfloor Duct
UL®	- Underwriters Laboratories Inc.®
ULC	- Underwriters Laboratories of Canada
UPC	- Universal Product Code
UPS	- Uninterruptible Power Supply
UTP	- Unshielded Twisted Pair
V	- Volt
VA	- Volt-Ampere
VCSEL	- Vertical Cavity Surface Emitting Laser
VLAN	- Virtual Local Area Network
VoIP	- Voice over Internet Protocol
VPN	- Virtual Private Network
W	- Watt
WAN	- Wide Area Network
WAP	- Wireless Application Protocol
WiFi	- Wireless Fidelity
Wi-Fi	- Wireless Fidelity
WLAN	- Wireless Local Area Network
WMAN	- Wireless Metropolitan Area Network
WWAN	- Wireless Wide Area Network
X	- Cross-connect
XLPE	- Cross-linked Polyethylene
XPE-PVC	- Expanded Polyethylene Polyvinyl Chloride

2. Products

2.1. NOT USED

3. Execution

3.1. NOT USED

END OF SECTION

1. General

1.1. CODES, STANDARDS AND REGULATIONS COMPLIANCES

- 1.1.1. Adhere to the latest edition of all applicable Codes, Standards, Regulations and documents listed throughout this document.
- 1.1.2. All products installed must meet or exceed all Local, Provincial and Federal Building, Fire, Health, Safety and Electrical Codes.
- 1.1.3. Non-plenum and plenum rated cables shall be ETL or ULC (UL) Listed and CSA Certified as type CMR / CMP (respectively).
- 1.1.4. The equipment, material and installation shall conform to the latest version of the applicable Codes, Standards and Regulations of authorities having jurisdiction as indicated in the table below. In the case of conflict or discrepancy the more stringent code, standard or regulation shall apply.

STANDARD	TITLE
ANSI/ICEA	
S-80-576	Standard for Category 1 & 2 Individually Unshielded Twisted Pair Indoor Cables (With or Without an Overall Shield) for Use in Communications Wiring Systems Technical Requirements
TIA/EIA	
455	Optical Fibre Test Procedures.
568-C.1	Commercial Building Telecommunications Cabling Standard: General Requirements.
568-C.2	Commercial Building Telecommunications Cabling Standard: Balanced Twisted Pair Cabling.
568-C.3	Commercial Building Telecommunications Cabling Standard: Optical Fibre Cabling Components Standard.
569-B	Commercial Building Standards for Telecommunications Pathways and Spaces. Including Addenda 1-6.
606-B	Administration Standard for the Telecommunications Infrastructure of Commercial Buildings.
607	Commercial Building Grounding and Bonding Requirements for Telecommunications.
RS232C	Interface between Data Terminal Equipment and Data Communications Equipment Employing Serial Binary Data Interchange
RS485	Electrical Characteristics of Generators and Receivers for use in Balanced Digital Multi-Point Systems
CSA	
C22.1-12	Canadian Electrical Code Part I: Safety Standards for Electrical Installations.
CAN/CSA-C22.2 NO. 182.4-M90	Plugs, Receptacles, and Connectors for Communication Systems.
C22.2 NO. 214-08	Communications Cables.
C22.2 NO. 0.1-M1985	Canadian Electric Code Part II: General Requirements for Double-Insulated Equipment
C22.2 NO. 232-09	Canadian Electric Code Part II: Optical Fibre Cables.

C22.2 NO. 205-12	Signal Equipment
T527-94	Grounding and Bonding for Telecommunications in Commercial Buildings.
T528-93	Design Guidelines for Administration of Telecommunications Infrastructure in Commercial Buildings.
T529-95	Design Guidelines for Telecommunications Wiring Systems in Commercial Buildings.
T530-99	Building Facilities, Design Guidelines for Telecommunications.
NFPA	
NFPA70	NFPA70 – National Electrical Code
OTHER	
CAN/ULC-S115-05	Standard Method of Fire Tests of Firestop Systems.
CAN/ULC-S101-14	Standard Method of Fire Endurance Tests of Building Construction and Materials.
CAN/ULC-S102-10	Standard Method of Testing for Surface Burning Characteristics of Building Materials and Assemblies.
CAN/ULC S316-14	Standards for Performance of Video Surveillance Systems
CAN/ULC S319-05	Electronic Access Control Systems
UL 294	The Standard of Safety for Access Control System Units
UL 365	Police Station Connected Burglar Alarm Units and Systems
ULC1076	Proprietary Burglar Alarm Units and Systems
UL 609	The Standard of Safety for Local Burglar Alarm Units and Systems
UL 639	Standard for Intrusion-Detection Units
UL 1610	Standard for Central-Station Burglar-Alarm Units
ULC-S306-03	The Standard of Safety for Intrusion Detection Units
UL 969	Standard for Marking and Labeling Systems
UL 1037	Standard for Antitheft Alarms and Devices
UL 1067	Standard for Electrically Conductive Equipment and Materials for Use in Flammable Anesthetizing Locations
UL 1492	Standard for Audio-Video Products and Accessories
UL 2044	Standard for Commercial Closed-Circuit Television Equipment
CEC, Part 1	The Canadian Electrical Code, Part 1.
CSA ISO/IEC 11801	Information Technology: Generic Cabling for Customer Premises
ICEA S-80-576	Individually Unshielded Twisted Pair Indoor Cable for Use in Communications Wiring Systems.
IEEE Std 1100	IEEE Recommended Practice for Powering and Grounding Electronic Equipment (IEEE Emerald Book).
IEC 603-7, Part 7	Detailed Specifications for Connectors, 8-Way, Including Fixed and Free Connectors with Common Mating Schemes.
ISO/IEC IS 11801A	Generic Cabling for Customer Premises.
WC 63.1	Performance Standard for Field Testing of Unshielded Twisted-Pair Cabling System.
OHSA	Occupational Health and Safety Act - R.S.O. 1990, c. 0-1.

UL 444 and 13	Adopted Test and Follow-Up Service Requirements For The Optional Qualification of 100Ω Twisted-Pair.
CCTA	Canadian Cable Television Association
NCTA-02/89 rev. 93	NCTA Recommended Practices for Measurements on Cable Television Systems.
Industry Canada	ICES 003 Emissions
RoHs	
Subpart B	RF Emissions
CE Standards	EN 55022 RF Emissions
CE Standards	EN 55024 RF Immunity
FCC	Federal Communications Commission
FCC Part 15	Radio Frequency Device
FCC Part 68	Connection of Terminal Equipment to the Telephone Network
CE Standards	EN 60950-1 Equipment Safety
Provincial	
Ontario	
OESC	Ontario Electrical Safety Code – latest edition.
O.R. 388/97	Ontario Fire Code – latest edition.
O.R. 403/97	Ontario Building Code – latest edition.
Alberta	
AEUC	Alberta Electrical Utility Code
	Alberta Building Code
Quebec	
	Canadian Electrical Code, – latest edition with Québec amendments
British Columbia	
	British Columbia Building Code
	British Columbia Fire Code
	City Of Vancouver Building By-Law
Nova Scotia	
	Nova Scotia Electrical Installation and Inspection Act
	Nova Scotia Building Code Act
Manitoba	
	Manitoba Electrical Code
	Manitoba Fire Code

1.1.5. Comply with applicable Electrical Safety Code, all Local, Provincial and Federal laws, where applicable and with requirements of the Canadian Standards Association (CSA) when mandatory. Make any changes or alterations required by the authorised inspector of the authority having jurisdiction, at no extra charge to the Region.

2. Products

2.1. NOT USED

3. Execution

3.1. CODE, STANDARD AND REGULATION COMPLIANCES

3.1.1. All cables and components shall be installed and terminated in accordance with CSA. Particular attention shall be given to ensuring proper distance is kept from fluorescent light fixtures, electrical cables or any other source of EMI. Cables shall be combed and bundled in a neat and organised manner. The Electronic Safety and Security Engineer's Representative will determine neatness of the installation. Cables that have not been properly combed and dressed shall be re-dressed at no extra cost. Co-ordinate with the Electronic Safety and Security Engineer's Representative prior to termination in any Telecom Rooms.

3.1.2. The maximum horizontal run length shall not exceed the equipment manufacturer's specifications. If the constraint cannot be met, notify the Electronic Safety and Security Engineer's Representative of any cables that exceed the equipment manufacturer's stated limitations. Include for rectification of the limitation in their bid. Rectifications shall include but not limited to active and passive devices, signal boosters, signal extenders, protocol converts, installation of wire gauge suitable to the cabling length being installed and/or a combination of the aforementioned.

END OF SECTION

1. General
- 1.1. SUBMITTALS – DRAWING DOCUMENTATION AND CABLE TEST RESULTS
 - 1.1.1. Clearly mark all changes and deviations on construction drawing(s) during the construction process, include all conduit and cable pathways to and from equipment. Drawing(s) shall be kept up-to-date during construction and in addition to field measurements shall include field instructions and all other changes. The as-built drawing(s) shall also include all additional cables installed during the project. The Electronic Safety and Security Engineer's Representative shall have the right to review the status of the as-built drawing(s) from time to time during the construction process. On completion of the project, forward to the Electronic Safety and Security Engineer's Representative two sets of drawings indicating all such changes and deviations for review within 5 business days of the completion of the project.
 - 1.1.2. Supply (temporary hand-marked) as-built drawings to Electronic Safety and Security Engineer's Representative for The Region use 3 days prior to cut-over.
 - 1.1.3. Request (via email) from the Electronic Safety and Security Engineer's Representative soft copy of drawings for use in preparation for Record Drawings.
 - 1.1.4. All changes to drawing(s) shall be Engineering Draft Standards.
 - 1.1.5. Return record drawing(s) on Flash Drives using AutoCAD R2000 or better. If this requirement cannot be met, Smith + Andersen will update all hand drawn Record Drawings to AutoCAD. The cost for this service shall be based on Smith + Andersen's per diem rates at time of completion. Pay for all costs associated with this work.
 - 1.1.6. Print / plot **two** sets of as-built drawings at no extra cost. Final as-built print(s)/plot(s) shall not contain markings or corrections by hand (i.e. marker, pen, pencil, etc.) and shall be delivered to Smith + Andersen for final review and delivery to the Region.
 - 1.1.7. The project will remain incomplete and a holdback will be retained until satisfactory as-built drawing(s) are provided.
- 1.2. SUBMITTALS – TESTING AND COMMISSIONING
 - 1.2.1. Provide testing and commissioning documentation in soft and printed format for all items and their related components to the Electronic Safety and Security Engineer's Representative prior to the completion of the project or at the Electronic Safety and Security Engineer's Representatives request. Include maintenance manuals and operating instructions for The Region's staff use.
- 1.3. PERMITS, LICENSE REVIEWS AND FEES
 - 1.3.1. Where materials are specified which require special review and approval of CSA and/or local authorities obtain such approval for the particular installation with the co-operation of the material supplier. Obtain and pay for permits and review required for work performed.
 - 1.3.2. Submit required Documents and shop drawings to authorities having jurisdiction in order to obtain approval for the work. Prepare any additional information, details and drawings that these authorities may require.

1.4. ALTERNATE PRODUCT

- 1.4.1. This document specifies the use of complete end to end Electronic Safety and Security Systems as manufactured, warranted and certified by a single manufacturer. Alternate materials (from the overall system) will not be accepted unless specifically noted.
- 1.4.2. Where supply of the materials would compromise the schedule, submit a request to use alternate product to the Electronic Safety and Security Engineer's Representative. Depending on the circumstance, the Electronic Safety and Security Engineer's Representative may provide written authorisation to substitute the Product. Written authorisation shall be obtained before alternatives are purchased or installed.

1.5. SCHEDULING

- 1.5.1. Within one week of award of the contract submit a formal project schedule to the Electronic Safety and Security Engineer's Representative showing start and finish dates of major tasks as denoted by System, material order and delivery to site, installation, testing and commissioning.
- 1.5.2. Updated schedules shall be submitted as periodically requested by Electronic Safety and Security Engineer's Representative.

1.6. PROJECT MANAGEMENT

- 1.6.1. Provide complete project management for this project. Complete project management shall include but not limited to:
- .1 Develop detailed Gantt Chart project plan and submit to The Region and Electronic Safety and Security Engineer's Representative for review and approval prior to start of project.
 - .2 Chair biweekly construction meetings for the duration of the project. Construction meetings shall be on site or via conference call at the Region's and or Electronic Safety and Security Engineer's Representative's discretion.
 - .3 Generate and submit detailed biweekly construction progress reports to The Region and Electronic Safety and Security Engineer's Representative. Each progress report shall include itemized detailed description and extent of tasks completed, itemized detailed description and quantification of materials installed and labeled photos that clearly show the extent of construction progress.

1.7. CLEANUP

- 1.7.1. Keep the site and surrounding area clean, safe and free from debris at all times. Remove all debris from the site on a daily basis.
- 1.7.2. Upon completion of the work and before acceptance and final payment will be made, remove from the site, all surplus and discarded materials, temporary structures and debris of every kind. Surplus and waste materials removed from the site shall be disposed of in accordance with applicable laws and regulations.

1.8. ACCEPTANCE

- 1.8.1. Before acceptance by the Electronic Safety and Security Engineer's Representative, all the equipment and cabling must be installed, cleaned, tested commissioned. At points of

termination, all cabling and terminations must be free of any cable pulling lubricants before acceptance by the Electronic Safety and Security Engineer's Representative.

1.9. REVIEW AND TESTING REQUIREMENTS

- 1.9.1. Develop a testing and commissioning checklist for each system and submit to the Electronic Safety and Security Engineer's Representative for approval 10 business days before commissioning commences.
- 1.9.2. The Electronic Safety and Security Engineer's Representative must approve the testing and commissioning procedure prior to the commencement of testing and commissioning and may request to be present.
- 1.9.3. Local testing to be performed at the facility. Following successful demonstration of local testing, operational testing to be performed utilizing Region's existing Honeywell EBI Server.
- 1.9.4. Local testing to be performed at the facility. Following successful demonstration of local testing, operational testing to be performed utilizing Region's existing Honeywell EBI Server.
- 1.9.5. Following successful integration with Honeywell EBI Server, shift programming of the facility, if applicable, to be coordinated through the Region's Security and Life Safety Coordinator (905) 830-4444 ext.6900.
- 1.9.6. The Electronic Safety and Security Engineer's Representative shall be invited to witness field testing and commissioning, and shall be notified of the start date of the testing phase 10 business days before testing and commissioning commences.
- 1.9.7. Test and commission all electronic safety and security systems.

2. Products

2.1. NOT USED

3. Execution

3.1. INSTALLATION

3.1.1. NOT USED

END OF SECTION

1. General

1.1. WORK INCLUDED

1.1.1. Fire Stopping

- .1 Provide seals in all Fire Rated Separations and Firewalls to form tight barriers to retard the passage of flame and smoke.
- .2 The installed seals shall provide and maintain the fire resistance rating of the adjacent floor, wall or other fire separation assembly to the Code Requirements.
- .3 Moisture seals as well as fire and smoke seals shall be required for all floor penetrations.
- .4 Establish and or re-establish the integrity of all fire-rated structures and assemblies that they have created or disturbed.
- .5 Supply and install Fire Stop pillows for existing cable tray penetrations through firewalls.
- .6 For the purposes of this specification, the only acceptable Fire Stop Systems shall be those that have been tested to the applicable ULC Standards.
- .7 Supply and install non-permanent CSA approved Fire Stop systems that are dielectric, water resistant, non-hardening, permanently pliable/re-enterable putty along with the appropriate damming or backer materials (where required).
- .8 All fire stopping shall maintain a minimum one hour rating and shall meet applicable Federal, Provincial and Local building codes.
- .9 All Fire Stop Systems shall be listed and tested by an SCC and accredited Third Party Testing Agency in accordance with the Standards.
- .10 Fire resistance ratings of installed Fire Stop Systems shall not be less than the fire resistance rating of the surrounding Fire Separation or Firewall.
- .11 All Smoke Seals selected for use shall comply with Standards.
- .12 Where moisture seals are required for floor penetrations in Operating Rooms, Morgues, and Laboratories in Hospitals, Universities and Schools, the Fire Stop Materials selected shall be compatible with Formalin.
- .13 All Fire Stop Materials and Smoke Seals shall have elastomeric characteristics to allow for building settling and seismic movement. All Fire Stop Materials and Smoke Seals shall be free of asbestos.

1.1.2. Water Proofing

- .1 Seal all foundation penetrating conduits and service entrance conduits and sleeves to eliminate the intrusion of moisture and gases into the building. This requirement also includes spare conduits.
- .2 All service entrance conduits through building shall be sealed or resealed upon cable placement. Spare conduits shall be plugged with expandable plugs.

1.1.3. Quality Assurance

- .1 Provide fire stopping systems that comply with the following requirements following:
 - .1 Fire stopping tests are performed by a qualified, testing and inspection agency. A qualified testing and inspection agency is UL, or another agency performing testing and follow-up inspection services for fire stop system acceptable to authorities having jurisdiction.

- .2 Fire stopping products bear the classification marking of qualified testing and inspection agency
 - .2 Provide the work of this Section using competent installers, experienced in the application of the materials and systems being used, approved and trained by the material or system manufacturer.
 - .3 Fire Stop Systems shall conform to the fire (F), hose (H) and temperature (T) ratings of Codes.
 - .4 Fire Stop Materials and Smoke Seal materials shall have a flame spread rating of 25 or less, National Fire Protection Association (NFPA Class "A").
 - .5 For the purposes of this specification the only acceptable Fire Stop Systems are those that have been tested to the CAN/ULC S115 Standard.
- 1.1.4. Performance
- .1 Fire rated pathway devices shall be the preferred product and shall be installed in all locations where frequent cable moves, add-ons and changes will occur.
 - .2 Where non- mechanical products are utilized, provide products that upon curing do not re-emulsify, dissolve, leach, breakdown or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water or other forms of moisture characteristic during or after construction.
 - .3 Where it is not practical to use a mechanical device, openings within floors and walls designed to accommodate telecommunications and data cabling shall be provided with re-enterable products that do not cure or dry.
 - .4 Openings for cable trays shall be sealed using re-enterable fire stopping pillows.
- 1.1.5. Project Conditions
- .1 Do not install fire stopping products when ambient or substrate temperatures are outside limitations recommended by manufacturer
 - .2 Do not install fire stopping products when substrates are wet due to rain, frost, condensation, or other causes.
 - .3 Maintain minimum temperature before, during, and for a minimum 3 days after installation of materials.
 - .4 Do not use materials that contain flammable solvents.
 - .5 Coordinate construction of openings and penetrating items to ensure that through-penetration fire stop systems are installed according to specified requirements.
 - .6 Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration fire stop systems.
 - .7 Schedule installation of fire stopping after completion of penetrating item installation but prior to covering or concealing of openings.
2. Products
- 2.1. GENERAL
- 2.1.1. Use only fire stopping products that have been tested for specific fire resistance rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire rating involved for each separate instance.

2.2. MANUFACTURERS

- 2.2.1. Products manufactured by Hilti (or approved equivalent) are acceptable.
- 2.2.2. Obtain fire stop systems for each type of penetration and construction condition indicated only from a single manufacturer.

2.3. MATERIALS

- 2.3.1. Firestop Sealants: The following products are acceptable.
 - .1 Hilti FS-ONE high performance Intumescent Firestop Sealant
 - .2 Hilti CP 601S Elastomeric Firestop Sealant.
 - .3 Hilti CP 606 Flexible Firestop Sealant
 - .4 Hilti CP 604 Self-Leveling Firestop Sealant
- 2.3.2. Cast-In Firestop Device: A one-step cast-in firestop device for a variety of pipe materials and diameters. The following product is acceptable.
 - .1 Hilti CP 680-M Cast-in Firestop Device
- 2.3.3. Firestop Putty: An intumescent, non-hardening, firestop putty for cable and pipe penetrations. The following product is acceptable:
 - .1 Hilti CP 681 Firestop Putty Stick.
- 2.3.4. Firestop Plug: Ready-to-use intumescent and reusable plug for small openings. The following product is acceptable:
 - .1 Hilti CP 658T Firestop Plug.
- 2.3.5. Fire Rated Cable Pathways: Re-penetrable cable management device:
 - .1 Hilti CP 653 Speed Sleeve.

3. Execution

3.1. FIRE STOPPING

- 3.1.1. Before beginning installation, verify that substrate conditions previously installed under other sections are acceptable for installation of fire stopping in accordance with manufacturer's installation instructions and technical information
- 3.1.2. Examine sizes and conditions of Fire Stop Material voids. Fill and or correct Fire Stop Materials to eliminate voids.
- 3.1.3. Surfaces shall be free of dirt, grease, oil, scale, laitance, rust, release agents, water repellents, and any other substances that may inhibit optimum adhesion
- 3.1.4. Prepare surfaces in contact with Fire Stop Systems and Smoke Seals to manufacturer's instructions. Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.
- 3.1.5. Install/replace sound barrier/fire stopping materials as soon as cables have been pulled through the opening.

- 3.1.6. In all Fire Stop Systems that require mineral wool or ceramic fibre backer or filler materials, these materials shall be dry and free of other contaminants before, during and after installation of sealant Fire Stop Materials. Alkaline water contamination of the backer or filler materials may cause corrosion of metallic penetrating items.
- 3.1.7. Apply Fire Stop Systems and Smoke Seals in strict accordance with manufacturer's instructions to prevent the passage of fire and smoke, and where required and / or specifically designated, the passage of fluids.
- 3.1.8. Provide temporary forming and packing as required. Tool or trowel all exposed surfaces to smooth, neat and tidy finish.
- 3.1.9. Fire Stop and smoke seal gaps and holes in all Fire Separation and Firewall construction through which cables pass as a result of work in this document.
- 3.1.10. In Combustible Construction (membrane GWB type) where the framing members are wood or where paper faced insulation is incorporated within the separation, a Fire and Temperature rise "FT" rating is required equal to that of the rating of the Fire Separation. Include openings which have been formed and sleeved.

3.2. WATER PROOFING

- 3.2.1. Conduits with cables in them shall be permanently sealed by firmly packing the void around the cable with oakum and capping with a hydraulic cement or water proof duct seal.

3.3. EXPOSED SERVICE PENETRATIONS IN CEILING OF UNDERGROUND PARKING AREAS

- 3.3.1. Where the bottom of a Fire Stop System is exposed, seal bottom side of the assembly with a fire rated elastomeric Fire Stop sealant.

3.4. CLEAN UP

- 3.4.1. Remove excess materials and debris and clean adjacent surfaces immediately after application to satisfaction of Project Manager. Remove and or correct staining and discolouring of adjacent surfaces as directed.

END OF SECTION

1. General

1.1. TRAINING

- 1.1.1. Include for adequate training of minimum 4 operations personnel on the operation and maintenance of the Electronic safety and Security Systems. The training shall be minimum eight (8) hours of instruction in two (2) 4-hour segments.
- 1.1.2. Coordinate with the Region and configure and or reconfigure and populate and or repopulate all Electronic Safety and Security system related databases, configure and or reconfigure all the systems parameters to the Regions' satisfaction and or until initialed databases are complete and functional and or until all the security system parameters are working to the Region's satisfaction. Provide one technician to work side-by-side with the Region's representatives to assist and instruct the Region's representatives with further customization of all systems functionalities to the Region's satisfaction.
- 1.1.3. The training shall include but not limited to oral and written presentations and onsite system interactive training sessions that ensure operational competency of operations personnel on each Electronic Safety and Security system.
 - .1 Provide 6 full sets of maintenance manuals and operating instructions. This shall include comprehensive descriptive data sheets, brochures and technical manuals for all systems and equipment forming part of the contract. The manuals shall include wiring and schematic diagrams for the IESSS and all related subsystems.
 - .2 For each Electronic Safety and Security subsystem, Provide and A4 laminated sheet with short form operating instructions on one side, and a site diagram showing systems components on the other.
 - .3 Submit a full schedule of maintenance that shall be carried out on each Electronic Safety and Security system during the warranty period and under subsequent maintenance contracts.
- 1.1.4. Training shall cover all aspects of all the systems under the electronic safety and security scope.
- 1.1.5. All training sessions shall be provided on minimum 4 Flash Drives for later use by The Region.

2. Products

2.1. NOT USED

3. Execution

3.1. NOT USED

END OF SECTION

1. General

1.1. NOT USED

1.2. FLOOR/CEILING TILES

1.2.1. Allow for the removal and re-installation of all floor/ceiling tiles in areas affected by their work. This shall be done on a daily basis for all areas that are occupied during the construction period. Otherwise remove and re-install the tiles after their work is complete.

1.2.2. Replace all soiled and or damaged ceiling tiles during the installation of any work described in this document. Damages include chipping, breaking or fingerprints. Final decisions on the trade responsible for any damage to ceiling tiles shall be made by the Project Manager and/or the Electronic Safety and Security Engineer's Representative.

1.2.3. Store and protect all floor/ceiling tiles when they have been removed from the floor/ceiling grid.

1.3. SAFETY OF PERSONS AND PROPERTY

1.3.1. Comply with all laws, ordinances, rules, regulations, policies of the Region and lawful orders of any public authority having jurisdiction for safety of persons or property or to protect them from damage, injury or loss.

1.3.2. Moderate public pedestrian traffic should be expected around all work locations. Ladders scaffold, installation materials, and all other hazardous conditions shall be fully protected at all times. Warning cones, signs, barricades and warning tapes shall be used to warn and protect persons and property at all times in public corridors.

1.3.3. Work shall not interfere with legal fire exits. Corridors, areas of egress, fire protection stand pipes, hydrants and exit stairs shall be maintained at all times.

1.3.4. No open flames/smoking shall be permitted without prior written approval of the Region.

1.3.5. Set up and remove of all signage and safety measures to ensure that other trades and non-trade personnel are safe from all work being performed.

1.4. ACCESS TO SITE

1.4.1. Coordinate site access with the General Contractor and/or The Region as determined during the initial project meeting.

1.5. IDENTIFICATION

1.5.1. All personnel shall be clearly identified by either uniform or company ID. In addition, wear The Region provided ID for required card access locations or identification. All The Region ID must be returned daily or at the end of the project as determined by the Region.

1.6. EMERGENCY FACILITIES

- 1.6.1. Maintain at all times free access to fire lanes and emergency and utility control facilities such as fire alarm boxes, utility vaults, manholes and junction boxes.
- 1.7. PRODUCT DELIVERY REQUIREMENTS
 - 1.7.1. Allow for complete delivery, handling, and installation of all materials used in the performance of the work.
 - 1.7.2. Arrange for the delivery of The Region furnished equipment/materials related to this Specification and related items, including unloading of supplier's truck, elevator scheduling and placement on The Region premises as indicated on Contract drawings.
- 1.8. PRODUCT AND TOOLS STORAGE REQUIREMENTS
 - 1.8.1. Allow for complete storage and handling of all materials used in the performance of the work.
 - 1.8.2. Storage of job boxes on the site during construction may be allowed by The Region. Coordinate the storage of job boxes onsite with The Region. The Region and his representatives shall be in no way responsible or liable for any stored tools and or materials.
- 1.9. CONFINED SPACES
 - 1.9.1. Comply with all code related and The Region specific safety requirements when performing work in a confined space.
- 1.10. CO-ORDINATION WITH OCCUPANTS
 - 1.10.1. Coordinate all work with the Region/tenant of the floor space for their daily work.
- 1.11. PROJECT MEETINGS
 - 1.11.1. Attend site meetings when requested by the Electronic Safety and Security Engineer's Representative and/or the Project Manager. Regular meetings may occur once per week at the Electronic Safety and Security Engineer's Representative's and/or the Project Manager's discretion.
 - 1.11.2. Attend weekly project meetings throughout the duration of the project to review the status of current and planned activities, schedule and conduct other business associated with the project.
 - 1.11.3. PROGRESS REPORTS
 - 1.11.4. Issue a status report at the weekly project meeting including status of: progress, project completion for phases, material ordering and delays.
- 2. Products
 - 2.1. NOT USED

3. Execution

3.1. PRODUCT DELIVERY REQUIREMENTS

- 3.1.1. Unload materials from delivery trucks in such a manner as to protect the materials from damage. In particular, reels of cable shall not be unloaded by dropping them off the vehicle.

3.2. PROTECTING INSTALLED SYSTEMS AND CONSTRUCTION

- 3.2.1. Assemble the above equipment/materials and protect the above equipment and related items until project cut over. Replace all damaged equipment at no extra charge.

END OF SECTION

1. General

1.1. NOT USED

2. Products

2.1. RECORD DRAWINGS

2.1.1. Request in writing from the Engineer's Representative all Contract Drawings in AutoCAD format required to complete the Record Drawings. Complete attached form and pay the Engineer's Representative directly the costs identified within the form prior to receiving the Contract Drawings. After the final Record Drawings have been reviewed, provide multiple copies of the drawings on a Flash Drive. One copy is to be returned to the Engineer's Representative for their records and a minimum of one copy with each set of operation and maintenance manuals. Provide additional copies if required under the General Conditions. Use latest release of AutoCAD software.

2.1.2. The Record Drawings shall include but not limited to:

- .1 AutoCAD and .pdf copies of Site and Floor Plans indicating locations of all devices
- .2 AutoCAD and .pdf copies of Point –to-point wiring schematics of all systems and subsystems
- .3 AutoCAD and .pdf copies of Elevations of all rack, cabinets and backboard showing details device mounting
- .4 MS Word/Excel and .pdf copies of All related schedules
- .5 MS Word/Excel and .pdf copies of Testing and commissioning documentation for all devices

2.1.3. Identify the cost of Record Drawings and the Operation and Maintenance Manuals as a separate line item on progress draw. The following values are to be broken out:

\$3,500	For Contracts up to \$250,000
2% of Contract	For Contracts from \$250,000 to \$1,500,000

The project will remain incomplete and no money will be released until the final versions, both hard and electronic, of the drawings and manuals are received.

2.1.4. Final Record Drawings prints/plots shall not contain markings or corrections by hand (i.e. marker, pen, pencil, etc.). References to the Architect and Engineer must be deleted from the drawings.

2.1.5. Final Record Drawings shall include all revisions made to the drawings during construction, including all approved change. The Record Drawings shall also include the routing of all feeders except for branch circuits. Include slab layout drawings in as-built drawing package.

2.1.6. CADD Requirements:

- .1 All AutoCAD Record Drawings shall be prepared using the Region's CAD standards. Obtain the Region's CAD standards from the Region prior to preparing Record Drawings.

- .2 A complete list of layer names and brief description of each layer's use shall accompany all files.
 - .3 Fonts for text shall be AutoCAD standard. Custom fonts, shape files, etc., are not to be used.
 - .4 Final Record Drawings drawings shall be returned on a Flash Drive.
 - .5 Each CD ROM shall be clearly labelled with Engineer's Representative and The Region, Contract number, file names and Drawing number. If a complete listing exceeds the label size provide a "readme.txt" file in ASCII format with each Flash Drive. A printed copy of the readme file shall accompany each Flash Drive.
 - .6 All drawings shall be in the same units as issued on Bid Documents.
 - .7 Provide a complete list of symbol (block) names with a description of each symbol.
 - .8 Special effort shall be made to ensure that drafting is accurate: i.e. appropriate lines are indeed horizontal and vertical; lines that should intersect do but not over-intersect and ensure that entities are placed on correct layers.
- 2.1.7. Maintain two sets of white prints on site on which clearly mark, as the job progresses, all changes and deviations from that shown on Contract Drawings.
- 2.1.8. On completion of the building, forward to the Engineer's Representative the two sets of final drawings indicating all such changes and deviations for review by the Engineer's Representative.
3. Execution
- 3.1. NOT USED
- END OF SECTION

PROJECT NAME: Xxx

ATTENTION: Xxx

PROJECT NO.: Xxx

DATE: YYYY-MM-DD

ISSUED BY: Xxx

Conditions for Limited Use of CAD Drawings

Authorization for limited use of the Computer-Aided Drafting (CAD) drawing files listed below is hereby granted, subject to the following conditions. Signing of this form constitutes acceptance and agreement with the conditions and limitations.

Copyright is reserved. The drawing and design contained in the CAD drawing file is at all times the exclusive property of the Architect/Engineer and shall not be used without the Architect/Engineer's written consent.

The CAD drawing file may not be used wholly or in part for any purpose other than the intended use as stated on this form. Copying or distribution of this CAD drawing file in whole or in part to parties other than those signing below is not allowed.

The CAD file represents drawings which were prepared primarily for the purpose of obtaining tender prices. The drawings may or may not incorporate subsequent revisions, change orders, or addenda which have modified the drawings. CAD files obtained from different disciplines may not be fully updated and coordinated with other disciplines and must be verified from the tender documents. The Architect/Engineer assumes no liability for errors or omissions in the CAD drawing files. Authorized user assumes all risk and expense associated with the use of the drawing files in the production of his work.

References to the Architect and Engineer must be deleted from the drawings.

Please indicate a P.O. Number for charges associated with administrative costs to provide requested AutoCAD drawings.

Our charges are as follows:	\$50.00 each for the first 5 drawings			
	\$20.00 for each additional drawing from 6 to 19			
	\$500.00 for 20 drawings or more			
List of requested drawings:				
Total No. of Drawings:		Total Charge:		+ GST or HST, as applicable

Intended use (Shop drawings, As-built drawings, Installation and Interference drawings, etc.)

CD ROM disc (please provide delivery address)

E-mail (please provide e-mail address)

A cheque in the above amount shall be payable to **Smith + Andersen**.

Please sign and fax back this form to Smith + Andersen (416-487-9104) acknowledging the above charges and Conditions for Limited Use of CAD Drawings.

Accepted by:

Signature

Name (print or type)

Company Name

P.O. #

Company Address

Phone #

c.c. Accounting ; (Project Principal) – Smith + Andersen

1. General
- 1.1. NOT USED
2. Products
- 2.1. SUBMITTALS/SHOP DRAWINGS
- 2.1.1. Submittals/Shop Drawings shall indicate clearly the materials and/or equipment actually being supplied, all details of construction, accurate dimensions, capacity, operating characteristics and performance. Each Shop Drawing shall give the identifying number of the specific assembly for which it was prepared (e.g. B-P2-AAA).
- 2.1.2. All shop drawings shall identify the specific model number of equipment being supplied.
- 2.1.3. Each Shop Drawing for non-catalogue items shall be prepared specifically for this project. Shop Drawings data sheets and brochures for catalogue items shall be marked clearly to show the items being supplied.
- 2.1.4. Each Shop Drawing or catalogue sheet shall be stamped and signed to indicate that he has checked the drawing for conformance with all requirements of the drawings and specifications, that he has co-ordinated this equipment with other equipment to which it is attached and/or connected and that he has verified all dimensions to ensure the proper installation of equipment within the available space and without interference with the work of other trades. Ensure that all electrical, mechanical and architecture co-ordination are complete before submitting drawings for review.
- 2.1.5. Submit all submittals/shop drawings electronically in PDF format. Submittal shall be complete with a transmittal bound to the PDF file with the transmittal identifying the total number of pages in the submittal including the transmittal page.
- 2.1.6. Shop Drawings shall include but not limited to:
 - .1 Catalogue data sheets for each product that will be provided
 - .2 Detailed schematic riser drawings clearly indicating the physical and logical connectivity of each system and how each product will be implemented in the physical and logical connectivity of each system with interconnection diagrams.
 - .3 An itemized shop drawing index with a summery list of items being submitted for review. The list shall indicate Item Number, Item Manufacture and Model Number and Item name and a Review Comments Column.
 - .4 All additional requested information as determined by the Engineer's Representative
- 2.1.7. Installation of any equipment shall not start until after the Engineer's Representative has reviewed Shop Drawings.
- 2.1.8. When requested, Shop Drawings shall be supplemented by data explaining the theory of operation
- 2.1.9. Provide space for Shop Drawing review stamps for Engineer's Representative. This space shall be clear of all technical information and shall not be on the back of any sheets.

2.1.10. One original Shop Drawing will be returned either hard copy or electronically.

3. Execution

3.1. NOT USED

END OF SECTION

1. General

1.1. WORK INCLUDED

- 1.1.1. Supply and install conductors and cables as detailed in Contract Documents and as required and as recommended by the manufacturer to ensure proper operation of all devices and systems. Use pathways (by Division 26) to distribute the cables throughout the facility. Where the cables leave the pathways and extend to the termination point supply and install conduit as needed to support and secure the cables.
- 1.1.2. Where pathways are not provided by Division 26 provide pathways for all Electronic Safety and Security Systems conductors and cables.
- 1.1.3. All Electronic Safety and Security Systems conductors and cables shall be installed in pathways as shown on contract drawings.
- 1.1.4. Pathways shall include but not limited to conduit, cable trays and cable troughs.
- 1.1.5. Avoid scraping, denting, or otherwise damaging cables, before, during or after installation. Without any additional compensation replace damaged cables.
- 1.1.6. Ensure that all cable lengths are sufficient to allow for slack, vertical runs, wastage, connectorization and future moves.
- 1.1.7. Make any necessary changes or additions to routing of cables and pathways to accommodate structural, mechanical, electrical and architectural conditions. Where pathways or cables are shown diagrammatically install them in straight lines making 90 degree turns parallel to building grid lines. If it is necessary to run cables otherwise to accommodate acceptable cable lengths, written permission must be obtained from the Engineer's Representative prior to installation.

1.2. CABLE ROUTING

- 1.2.1. Make any necessary changes or additions to routing of cables, pathways to accommodate structural, mechanical, electrical and architectural conditions. Where pathways or cables are shown diagrammatically run them parallel to grid lines. If it is necessary to run cables otherwise to accommodate acceptable cable lengths, written permission must be obtained from the Electronic Safety and Security Engineer's Representative prior to installation.

2. Products

2.1. CABLING

- 2.1.1. Conductors and cables shall be CMR where installed completely in conduit and/or where installed in non-plenum rated areas. Conductors and cables shall be CMP where not completely installed in conduit and/or installed in plenum rated areas. All cable shall conform to the recommendations of the manufacturers of the electronic safety and security systems.
- 2.1.2. Conductors and cables shall be outdoor rated where installed outdoor and /or installed in locations where they will be exposed to weather elements.

- 2.1.3. Conductors and cables shall be rated for the environment and or environments in which they are being installed.
- 2.1.4. Provide and install shielded cables where required and or recommended by the manufacturer of the electronic safety and security systems.
- 2.1.5. Cabling shown is for typical systems. All cabling shall be as required and recommended by the manufacture of the electronic safety and security systems.
- 2.1.6. Provide all RS-232, RS-485, Optical Fibre and Ethernet cabling, and Fibre and Ethernet jacks as required for a complete network, if applicable.
- 2.1.7. All wiring shall be of proper gauge, type and quantity of conductors as required and as recommended by the manufacturer to ensure proper operation of electronic safety and security systems and peripheral devices. Provide
- 2.1.8. Multi-conductor cables shall have the conductors color coded.
- 2.1.9. All conductors and cables shall be CSA approved and shall be stamped accordingly.
- 2.1.10. Conductors and cables for Card Readers
 - .1 Minimum 3 pair, AWG 22, over all shielded or as required based on distance from controller
- 2.1.11. Conductors and cables for door contact
 - .1 Belden minimum 4 conductor, AWG 22 or as required based on distance from controller
- 2.1.12. Conductors and cables for electric strikes, magnetic locks, electric latches, electric mortise locks and all other electrified locks
 - .1 Belden minimum 4 conductor, AWG 18 or as required based on distance from power source
- 2.1.13. Conductors and cables for motion request to exit devices
 - .1 Belden minimum 6 conductor, AWG 22 as required based on distance from controller
- 2.1.14. Conductors and cables for push button and latch bolt monitor request to exit devices
 - .1 Belden minimum conductor, AWG 22 as required based on distance from controller
- 2.1.15. Conductors for RS-485 cables
 - .1 Twisted pair, each conductor No. 22 AWG stranded copper.
 - .2 Pairs: 2.
 - .3 Sheild: Aluminum-polyester and 90% copper tinned braid.
 - .4 Jacket: Black UV resistant PVC.
 - .5 Electrical Characteristics at 20oC
 - .6 Capacitance: 36.1 pF/m
 - .7 Impedance: 120 ohms
 - .8 Propagation Velocity: 78%

- .9 Belden Datalene Insulated 3107A.
- 2.1.16. Conductors for Serial Cables
 - .1 Belden #9945
 - .2 #22AWG.
 - .3 7-stranded copper.
 - .4 Overall Beldfoil aluminium polyester shield plus 65% minimum tinned copper braid shield.
 - .5 9 conductors. Select Belden trade number to suit number of conductors required for the specific application – Belden #99xx.
 - .6 EIA RS-232 applications.
- 2.1.17. Conductors and cables for IP CCTV Camera
 - .1 Conform with the following plenum rated Ethernet 100BASE-T TIA/EIA 568-B.2-1 Category 06 cable:
 - .2 CSA Certified for trays and risers.
 - .3 Conductors: Unshielded twisted pair, #23 AWG solid copper.
 - .4 Pairs: 4
 - .5 Jacket: Blue Flamearrest, CSA FT4/FT6 rating.
 - .6 Certification/Testing to Category 06 in accordance with the current TIA/ISO Channel Standards.
 - .7 Belden #2400.
- 2.1.18. Increase conductor quantities and or sizes beyond the above stated minimums as required to facilitate proper and complete operation of each respective device and systems.
- 3. Execution
 - 3.1. CABLE DISTRIBUTION
 - 3.1.1. Where cables are not installed in conduit neatly bundle and tie-wrap all cables using Velcro tie-wraps.
 - 3.1.2. Follow proper installation and termination practices for all cables. Do not kink or exceed the cable minimum bend radius. Maintain a minimum of four (4) times cable diameter as bend radii if the manufacturer specifies no bend radius.
 - 3.1.3. When bundling cables, comply with manufacturer's recommended bundling practices for installation. Ensure that excess pressure is not placed on the cable at any point that may

result in the compression or deformation of the cable jacket and internal pair/conductor geometry.

3.2. CONDUCTORS AND CABLES

- 3.2.1. Supply and install all wiring as required for the proper operating of each electronic safety and security system and each peripheral device.
- 3.2.2. Provide and install metal wiring duct to facilitate proper organization and proper dressing of all cables at and around each electronic safety and security system panel.
- 3.2.3. Supply and install metal wiring duct from conduit end points to and around all control panels.
- 3.2.4. All wiring ducts shall be installed such that the ducts house, protect and facilitate the routing of all cables at 90 degree angles to and around all access control panels.
- 3.2.5. Provide non-metallic wiring ducts within all control panels to manage all wiring to termination points.
- 3.2.6. All wiring duct shall be sized to house all cables while maintain manufactures recommended bend radius.
- 3.2.7. Provide all fitting for all wiring duct as required, including but not limited to; couplings, end caps, brackets, etc.
- 3.2.8. After installation, and before termination, all wiring and cabling shall be checked and tested to insure there are no grounds, opens, or shorts on any conductors or shields. A V.O.M. shall be utilized to accomplish these tests and a reading of greater than 20 Megohms shall be required to successfully complete the test.
- 3.2.9. Visually inspect wire and cable for faulty insulation prior to installation. Protect cable ends at all times with acceptable end caps except during actual termination.
- 3.2.10. Protect wire and cable from kinks.
- 3.2.11. Provide grommets and strain relief where required.
- 3.2.12. Comply with controller and peripheral device manufactures installation and termination recommendation.

END OF SECTION

1. General

1.1. WORK INCLUDED

- 1.1.1. This document describes the products and execution requirements relating to supplying and installing Grounding and Bonding for Electronic Safety and Security Systems.
- 1.1.2. All cables and related terminations, support and grounding hardware shall be furnished, installed, wired, tested, labelled, and documented as detailed in this document.
- 1.1.3. Product specifications, general design considerations, and installation guidelines are provided in this document.
- 1.1.4. Meet or exceed all requirements for the grounding system described in this document.

1.2. GENERAL REQUIREMENTS

- 1.2.1. Adhered to all applicable codes and standards.
- 1.2.2. Any metallic component that is part of an Electronic Safety and Security Room including equipment, racks, cabinets, ladder racks, enclosures, cable trays, duct work, etc. shall be bonded to the grounding system.

1.3. ELECTRONIC SAFETY AND SECURITY BONDING BACKBONE REQUIREMENTS

- 1.3.1. The Grounding Busbar (GB) in each Electronic Safety and Security space shall be grounded to the Building Ground Riser by Division 26. The GB and its Bonding Backbone (BB) shall be supplied and installed by Division 26.

2. Products

2.1. EQUIVALENT PRODUCTS

- 2.1.1. All grounding and bonding products required shall meet the requirements of this section and the applicable codes and standards of CSA C22.2 No. 41 – Grounding and Bonding of Equipment, latest edition.

2.1 CONDUCTORS

- 2.1.1 Bare or insulated, stranded, soft drawn annealed copper wire, for: ground bus, electrode interconnections, metal structures, ground connections, telephone ground.

2.2 LUGS

- 2.2.1 All grounding connections to be made with compression type fittings and lugs with inspection / viewing window.

2.3 ELECTRONIC SAFETY AND SECURITY GROUNDING BUSBAR

- 2.3.1 The Grounding Busbar (GB) shall be supplied and installed by Division 26. Use compression lugs with window when connecting conductors to the GB.

3. Execution

3.1. GENERAL

- 3.1.1. Ground and or Bond all metal components of the Electronic Safety and Security Systems to all applicable codes and standards.

END OF SECTION

1. General

1.1. WORK INCLUDED

- 1.1.1. Supply and install cabling as detailed in Contract Documents. Provide all required pathways to distribute the cables throughout the facility where conduit is not provided by Div 26. Where cables leave the pathways, Supply and install cable slings and/or j-hooks to support cabling up to point of termination.

1.2. CABLE DISTRIBUTION

- 1.2.1. Utilise all indicated and available cable pathways such as conduits, Communications cable tray, ducts, surface raceways and furniture system channels except where otherwise noted.
- 1.2.2. Inside buildings minimize any possibilities of disruption by maintaining the following minimum clearances from electrical and heat sources when routing cables.

Item	Minimum Separation Distances		
	(<2kVA)	(2-5kVA)	(>5kVA)
Unshielded power lines or electrical equipment in proximity to open or non-metallic pathway.	127 mm (5"(in))	305 mm (12"(in))	610 mm (24"(in))
Unshielded power lines or electrical equipment in proximity to a grounded metal conduit pathway.	64 mm (2.5"(in))	152 mm (6"(in))	305 mm (12"(in))
Power lines enclosed in a grounded metal conduit (or equivalent shielding) in proximity to a grounded metal	---	76 mm (3"(in))	152 mm (6"(in))
Motors	1.2 m (4'-0")		
Transformers	1.2 m (4'-0")		
Fluorescent Luminaires	300 mm (12")		
Pipes (gas, oil, water, etc.)	120 mm (5")		
HVAC (equipment, ducts, etc.)	152 mm (6")		

2. Products

2.1. NON-CONTINUOUS CABLE SUPPORT

- 2.1.1. Supply and install cable support for the distribution of horizontal and backbone cables where conduit or ladder tray has not been provided.
- 2.1.2. The size of J-hooks/support shall suit quantity of cables in runs used for distribution.
- 2.1.3. Include any other miscellaneous hardware (angled hanger bracket, hammer/screw on clamps) required to support horizontal and backbone cabling.

2.2. VELCRO TIE-WRAPPS

- 2.2.1. Supply and install Velcro tie-wraps. Only Velcro tie-wraps shall be acceptable. Under no circumstance shall plastic tie-wraps be used.
- 2.3. GROUNDING WIRE
 - 2.3.1. Supply and install #6 AWG green grounding wire for all metallic components that shall be grounded and Code Conductor Two Hole Long Barrel with Window Lug to bond the conductor to the GB.
- 3. Execution
 - 3.1. CABLE DISTRIBUTION
 - 3.1.1. Exercise caution when pulling cables in pathways to avoid damage to any existing cables and follow manufacturer's maximum pull-force and minimum bend radii.
 - 3.1.2. All cables and components shall be installed and terminated in accordance with applicable Codes, Standards and Regulations.
 - 3.2. CABLE SUPPORT
 - 3.2.1. Hangers shall be installed at 1219mm (48") intervals (maximum). Cables shall be run such that sag between supports does not exceed 100 mm (4"). Secure all cables to J-hooks/supports with Velcro tie-wraps. Cables shall be combed and dressed for all visible portions of the install. The above noted conditions will be strictly checked. Comb and redress any cables that are unsatisfactory at no additional cost.
 - 3.2.2. Attaching to T-bar support rods is not acceptable. Anchors for hangers must not be drilled into post tensioned beams under any circumstances. Do not use Pneumatic hammers. All anchors must be drilled into slab.
 - 3.2.3. Do not 'fire spray' insulation during installation of cable supports.
 - 3.3. VELCRO TIE-WRAPPS
 - 3.3.1. Velcro tie-wraps shall be used to neatly dress cables; they shall be placed at a maximum of 1219 mm (48") intervals for horizontal distribution (centre points between cable supports).
 - 3.3.2. Velcro tie-wraps shall also be used to dress cables into racks/cabinets. Maximum spacing of Velcro for cables into or along vertical cable managers shall be no more than 152 mm (6"), this includes cabling dropped from the ladder tray or ceiling above.
 - 3.4. CABLE DISTRIBUTION
 - 3.4.1. Do not exceed the copper cables maximum tensile rating during installation. Monitor tension of the cable during installation. Use a dynamometer to record installation tension. Use a tension limiting device to prevent the exceeding of maximum pulling tension specifications during installation. The tension limit shall be set at or below the manufacturer's limit. The cable shall be taken up at intermediate pulling points with an intermediate take-up device as approved by the Electronic Safety and Security Engineer's Representative, to prevent over tension on the cable.

- 3.4.2. Minimum bend radius shall be as per manufacturer's recommendations.
- 3.4.3. Make cable pulls continuous and steady between pull points. Do not interrupt the pull unless necessitated by excessive tension on the cable.
- 3.4.4. Protect exposed cable ends from moisture ingress.

3.5. DUCT AND CONDUIT

- 3.5.1. Clean out each section of duct or conduit by pulling a steel wire brush and mandrel of the correct size through the duct or conduit before pulling cables. Bush, ream and remove any sharp projections on all conduits prior to installation of communications cables. When cleaning ducts, if obstructions are encountered which cannot be removed, advise the Electronic Safety and Security Engineer's Representative of the problems encountered.
- 3.5.2. Apply manufacturer's recommended lubricant to cables to reduce friction between the cable and the conduit. Cable grip shall be attached to the sheath and its strength members so that no direct force is applied to the conductors/fibres. The cable grip shall have a ball bearing swivel to prevent the cable from twisting during pulling.

END OF SECTION

1. General

1.1. WORK INCLUDED

- 1.1.1. Provide A Class 3 system as per the latest version of the ANSI/TIA/EIA 606 Standards.
- 1.1.2. All elements of the Electronic Safety and Security Systems shall be labelled with unique identifiers.
- 1.1.3. Where labelling schemes are not provided co-develop a labelling scheme with the Region and the Electronic Safety and Security Engineer's Representative prior to the installation of any permanent labels on the Electronic Safety and Security Systems components.
- 1.1.4. Labelling schemes shall be confirmed with the Electronic Safety and Security Engineer's Representative prior to installation.

2. Products

2.1. LABELS

- 2.1.1. All cable and equipment labels shall meet the legibility, defacement, and adhesion requirements specified in ANSI/UL 969. In addition the labels shall meet the general exposure requirements in ANSI/UL 969 for indoor and outdoor use.
- 2.1.2. Cable labels shall be of self-laminating vinyl construction with a white printing area and a clear tail that self laminates the printed area when wrapped around a cable. The clear area should be of sufficient length to wrap around the cable at least one and one-half times. The width shall be sufficient to accommodate the appropriate label designation.
- 2.1.3. All backbone and horizontal cables including patch cord labels shall be printed in 10 point Arial Narrow, black, bold font.
- 2.1.4. All equipment labels shall be printed in 14 point Arial Narrow, black, bold font.
- 2.1.5. All Hub, Main Cabinets and controlling device enclosure labels shall be black lamacoid plates with white 60 point Arial Narrow, engraved upper case letters enclosed by white border on
- 2.1.6. Labels should be visible during the installation of and normal maintenance of the infrastructure. Labels should be resistant to the environmental conditions at the point of installation (such as moisture, heat or ultraviolet light) and should have a design life equal to or greater than that of the labelled component.
- 2.1.7. Provide vinyl substrate with a white printing area and black print. If cable jacket or equipment is white, provide cable label with printing area that is any other color than white, preferably orange or yellow – so that the labels are easily distinguishable.
- 2.1.8. Labels shall be flexible vinyl or other substrates to apply easy and flex as cables are bent. Labels shall use aggressive adhesives that stay attached even to the most difficult to adhere to jacketing.

- 2.1.9. All labels shall be mechanically printed using a laser printer. Hand-written labels are not permitted.
- 2.1.10. Wire and cable markers shall be Printable, self-laminating, self-adhesive markers, white background, black lettering on white background, vinyl plastic or polyester film suitable to environment. E-Z-Code by Thomas & Betts Ltd., or approved equivalent. Wire marker to be sleeved with clear heat shrink tubing.
- 2.1.11. Submit label samples Communication Engineer's Representative and The Region for approval prior to procurement and installation.

3. Execution

3.1. LABELLING

- 3.1.1. Supply and install all labels as indicated in this document and contract drawings.
- 3.1.2. Supply and install all labels for all cables and all active and passive devices, conduits and pull boxes.
- 3.1.3. All temporary labels shall be removed from cables and equipment prior to commissioning.
- 3.1.4. All labels must be mechanically printed using a laser printer. Hand-written labels are not permitted.
- 3.1.5. Label all ends of conduits including ends of conduits that terminate in pull boxes. Label shall be installed within 304mm (12") of each conduit end. Label designations for conduit and pull boxes shall be confirmed with consultant prior to procurements and installation. Allow for adding label designations (soft) for conduits and pull boxes to soft cabling schedules.
- 3.1.6. All backbone and horizontal cables including patch cord labels shall be printed in 10 point Arial Narrow, black, bold font.
- 3.1.7. All equipment labels shall be printed in 14 point Arial Narrow, black, bold font.
- 3.1.8. All Hub and Main Cabinets labels shall be shall be black lamacoid plates with white 60 point Arial Narrow ,engraved upper case letters enclosed by white border on
- 3.1.9. Submit sample labels to Communications Consultant for approval prior to procurement and instillation.
- 3.1.10. Labels shall be located on cables and equipment as indicated in this document and on contract drawings.
- 3.1.11. Labels shall be affixed to the front and rear of equipment where required and 150 mm (6") from the end of all backbone and horizontal cables.
- 3.1.12. Labels shall be affixed 75 mm (3") from the end of all patch cords.
- 3.1.13. All labels shall be visible.
- 3.1.14. All temporary labels shall be removed from cables and equipment prior to commissioning.

3.2. LABEL LOCATIONS

- 3.2.1. All labels shall be visible.
- 3.2.2. Labels should be attached at both ends of all cables (within 75 mm (3") of end).
- 3.2.3. All active and passive equipment shall be labeled.
- 3.2.4. Labels shall be affixed to the front and rear of equipment where required and 150 mm (6") from the end of all backbone and horizontal cables.

END OF SECTION 28 05 53.00

1. General

1.1. PURPOSE

- 1.1.1. The buildings and facilities Access Control System primary function is to protect the assets. The contents of this document are critical and are considered confidential. This information shall not be disclosed to anyone other than authorized personnel.

1.2. SCOPE OF WORK

- 1.2.1. The work covered by this section includes the furnishing, installation and activation of all equipment & materials associated with complete Access Control System as shown and as specified herein. This work may include, but is not limited to integration with the associated subsystems and components listed in these sections.

1.3. SYSTEM CONFIGURATION

- 1.3.1. An existing Honeywell EBI access control system is installed in the York Region building electrical rooms.
- 1.3.2. The new access control system and devices shall be an extension of and shall be integrated with the existing Honeywell EBI access control system.
- 1.3.3. Provide all software licences as required for a complete turnkey access control system. Allow for configuration and programming of additional devices.

2. Products

2.1. GENERAL

- 2.1.1. All products and materials must be new and approved in the pre-installation submittals.
- 2.1.2. Exterior devices shall be sealed and protected against weather conditions including heat, cold, moisture, dust, and sand.
- 2.1.3. Commercial grade, high quality and rated for the environment in which it is being installed
- 2.1.4. Compatible with the access control system.
- 2.1.5. Include Back up UPS Pro to power all security, access control and wireless network solution. Model to be used is Antigen-presenting cell ("APC") Pro BR 1300G or equivalent

2.2. NETWORK CONTROLLER

- 2.2.1. Honeywell Tema Server2 Control Panel: TS2 up to 16 doors using Weigand Interface Units("WIU") (each WIU shall be capable of managing one access controlled door with either 1 in reader or 1 in and 1 out reader at the door). Uses on board TCP/IP, 128MB DDR SRAM.
- 2.2.2. Include 6.5amp Electronic Security Devices SPS-6.5 Power Supply for Panel.
- 2.2.3. Include 5amp Electronic Security Devices SPS-5 for Lock power with Altronix ACM8 lock distribution w/Fire Interface.
- 2.2.4. Include Full Size Cabinet and cabinet tamper switch. Power Supply to be CSA and ULC listed
- 2.2.5. Include Back up UPS Pro to power all security, access control and wireless network solution. Model to be used is Antigen-presenting cell ("APC") Pro BR 1300G or equivalent

- 2.3. INPUT/ OUTPUT MODULE
 - Input I/O Module A01, allows for 4 input/output per unit.
- 2.4. WEIGAND INTERFACE UNIT
 - 2.4.1. Honeywell A08 Weigand Interface Unit, allows control of one door configured as either 1 in reader or 1 in reader and 1 out reader.
- 2.5. CREDENTIAL READERS - MULTITECHNOLOGY ICLASS READER
 - 2.5.1. Card Readers: Provide multi-technology iClass / proximity card readers where shown on the Drawings and/or where required by the Contract. Card Readers shall be rated for indoor and outdoor use, have multicolour LED with beeper for operator status indications and will operate on 5-16 VDC. Provide thin line mullion style readers where required to match door frame configuration:
 - .1 Model RP15 Mullion Reader
 - .2 Model RP40 Switch plate Reader
 - .3 Model RPK40.
- 2.6. CREDENTIALS
 - 2.6.1. The Region Provided.
- 2.7. PERIPHERAL DEVICES
 - 2.7.1. Door Contacts (Steel)
 - .1 1" dia. contact for use in steel doors.
 - .2 Flush or surface mount as required
 - .3 Self-lock mounting
 - .4 Rugged Construction
 - .5 GE Security/Interlogix 1078, or approved equivalent
 - 2.7.2. Request to Exit Detector
 - .1 Dual Technology
 - .2 Electrical
 - .1 Voltage: 12 to 30 VAC/VDC
 - .2 Current: 23 mA typical, 28 mA max. @ 12 VDC; 15mA typical, 17 mA max. @ 24 VDC; 31 mA typical, 38 mA max. at 12 VAC; 26 mA typical, 29 mA max.at 24 VAC
 - .3 Time delay: 1/2, 1, 2, 4, 8, 16, 32, 64 sec. at $\pm 10\%$,selectable
 - .4 Loop type: Open or Closed
 - .5 Max. loop rating: 2 A @ 30 VDC
 - .6 Alarm output: DPDT (Form C)
 - .7 Tamper output: 50 mA @ 30 VDC
 - .8 Wire gauge: AWG 14 to 22 (18 to 22 recommended)
 - .3 Features
 - .1 Radar frequency: 5.8 GHz
 - .2 Range, depth: 3 to 15 ft. (0.9 to 4.57 m) adjustable
 - .3 Range, width: 7.9 ft. (2.4 m)

- .4 Range, PIR: 15 ft. (4.6 m), adjustable
 - .4 Environmental
 - .1 Operating temperature: -20 to 120°F (-29 to 50°C)
 - .2 Relative humidity: 0 to 95% noncondensing
 - .3 RFI immunity: 10 V/m @ 80 MHz to 2 GHz
 - .4 Static immunity: 10 kV
 - .5 Lightning immunity: 2.3 kV @ 1.4 J
 - .5 Physical
 - .1 Dimensions (HxWxD): 1.76 x 7.395 x 1.85 in. (45 x188 x 47 mm)
 - .2 .2 Weight: 9.2 oz. (261 g)
 - .3 .3 Housing material: ABS plastic
 - .4 Colors: White, black, gray. Confirm color requirements for each door with the Electronic Safety and Security Engineer's Representative prior to procurement and installation.
 - .5 Mounting height: 7 to 15 ft. (2.13 to 4.57 m) typical
 - .6 .6 Regulatory
 - .7 .1 FCC, CE, UL, CUL
 - .8 All Request to Exit Detectors shall be Honeywell IS310, or approved equivalent.
- 2.8. PUSH BUTTONS
- 2.8.1. Wall mount brushed stainless steel plate enclosure, momentary switch output, SPDT 10A @ 125/250 VAC, UL Listed.
 - 2.8.2. Kantech PB-EXIT, or approved equivalent.
- 2.9. TRANSFORMERS
- 2.9.1. 120V input, 16V output, 40VA, 60 Hz, single phase rating, copper conductors, dry type
 - 2.9.2. Transformers shall be designed, constructed and rated in accordance with UL, CSA and NEMA standards.
 - 2.9.3. All transformers to be from a single manufacturer.
 - 2.9.4. Frost, 1640, or approved equivalent.
- 2.10. BATTERIES
- 2.10.1. Gel Cell Battery back-up batteries, 12v, 7amp-hours.
 - 2.10.2. Exaltor or approved equivalent.
- 2.11. ACCESS CONTROL CONTROLLER ENCLOSURES
- 2.11.1. Provide NEMA 4 access control controller enclosures to house and protect all controllers.
 - 2.11.2. All access control controller enclosures shall be a single key locking metal box.
 - 2.11.3. Size as required to house and protect all controllers.
 - 2.11.4. Equipped with door tamper switch. Connect each door tamper switch to the access control system.

- 2.11.5. The quantity and size of access control controller enclosures shall not exceed the real estate provided for mounting access control controller enclosures. Refer to contract drawings and coordinate as such.
- 2.12. TERMINAL BLOCKS
 - 2.12.1. 600 V, 25 A minimum rating, modular, 35 mm DIN rail mounted, provision for circuit number labelling, individually removable, sized to accommodate conductor size and circuit current. Sak Series by Weidmuller Ltd., UK Series by Phoenix Terminal Blocks Ltd., WK Series by Wieland Electric Inc., Entrelec.locks shall be provided by locksmith on record.
- 2.13. ELECTRIFIED LOCKS
 - 2.13.1. All electrified locks shall be provided by locksmith on record.
 - 2.13.2. Electrified locks shall include but not limited to electric strikes, electric mortise locks, electric latch retraction, maglocks all electrified locks noted on project door hardware schedule and or architectural drawings and schedules.
 - 2.13.3. Provide a separate power supply for electrified locking devices to facilitate complete operation of all electrified locks.
- 3. Execution
 - 3.1. COORDINATION
 - 3.1.1. The ESSC shall be responsible for the systems specified in this Section, including coordination with related trades.
 - 3.1.2. The ESSC shall coordinate all work and submittal details with the electronic door hardware supplier to ensure proper sizing of control equipment and shall be responsible for proper sizing of interface equipment (i.e., relays, contact ratings, etc.) to eliminate interface problems.
 - 3.1.3. Provide the following related work:
 - .1 Coordination of all works related to the door hardware contractor, all electrified door hardware and electrified locks.
 - .2 Provide all interface, wiring and connections to all electrified door hardware and electrified locks as required to facilitate a complete and operational electronic access control system.
 - .3 Related Electrical Works
 - .4 Related Control Work and/or annunciation
 - .5 All 120 Volt wiring and connections from power source to terminal strips in electronic low-voltage controllers, power supplies and devices.
 - .6 Provide cable troughs, raceway, conduits, including all back boxes and pull strings and device specific and or proprietary and or special back boxes.
 - 3.2. CONTROLLERS AND PERIPHERAL DEVICES
 - 3.2.1. Provide and install access control controllers/enclosures as required to house and protect all controllers.
 - 3.2.2. All controllers and peripheral devices shall be installed and configured in accordance with manufacturer's installation instructions and recommendations, as per the Region's requirements and as per contract drawings and specifications.

- 3.2.3. Coordinate the exact mount location of peripheral device devices with the electrical contractor to ensure that all conduits and back boxes are installed in the optimal locations.
- 3.2.4. Coordinate exact mounting locations of all controllers on site with security Engineer's Representative and The Region.
- 3.2.5. Supply and install all peripheral devices where indicated on contract drawings and documents.
- 3.2.6. Refer to Architectural Door and Door Hardware Schedules and ensure that each peripheral device is coordinated with its respective door and door hardware.
- 3.2.7. All peripheral devices shall be compatible with the access control system.
- 3.2.8. Submit shop drawings of all peripheral devices to the Security Engineer's Representative for approval prior to procurement and installation.
- 3.2.9. Allow for "needs assessment sessions" with The Region to determine the exact mode/s of operation of each peripheral device.
- 3.2.10. Configure each peripheral device and each controller to suit the Region's requirements.
- 3.3. POWER SUPPLY
 - 3.3.1. Supply and install power supplies as required for a fully functional access control system. Power supplies shall include but not limited to all controller power supplies, all electric lock power supplies and all peripheral device power supplies.
 - 3.3.2. All power supplies shall be sized to facilitate connection of each electrified lock and each powered device to separately fused power output.
- 3.4. FIELD WIRING TERMINATIONS:
 - 3.4.1. Where screw-type terminal blocks are provided, supply insulated fork tongue terminals. Sta-Kon by Thomas & Betts Ltd., Scotchlok by 3M Canada Inc.
- 3.5. ELECTRIC LOCKS
 - 3.5.1. All electric locks shall be supplied and installed by others.
 - 3.5.2. Electrified locks shall include but not limited to :
 - .1 Electric strikes
 - .2 Magnetic locks/Maglocks
 - .3 Electric mortise locks
 - .4 Electric latch retraction
 - 3.5.3. Coordinate with the door hardware contractor and electrical contractor, make all wire connections to all electric locks as required for a complete access control system.
 - 3.5.4. Supply and install wiring as required for complete operation all access control devices and systems.
 - 3.5.5. Include for all costs and work associated with acquiring permits for all magnetic locks.
- 3.6. INSTALLATION
 - 3.6.1. Install all system components and appurtenances in accordance with the respective manufacturer's specifications, referenced practices, guidelines, and applicable codes. Furnish all necessary interconnections, services, and adjustments required for a complete and operable system as specified. Control signal, communications, and data transmission line grounding shall be installed as necessary to preclude ground loops, noise, and surges from adversely affecting system operation.

- 3.6.2. Install the wiring system and integrate the system as indicated in this specification. All wiring is to be installed in dedicated conduit throughout. wiring shall not be pulled into conduits or placed in raceways, compartments, outlet boxes, junction boxes, or similar fittings with other building wiring.
- 3.6.3. All low voltage wiring outside the control console, cabinets, boxes, and similar enclosures, shall be plenum rated where required by code.
- 3.6.4. All wiring conductors shall be individually numbered and each cable or wiring group being extended from a controller or cabinet to a building mounted device shall be identified with the name and number of the particular device.
- 3.6.5. All exposed wiring inside and outside the control console, cabinets, boxes, and similar enclosures, shall be dressed down neatly and secured with wiring cleats or wire ties.
- 3.6.6. All exposed metallic flexible conduit and armored cable shall be dressed down neatly and secured with low profile, metal fasteners.
- 3.6.7. All cabinets, boxes, and similar enclosures containing security system components and/or cabling and which are easily accessible to employees or to the public shall be provided with a lock. Boxes above ceiling level in occupied areas of the building shall not be considered to be accessible.
- 3.6.8. All junction boxes and small device enclosures below ceiling level and easily accessible to employees or the public shall be covered with a suitable cover plate and secured with tamper proof screws.
- 3.6.9. End-of-Line resistors shall be installed at the field device location and not at the controller location.
- 3.6.10. System devices identified on building drawings are intended to generally indicate areas where such devices are to be located. Determine and coordinate the final locations of these devices on site with the electrical contractor to ensure that all conduits and associate Backboxes are located where respective devices will be installed. Be responsible for all costs resulting from failure to execute the above.
- 3.6.11. Riser diagrams are schematic and do not show every conduit, wire box, fitting, or other accessories. Provide such materials as necessary for a complete and functioning installation. Install in accordance with referenced codes and these specifications. Use weatherproof equipment or covers where installed in areas exposed to weather.
- 3.6.12. All equipment shall be mounted with sufficient clearance to meet all applicable codes and facilitate observation and testing. All equipment shall be securely fastened with appropriate fittings to ensure positive grounding and be free of ground loops.
- 3.6.13. Determine conductor requirements for each device in accordance with the Contract Documents and manufacturer requirements.
- 3.6.14. Install cable in accordance with Security System manufacturer requirements
- 3.6.15. Neatly route cables parallel or perpendicular to building lines.
- 3.6.16. Provide J hooks and other cable support systems (spaced at regular intervals) within accessible ceiling spaces. Fasten cables to the cable support systems and provide strain relief to protect cables and ensure compliance with required cable bends.
- 3.6.17. Keep cable not run in conduit a minimum of 18" from high voltage (120 VAC and above) circuits (e.g. light fixtures, wire run parallel with conduit, transformers, electric controllers, etc.).
- 3.6.18. Run cables at least six inches from the communications cable plant, intercom wires, input/output wires, and siren wires.
- 3.6.19. Route wire and cable as required preventing interference and signalling contamination of both Security System cable and cable associated with other systems. Coordinate the routing of wire and cable requiring isolation from power, radio frequency (RF), telephone, etc.

- 3.6.20. Provide sleeves and code compliant fire proofing techniques for all penetrations of fire rated partitions, masonry walls, and slabs, where the penetrations are made by or used for installation of Security Systems.
 - 3.6.21. Separate high voltage (120 VAC and above) cables from low voltage cables within enclosures
 - 3.6.22. Run wire and cable continuous from device location to the final point of termination. No mid-run cable splices will be allowed
 - 3.6.23. Bundle and tie wire and cable with cable ties.
 - 3.6.24. Cover exposed high voltage (120 VAC and above) power terminations within controller, power distribution cabinets and other security enclosures.

 - 3.7. LABELED FRAMES, DOORS AND ENCLOSURES
 - 3.7.1. In no instance shall any UL labeled door, frame or enclosure be drilled, cut, penetrated, or modified in any way.

 - 3.8. PROGRESS OBSERVATION
 - 3.8.1. Security Engineer's Representative will conduct progress observations during construction to verify construction progress and verify the construction schedule. Coordinate progress observation site visits with the Contractor.
 - 3.8.2. Security Engineer's Representative will conduct the following minimum progress observations:
 - .1 Security Conduit Rough-in and Preliminary Wire and Cable Installation
 - .1 The intent of this observation is to verify that adequate and proper conduit rough-in is installed, verify that wire and cable are being properly installed and labeled, and identify and resolve issues regarding conduit and wire and cable installation.
 - .2 Preliminary Wire Termination Progress
 - .1 The intent of this observation is to verify that the contractor will install and terminate equipment in accordance with specifications and standards.
 - 3.8.3. Observations will occur upon initial installation of each type of equipment (i.e. Controllers, Card readers, alarm devices, junction boxes, etc.).
 - 3.8.4. Observations must be complete prior to proceeding with the installation of remaining similar or like equipment.
 - 3.8.5. The Electronic Safety and Security Contractor shall coordinate appropriate timing of each observation with the general contractor, security Engineer's Representative as required to meet intended goals.
 - 3.8.6. The reviewers will issue reports for each observation to summarize findings and document clarifications noted during the observation.
- END OF SECTION

1. General

1.1. PURPOSE

- 1.1.1. The network video management systems (NVMS) system, Cameras and accessories form part of the overall security strategy implemented and the system shall provide real time surveillance, recording of real time events and historical video data for video evidence of a security event; and provide a deterrent throughout the facility and the site at designated locations as required in the contract document.

1.2. SCOPE OF WORK

- 1.2.1. The work covered by this section includes the furnishing, installation and activation of all equipment & materials associated with complete Closed Circuit Television (CCTV) Systems as specified herein. This work may include, but is not limited to integration with the associated subsystems and components listed in these sections.
- 1.2.2. The requirements of the conditions of the Contract, Supplementary Conditions, and General requirements apply to the work specified in this section.

1.3. SYSTEM CONFIGURATION

- 1.3.1. An existing DVMS system is fully integrated with the Honeywell EBI access control system.
- 1.3.2. The new camera equipment shall be an extension of and shall be integrated with the existing DVR (Digital Video Recorder).
- 1.3.3. Provide all software licences as required for a complete turnkey video system.
- 1.3.4. Allow for configuration and programming of additional devices.
- 1.3.5. Provide all security video cameras, pan/tilt/zoom (PTZ) cameras, mounts, housings, power supply systems, network cables, connectors, equipment racks, monitors and consoles, computer controlled network switchers, workstations, network video recorders, encoders, decoders, displays, and all other hardware and software to provide a fully operational system.
- 1.3.6. Video Management System Supported DVR Models listed below:
- .1 HRE16R48D1T0 Rapid Eye Hybrid 16 channel, 1TB storage
 - .2 HRE16R48D500 Rapid Eye Hybrid 16 channel, 500 Gb storage
 - .3 HRE4R12D1T0 Rapid Eye Analog, 4 channel, 1TB
 - .4 HRE4R12D500 Rapid Eye Analog, 4 channel, 500
 - .5 HRE8R12D1T0 Rapid Eye Analog, 8 channel, 1TB
 - .6 HRE8R12D500 Rapid Eye Analog, 8 channel, 500

2. Products

2.1. GENERAL

- 2.1.1. All products and materials must be new and approved in the pre-installation submittals. Provide all equipment for a complete and operational IP based Security CCTV System. Provide client with the necessary licenses as required for a complete and operational IP based video surveillance system.
- 2.2. CCTV CAMERA TYPES
 - 2.2.1. Refer to the list below and provide CCTV cameras with the relative features as indicated: Where features are indicated:
- 2.3. NETWORK CAMERAS:
 - 2.3.1. Honeywell TO BE DETERMINED
 - 2.3.2. All IP CCTV cameras that are located within 90 metres of the Security system IP data switch shall utilize 4 pair Category 6 cabling as a transmission medium.
 - 2.3.3. All IP CCTV cameras that are located beyond 90 metres from the Security system IP data switch shall utilize 4 pair Category 6 UTP cabling, multimode fibre optic cabling or coaxial cabling as a transmission medium.
 - 2.3.4. Provide Ethernet over twisted pair extenders, fibre optic to twisted pair media converters or Ethernet over coaxial extenders as required to facilitate complete connectivity of each respective CCTV camera.
- 2.4. FIBRE OPTIC TO TWISTED PAIR MEDIA CONVERTER
 - 2.4.1. Xxx
- 2.5. ETHERNET OVER COAXIAL EXTENDERS
 - 2.5.1. Xxx
- 3. Execution
 - 3.1. COORDINATION
 - 3.1.1. Provide the following related work:
 - .1 Communications (IT)
 - .2 Electrical Works
 - .3 All 120 Volt wiring and connections from power panels to terminal strips in electronic low-voltage panels, power supplies and devices.
 - .4 All raceway, conduit to the device(s), including all back boxes and pull strings and the installation of all special back boxes.
 - 3.2. CAMERAS AND ACCESSORIES

- 3.2.1. Provide and install camera housing and mounting accessories for complete operation of the videos surveillance system.
- 3.2.2. Coordinate the exact mount location of devices with the electrical contractor to ensure that all conduits and back boxes are installed in the optimal locations.
- 3.2.3. Coordinate exact mounting locations of all cameras on site with security Engineer's Representative and client.
- 3.2.4. Submit shop drawings to the Security Engineer's Representative for review prior to procurement and installation.
- 3.2.5. Allow for "needs assessment sessions" with client to determine the exact camera settings.
- 3.3. POWER SUPPLY
 - 3.3.1. Supply and install power supplies as required for a fully functional video Surveillance System.
 - 3.3.2. All power supplies shall be installed to manufacturer's recommendations.
- 3.4. INSTALLATION
 - 3.4.1. Supply, install, configure and configure all CCTV system wiring, devices and software as required for a complete and operational CCTV System.
 - 3.4.2. All camera installation, configuration, setup, program and related work shall be performed by technicians thoroughly trained by the manufacturer in the installation and service of the equipment provided.
 - 3.4.3. Provide all camera brackets as required for each camera's application.
 - 3.4.4. Carefully follow instructions in documentation provided by the manufacturer to insure all steps have been taken to provide a reliable, easy-to-operate system.
 - 3.4.5. All equipment shall be tested and configured in accordance with instructions provided by the manufacturer prior to installation.
 - 3.4.6. All firmware found in CCTV System active devices shall be the latest and most up-to-date provided by the manufacturer.
 - 3.4.7. All equipment requiring users to log on using a password shall be configured with user/site-specific password/passwords. No system/product default passwords shall be allowed.
 - 3.4.8. Final CCTV camera viewing requirements to be determined by owner. Coordinate with the owner and obtain viewing parameters for each CCTV Camera. Adjust all CCTV cameras to meet the owner's requirements.
 - 3.4.9. Adjust each CCTV camera to obtain the best quality image or CCTV camera image that is acceptable to the client.
 - 3.4.10. All domes must have the password protection feature enabled to protect against unauthorized changes to dome programming. All PTZ domes will be operated in continuous mode running an operator defined pattern, pre-set tour, or combination pattern/pre-set tour. PTZ dome movement criteria are to be coordinated with the System Operator(s) and Design Engineer's Representative to ensure camera coverage meets defined needs. PTZ domes must be programmed for "auto-resume" after a pre-defined time period, and on power-up.

- 3.4.11. Labeled frames, doors and enclosures
- 3.4.12. In no instance shall any UL labeled door, frame or enclosure be drilled, cut, penetrated, or modified in any way.
- 3.5. PROGRESS OBSERVATION
 - 3.5.1. The Security Engineer's Representative will conduct progress observations during construction to verify construction progress and verify the construction schedule. Coordinate progress observation site visits with the Security Engineer's Representative.
 - 3.5.2. Security Conduit Rough-in and Preliminary Wire and Cable Installation
 - 3.5.3. The intent of this observation is to verify that adequate and proper conduit rough-in is installed, verify that wire and cable are being properly installed and labeled, and identify and resolve issues regarding conduit and wire and cable installation.
 - 3.5.4. Preliminary Wire Termination Progress
 - 3.5.5. The intent of this observation is to verify that the installations and terminations to equipment are in accordance with specifications and standards.
 - 3.5.6. Observations will occur upon initial installation of each type of equipment (i.e. Panels, Card readers, alarm devices, junction boxes, etc.).
 - 3.5.7. Observations must be complete prior to proceeding with the installation of remaining similar or like equipment.
 - 3.5.8. Coordinate appropriate timing of each observation with the general contractor, security Engineer's Representative as required to meet intended goals.
 - 3.5.9. The reviewers will issue reports for each observation to summarize findings and document clarifications noted during the observation.

END OF SECTION 28 23 00.00