

**TURNSTILES AT  
TORONTO PARAMEDIC SERVICES**

4330 Dufferin Street  
Toronto, ON

Architectural | Electrical  
Specifications

Issued for Tender  
May 2024

Project No. 2312

**CHERIE NG ARCHITECT INC.**

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Electrical Consultant  
**Solid Ground Engineering**

- .1 Refer to Project Manual, Section 00 01 10 - Table of Contents, for indication of document responsibility (DR). Abbreviations for entity responsible for document preparation are as follows:
- .1 A - Denotes documents prepared by Architect.
  - .2 E - Denotes documents prepared by Electrical Engineer.
  - .3 R - Denotes documents prepared by Refrigeration Engineer.
  - .4 O - Denotes documents prepared by Owner.

**DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS**

Document	Title	Discipline	Pages
00 01 10	Table of Contents	A	2
00 31 00	Information Available to Bidders	A	1
	- Designated Substance Survey Report	O	85
	- Designated Substances and Hazardous Building Materials Assessment Report	O	36
	- Laboratory Analysis Report	O	5
	- Security Certified Dealers List	O	2

**DIVISION 01 - GENERAL REQUIREMENT**

Document	Title	Discipline	Pages
01 10 10	General Requirements	A	51

**DIVISION 02 - EXISTING CONDITIONS**

Document	Title	Discipline	Pages
02 40 00	Demolition and Removals	A	8
02 80 00	Management of Designated Substances	A	3

**DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES**

Document	Title	Discipline	Pages
06 20 00	Finish Carpentry	A	6

**DIVISION 07 - THERMAL AND MOISTURE PROTECTION**

Document	Title	Discipline	Pages
07 85 00	Firestopping and Smoke Seals	A	6
07 91 00	Sealants	A	8

**DIVISION 09 - FINISHES**

<b>Document</b>	<b>Title</b>	<b>Discipline</b>	<b>Pages</b>
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09 51 00	Acoustical Ceilings	A	3
09 62 20	Tactile Warning Surfacing	A	3
09 91 00	Painting	A	9

**DIVISION 10 – SPECIALTIES**

<b>Document</b>	<b>Title</b>	<b>Discipline</b>	<b>Pages</b>
10 95 00	Miscellaneous Specialties	A	2

**DIVISION 11 – EQUIPMENT**

<b>Document</b>	<b>Title</b>	<b>Discipline</b>	<b>Pages</b>
11 14 13	Pedestrian Control System	A	12

**DIVISION 26 – ELECTRICAL**

<b>Document</b>	<b>Title</b>	<b>Discipline</b>	<b>Pages</b>
See attached Electrical Table of Contents.		E	18

**DIVISION 27 – COMMUNICATIONS**

<b>Document</b>	<b>Title</b>	<b>Discipline</b>	<b>Pages</b>
See attached Electrical Table of Contents.		E	4

**DIVISION 28 – ELECTRONIC SAFETY AND SECURITY**

<b>Document</b>	<b>Title</b>	<b>Discipline</b>	<b>Pages</b>
See attached Electrical Table of Contents.		E	12
Appendix A – City of Toronto Structured Cabling Design Guide		O	110
Appendix B – City of Toronto Corporate Security Access Control System and System Requirements		O	78

END OF DOCUMENT

**REPORT(S)**

- 1.1 A copy of the following report(s) are appended under separate cover:

**Designated Substance Survey Report (85 pages)**

Prepared by Pinchin Ltd.

Toronto Emergency Headquarters, Paramedic Station 53 & Parking Garage

4330 Dufferin Street

December 6, 2023

**Designated Substances and Hazardous Building Materials Assessment Report (36 pages)**

Prepared by SafeTech Environmental Ltd.

Toronto Emergency Headquarters – 4330 Dufferin Street

November 15, 2023

**Laboratory Analysis Report (5 pages)**

Prepared by Fisher Environmental Ltd.

4330 Dufferin Street

March 9, 2022

**Security Certified Dealers List (2 pages)**

**Prepared by City of Toronto Corporate Security**

dated Jan 2023

- 1.2 The report(s), by their nature, cannot reveal all conditions that exist or can occur on the site. Should conditions be found to vary substantially from the report, immediately notify Consultant in writing and await instructions.
- 1.3 Contractor shall not be entitled to extra payment or extension of Contract Time for work which is required and which is reasonably inferable in the report(s) as being necessary.

END OF SECTION





## **Designated Substance Survey Report**

Toronto Emergency  
Headquarters, Paramedic  
Station 53 & Parking Garage  
4330 Dufferin Street,  
Toronto, Ontario

Prepared for:

### **City of Toronto**

55 John Street, 2nd Floor  
Toronto, Ontario, M5V 3C6

December 6, 2023

Pinchin File: 309046.002



**Designated Substance Survey Report**

Toronto Emergency Headquarters, Paramedic Station 53 & Parking Garage, 4330 Dufferin Street, Toronto, Ontario  
City of Toronto

December 6, 2023

Pinchin File: 309046.002

**Issued to:** City of Toronto  
**Issued on:** December 6, 2023  
**Pinchin File:** 309046.002  
**Issuing Office:** Toronto, ON

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## EXECUTIVE SUMMARY

City of Toronto (Client) retained Pinchin Ltd. (Pinchin) to conduct a Designated Substance Re-Survey (reassessment) of Toronto Emergency Headquarters, Paramedic Station 53 & Parking Garage located at 4330 Dufferin Street, Toronto, Ontario. Pinchin performed the reassessment on October 16, 2023.

The objective of the reassessment was to document any changes in condition and quantity of specified Designated Substances, polychlorinated biphenyls (PCBs) and mould identified in the previous Designated Substances Survey (2020, Pinchin File No. 274992.001), and develop corrective action plans as required. The results of this reassessment are not intended for construction, renovation, demolition, or project tendering purposes.

## SUMMARY OF FINDINGS

The following is a summary of significant findings; refer to the body of the report for detailed findings:

Asbestos: Presumed asbestos-containing materials (ACM) are present as follows and are in good condition:

- Non-friable cement (Transite) pipe present as rainwater leaders throughout the building.
- Non-friable backing paper/adhesive behind vinyl sheet flooring within Office Space.
- Non-friable vinyl floor tiles and associated mastic within File Storage Room.

Lead:

- All paints sampled contain lead concentrations below the City of Toronto action limit of 0.1%.
- Lead may be present within batteries of emergency lights.

Silica: Crystalline silica is present in concrete, mortar, masonry, ceramics, grout, drywall, ceiling tiles, plaster, and asphalt.

Mercury: Mercury vapour is present in lamp tubes.

Polychlorinated Biphenyls (PCBs): Based on the date of construction, PCBs are not present.

Mould and Water Damage: Visible mould and water damage was not observed during the reassessment.

Urea Formaldehyde Foam Insulation (UFFI): Urea Formaldehyde Foam Insulation (UFFI) was not observed during the reassessment.



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Toronto Emergency Headquarters, Paramedic Station 53 & Parking Garage, 4330 Dufferin Street, Toronto, Ontario  
City of Toronto

December 6, 2023

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## **SUMMARY OF RECOMMENDATIONS**

The following is a summary of significant recommendations; refer to the body of the report for detailed recommendations.

1. Perform a reassessment of asbestos materials on an annual basis.
2. Prepare a pre-construction survey and remove all ACM prior to alterations or maintenance work or if ACM may be disturbed by the work.
3. Recycle mercury-containing light tubes when removed from service.
4. Follow appropriate safe work procedures when handling or disturbing asbestos, lead, and silica.

Please refer to Section 5.0 of this report for detailed recommendations regarding administrative and remedial actions.

*This Executive Summary is subject to the same standard limitations as contained in the report and must be read in conjunction with the entire report.*



## Designated Substance Survey Report

Toronto Emergency Headquarters, Paramedic Station 53 & Parking Garage, 4330 Dufferin Street, Toronto, Ontario  
City of Toronto

December 6, 2023

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## APPENDICES

APPENDIX I	Room-by-Room Inventory Sheet
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APPENDIX II-C	PCB Analytical Certificates (No Information to Report)
APPENDIX III	Drawings
APPENDIX IV	Methodology
APPENDIX V	Corrective Action Inspection Report (No Information to Report)



## **1.0 INTRODUCTION AND SCOPE**

City of Toronto (Client) retained Pinchin Ltd. (Pinchin) to conduct a Designated Substance Re-Survey (reassessment) of Toronto Emergency Headquarters, Paramedic Station 53 & Parking Garage located at 4330 Dufferin Street, Toronto, Ontario

Pinchin performed the reassessment on October 16, 2023. The surveyor was unaccompanied during the reassessment. The assessed area was occupied at the time of the reassessment.

The objective of the reassessment was to document any changes in condition and quantity of specified Designated Substances, polychlorinated biphenyls (PCBs) and mould identified in the previous Designated Substances Survey (2020, Pinchin File No. 274992.001), and develop corrective action plans as required.

This reassessment is only to be used for the purposes of long-term management and routine maintenance. The results of this reassessment are not to be used for construction, renovation, demolition, or project tendering purposes.

### **1.1 Scope of Assessment**

For the purpose of the reassessment and this report, hazardous building materials are defined as follows:

- Asbestos
- Lead
- Silica
- Mercury
- Mould
- Urea Formaldehyde Foam Insulation (UFFI)

Based on the date of construction and known end of use dates, polychlorinated biphenyls are presumed not to be present in the building.

The following Designated Substances are not typically found in building materials in a composition/state that is hazardous and were not included in this reassessment:

- Arsenic
- Acrylonitrile
- Benzene
- Coke oven emissions



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- Ethylene oxide
- Isocyanates
- Vinyl chloride monomer

## 2.0 METHODOLOGY

Pinchin conducted an inspection of previously identified hazardous building materials to evaluate the current condition of all accessible identified in the most recent assessment. The surveyor made reference to any existing assessment or abatement reports (as provided by the Client).

The reassessment was performed based on the methodology outlined in the City of Toronto, Facilities Management, Standard Operating Procedure for Designated Substance Surveys.

For further details on the methodology including test methods, refer to Appendix IV.

## 3.0 BACKGROUND INFORMATION

### 3.1 Building Description

Description Item	Details
Use	Toronto Paramedic Services Station, Toronto Emergency Services Headquarters and Parking Garage
Number of Floors	The building is four storeys plus one level below grade
Total Area	The total area of the building is approximately 400,000 square feet
Year of Construction	The building was constructed in 1990
Structure	Structural steel, concrete
Exterior Cladding	Metal siding, masonry, concrete
HVAC	Rooftop AC, boiler, hot water heating, natural gas heating
Roof	Built-up roofing, EPDM (Not assessed)
Flooring	Vinyl sheet flooring, vinyl tile, ceramic tile, laminate, carpet, concrete
Interior Walls	Plaster, drywall, ceramic tile, masonry, concrete
Ceilings	Plaster, drywall, acoustic tile, tectum tile



## Designated Substance Survey Report

Toronto Emergency Headquarters, Paramedic Station 53 & Parking Garage, 4330 Dufferin Street, Toronto, Ontario  
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### 3.2 Existing Reports and Summary of Asbestos Abatement

#### 3.2.1 Review of Previous Reports

Pinchin previously prepared the following report, which has been reviewed as part of this reassessment:

- “Designated Substance Survey Report, Toronto Emergency Headquarters, Paramedic Services Station 53 and Parking Garage, 4330 Dufferin Street, Toronto, Ontario” dated October 23, 2020. Pinchin File No. 274992.001.

#### 3.2.2 Summary of Asbestos Abatement since the Previous Reassessment

Based on observations made during the reassessment, asbestos abatement has not been conducted since the last reassessment.

### 3.3 Inaccessible Locations

The following rooms or areas were not accessible and are therefore not included in the report:

Area or Room	Reason	Previously identified PACM not inspected, and condition
Hydro Vault (Location 1-071)	Locked, no access	N/A
Garage (Location 1-099)	Locked, no access.	Cement (Transite) pipe
Sprinkler & Pump Room (Location 1-113)	Locked, no access	N/A
Vehicle Bays 1-4 (Location 1-120)	Locked, no access.	Cement (Transite) pipe
Vehicle Bays 5-10 (Location 1-121)	Locked, no access.	Cement (Transite) pipe
Main Switch Room (Location 2-104)	Locked, no access	N/A
UPS Room (Location 2-106)	Locked, no access.	Cement (Transite) pipe
Mechanical Room (Location 2-107)	Locked, no access	N/A
Boardroom (Location 2-138)	Locked, no access	N/A
Office (Location 3-039)	Locked, no access	N/A
Washroom (Location 3-040)	Locked, no access	N/A



## 4.0 FINDINGS

The following section summarizes the findings of the reassessment and provides a general description of the hazardous materials identified and their locations. No sampling was performed during this reassessment. Reference to the bulk samples refers to samples collected during previous assessments.

For details on approximate quantities, condition, and locations of hazardous materials; refer to the Room-by-Room Inventory Sheet in Appendix I. Any quantities listed in this report or Inventory Sheet are estimated based on visual approximations only and are subject to variation.

### 4.1 Asbestos

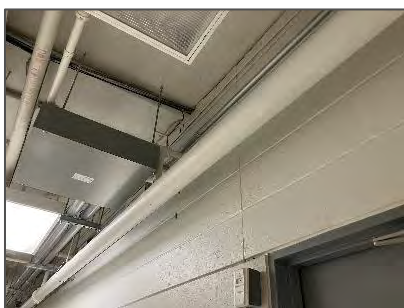
#### 4.1.1 Spray-Applied Insulation

Spray-applied fireproofing and overspray, present on structural steel including beams, trusses, joists, and corrugated steel decks throughout the building, was previously sampled and does not contain asbestos (samples 11850-A-01-01A-G and 2018-A0001A-C).

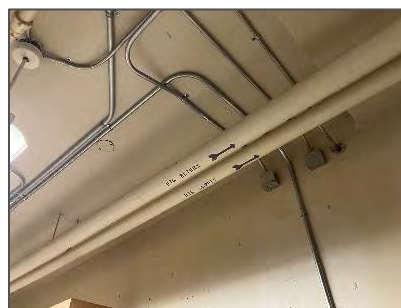
#### 4.1.2 Pipe Insulation

Previously identified non-asbestos parging cement (samples 11850-A-01-2A to C, 11850-A-01-3A to C, 11850-A-01-4A to C) present on pipe fittings has not been observed since the 2017 assessment.

Pipes observed are either uninsulated or insulated with fibreglass and jacketed in paper.



Uninsulated pipe – Corridor (Location B-001).



Pipes insulated with fiberglass and jacketed in paper– Cleaner Storage (Location B-004).

#### 4.1.3 Duct Insulation

Ducts are either uninsulated or insulated with fiberglass and jacketed in foil.

Mastic was not observed on exterior sections of ducts assessed.

Mastic may be present on exterior sections of ducts in inaccessible spaces such as above solid ceilings, in chases and within shafts.



Uninsulated duct – Corridor (Location B-001).



Duct insulated with fiberglass and jacketed in foil – Central Files Storage (Location B-007).

#### 4.1.4 Mechanical Equipment Insulation

Mechanical equipment observed is either uninsulated or insulated with fiberglass and jacketed in metal.



Uninsulated boiler – Boiler Room (Location B-014).



Hot water tanks insulated with fiberglass – Storage Cages (Location B-002).

#### 4.1.5 Acoustic Ceiling Tiles

Acoustic ceiling tiles are present in the assessed area, as follows:

Size, Type, Pattern	Locations	Sample Number, Composition or Date Code	Asbestos Type
ACT01: 24"x72", lay-in, short random fissure and pinpoint	Refer to the Room-by-Room Inventory Sheet in Appendix I for locations	11850-A-01-19A-C	None detected
ACT02: 24"x48", lay-in, white	Refer to the Room-by-Room Inventory Sheet in Appendix I for locations	11850-A-01-12A-C	None detected
ACT03: 24"x48", lay-in, wide pinpoint	Refer to the Room-by-Room Inventory Sheet in Appendix I for locations	11850-A-01-16A-C	None detected
ACT05: 24"x48", lay-in, short uniform fissure	Refer to the Room-by-Room Inventory Sheet in Appendix I for locations	11850-A-01-18A-C	None detected

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Size, Type, Pattern	Locations	Sample Number, Composition or Date Code	Asbestos Type
ACT06: 24"x48", lay-in, short random fissure with pinpoint drop-down	Refer to the Room-by-Room Inventory Sheet in Appendix I for locations	11850-A-01-14A-C	None detected
ACT07: 24"x48", lay-in, plain white drop-down	Refer to the Room-by-Room Inventory Sheet in Appendix I for locations	11850-A-01-13A-C	None detected
ACT08: 24"x72", lay-in, wide pinpoint	Refer to the Room-by-Room Inventory Sheet in Appendix I for locations	11850-A-01-20A-C	None detected
ACT09: 24"x72", lay-in, widthwise fissure and pinpoint	Refer to the Room-by-Room Inventory Sheet in Appendix I for locations	11850-A-01-21A-C	None detected
ACT10: 24"x72", lay-in, sparse widthwise fissure with pinpoint	Refer to the Room-by-Room Inventory Sheet in Appendix I for locations	Pinchin File No. 239118.003; S0001A-C	None detected
ACT11: 24"x72", lay-in, plain textured drop-down	Refer to the Room-by-Room Inventory Sheet in Appendix I for locations	11850-A-01-22A-C	None detected
ACT12: 24"x72", lay-in, plain drop-down	Refer to the Room-by-Room Inventory Sheet in Appendix I for locations	11850-A-01-23A-C	None detected
ACT13: 24"x48", lay-in, short random fissure with pinpoint	Refer to the Room-by-Room Inventory Sheet in Appendix I for locations	11850-A-01-15A-C	None detected
ACT14: 24"x72", lay-in, large random fissure with pinpoint	Refer to the Room-by-Room Inventory Sheet in Appendix I for locations	11850-A-01-24A-C	None detected
ACT15: 24"x 24", lay-in, plain white	Refer to the Room-by-Room Inventory Sheet in Appendix I for locations	11850-A-01-25A-C	None detected
ACT16: 24"x48", lay-in, plain textured	Refer to the Room-by-Room Inventory Sheet in Appendix I for locations	Fibreglass composition	**None
ACT17: 24"x48", lay-in, plain textured	Refer to the Room-by-Room Inventory Sheet in Appendix I for locations	11850-8019-04 to 06	None detected
ACT19: 24"x48", lay-in, textured pinhole	Refer to the Room-by-Room Inventory Sheet in Appendix I for locations	Date code: 05/14/13	*None
ACT20: 24"x48", lay-in, random fissure and pinhole	Refer to the Room-by-Room Inventory Sheet in Appendix I for locations	Date code: 08/20/16	*None

Size, Type, Pattern	Locations	Sample Number, Composition or Date Code	Asbestos Type
ACT21: 24"x48", lay-in, random fissure and pinhole	Refer to the Room-by-Room Inventory Sheet in Appendix I for locations	Date code: 03/09/16	*None
ACT22: 24"x48", lay-in, random fissure and pinhole	Refer to the Room-by-Room Inventory Sheet in Appendix I for locations	Date code: 2019	*None
ACT23: 24"x48", lay-in, white pinhole	Refer to the Room-by-Room Inventory Sheet in Appendix I for locations	Date code: 07/27/12	*None

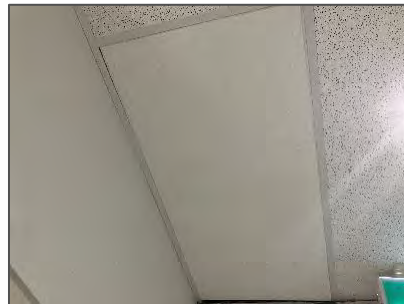
\*Ceiling tiles are presumed to be non-asbestos based on the date of manufacture determined from the date stamp applied to the top of the tiles. The tiles were manufactured after asbestos stopped being used in acoustic ceiling tiles.

\*\*Ceiling tiles are presumed to be non-asbestos based on the composition of the tiles (e.g. fibreglass).

Non-asbestos metal acoustic ceiling tiles (ACT18: 24"x48", lay-in, uniform dot) was not observed during this reassessment and is no longer present.



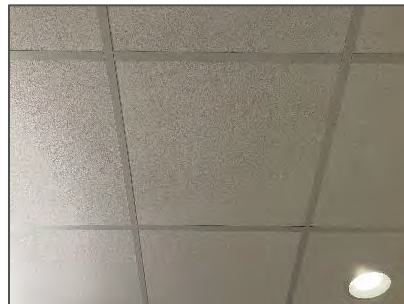
Non-asbestos acoustic ceiling tiles (ACT01).



Non-asbestos acoustic ceiling tiles (ACT02).



Non-asbestos acoustic ceiling tiles (ACT10).



Non-asbestos acoustic ceiling tiles (ACT15).

#### 4.1.6 Plaster

Plaster is present on wall and ceiling finishes throughout the South Building.

Asbestos in plaster was banned in 1980; however, based on historical data, it has been found present up until 1986. Plaster in the assessed area was installed on or after 1990 and is presumed not to contain asbestos.

#### 4.1.7 Drywall Joint Compound

Drywall (gypsum board) and drywall joint compound is present as a wall and ceiling finish throughout the building.

Drywall joint compound was previously sampled and does not contain asbestos (samples 12-4832-13 to 18, 12-4832-4 to 9, 13-6484-04 to 09, 12-4788-1 to 3, 10-1303-1 to 3, 13-7419-01 to 03, 13-6484-01 to 09, 13-6174-01 to 03, 14-8019-07 to 11).

Asbestos in drywall joint compound was banned in 1980; however, based on historical data, it has been found present up until 1986. Drywall joint compound in the assessed area was installed on or after 1990 and is presumed not to contain asbestos.

#### 4.1.8 Asbestos Cement Products (Transite)

Cement (Transite) pipe, present as rainwater leaders throughout the building, presumed to contain asbestos based on visual observation. Transite is non-friable and in good condition.



Presumed asbestos-containing Transite pipe – Corridor  
(Location 1-098).



Presumed asbestos-containing Transite pipe – Men's /  
Women's Change Room (Location 2-145).

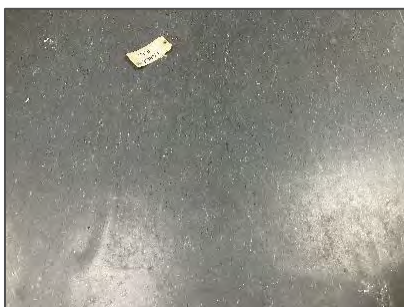
#### 4.1.9 Vinyl Sheet Flooring

Vinyl sheet flooring is present as follows:

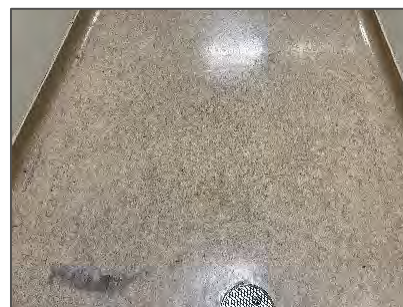


Pattern, Colour	Locations	Sample Number	Asbestos (Backing / Adhesive)
VSF01: dark blue	Stores Storage Mezzanine (Location 1-020)	11850-A-01-09A-C	None detected
VSF02: beige mosaic	Refer to the Room-by-Room Inventory Sheet in Appendix I for locations	2018-A0003A-C	None detected
VSF03: grey with black fleck	Corridor (Location 2-013)	11850-A-01-10A-C	None detected
VSF04: grey	Office (Location 1-108)	N/A	Presumed asbestos-containing

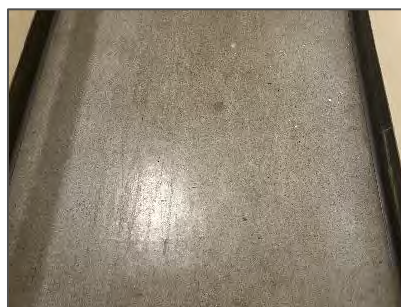
Asbestos-containing vinyl sheet flooring (VSF04: grey) was not observed in Office (Location 1-108) due to raised computer flooring in the room. Vinyl sheet flooring is presumed present under new flooring. Backing paper/adhesive behind VSF04 is presumed to contain asbestos until sampling proves otherwise. Backing paper/adhesive is a non-friable material but can become friable during removal and the current condition is unknown.



Non-asbestos vinyl sheet flooring (VSF01).



Non-asbestos vinyl sheet flooring (VSF02).

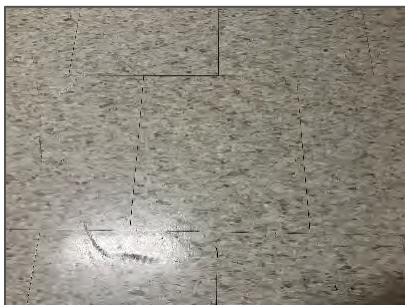


Non-asbestos vinyl sheet flooring (VSF03).

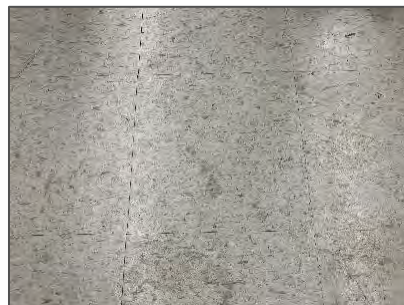
#### 4.1.10 Vinyl Floor Tiles and Mastic

Vinyl floor products and associated mastics are present as follows:

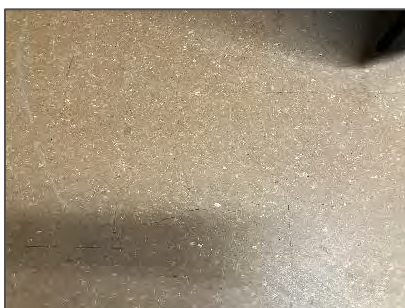
Description	Locations	Sample Number	Asbestos Type (tile)	Asbestos Type (mastic)
VFT01: 12"x12", Light grey mosaic	Refer to the Room-by-Room Inventory Sheet in Appendix I for locations	12-4832-1 to 3	None detected	None detected
VFT02: 12"x12", grey mosaic	Refer to the Room-by-Room Inventory Sheet in Appendix I for locations	12-4832-10 to 12	None detected	None detected
VFT03: 12"x12", rust mosaic	Refer to the Room-by-Room Inventory Sheet in Appendix I for locations	2018-A0002A-C	None detected	None detected
VFT04: 12"x12", grey, white streaks	Refer to the Room-by-Room Inventory Sheet in Appendix I for locations	2017-A0001A-C	None detected	None detected
VFT05: 12"x12", dark green rippled	File Storage (Location 2-122)	N/A	Presumed asbestos-containing	Presumed asbestos-containing



Non-asbestos vinyl floor tiles (VFT01).



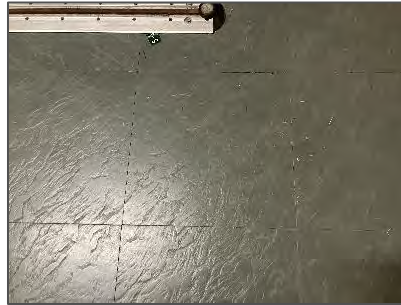
Non-asbestos vinyl floor tiles (VFT02).



Non-asbestos vinyl floor tiles (VFT03).



Non-asbestos vinyl floor tiles (VFT04).



Presumed asbestos-containing vinyl floor tiles (VFT05).

#### *4.1.11 Firestopping*

White firestopping, present in the Corridor (Location 2-013), was previously sampled, and does not contain asbestos (samples 11850-A-01-07A-C).

Grey firestopping, present in the Office (Location 1-139), was previously sampled, and does not contain asbestos (Pinchin File No. 239118.000, samples 2019-A0001A-C).

Grey (cementitious) firestopping, present at pipe and conduit penetrations in Ground Floor Electrical Room (Location 1-057) and Secondary Electrical Room (Location 1-070), was previously sampled and does not contain asbestos (Pinchin File No. 239118.002, samples A0002A-C).

#### *4.1.12 Caulking and Mastic*

Black caulking, present on the support legs of the rooftop condenser units, was previously sampled, and does not contain asbestos (Pinchin File No. 239118.002, samples A0001A-C).

Yellow floor mastic, present beneath raised ceramic floor tiles in the Office (Location 1-140) was previously sampled and does not contain asbestos (Pinchin File No. 239118.001, samples 2019-A0002A-C).

#### *4.1.13 Other Building Materials*

Tectum tiles, present as a ceiling finish in the Storage Cages (Location B-002), was previously sampled and does not contain asbestos (samples 11850-A-01-11A-C).

Thin-set, present under ceramic tiles on the floor in the Office (Location 1-139), was previously sampled and does not contain asbestos (Pinchin File No. 239118.001, samples 2019-A0003A-C).





Non-asbestos tectum tiles – Storage Cages (Location B-002).

#### 4.1.14 Excluded Materials

The following is a list of materials which may contain asbestos and was excluded from the reassessment. These materials are presumed to contain asbestos until otherwise proven by sampling and analysis:

- Roofing felts and tar, mastics
- Ceramic tile setting compound
- Elevator and lift brakes
- Electrical components
- Vermiculite
- Concealed adhesives and duct mastics
- Caulking and putties (previously not sampled)
- Soffit and fascia boards
- Fire resistant doors
- Metal clad finishes
- Sealants on pipe threads

## 4.2 Lead

### 4.2.1 Paints and Surface Coatings

The following table summarizes the analytical results of paints previously sampled.

Sample Number	Colour, Substrate Description	Sample Location	Lead (%)
14-8019-12	Off-white paint	EMS Communications Room (Location 3-020)	0.003
Pinchin File No. 239118.000; L0001	White paint on drywall wall	Stairwell (Location 1-139)	<0.0054

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Sample Number	Colour, Substrate Description	Sample Location	Lead (%)
Pinchin File No. 239118.000; L0002	Light green paint on drywall wall	Stairwell (Location 1-139)	<0.0067
Pinchin File No. 239118.000; L0003	Grey paint on metal door frame	Stairwell (Location 1-139)	<0.0049
Pinchin File No. 239118.000; L0004	Off-white paint on drywall wall	Stairwell (Location 1-139), Washroom (Location 1-140)	<0.0048
Pinchin File No. 239118.001; L0005	Beige, drywall wall	Housekeeping (Location 1-141)	<0.0074
Pinchin File No. 239118.002; L0001	Silver, structural steel	Roof (Location 0-000)	0.0076
Pinchin File No. 239118.002; L0002	Off-white, drywall wall	Second Floor Server Room (Location 2-027)	<0.0058
Pinchin File No. 239118.002; L0003	Pale green, concrete block wall	Ground Floor Electrical Room (Location 1-057)	<0.0055
Pinchin File No. 239118.003; L0001	Dark beige, drywall, wall	Classrooms (Locations 1-091, 1-092, 1-097)	<0.0058
Pinchin File No. 239118.003; L0002	White, drywall, bulkhead	Classrooms (Locations 1-091, 1-092, 1-097)	<0.00061
Pinchin File No. 239118.003; L0003	Beige, drywall, wall	Corridor (Location 1-101)	<0.0055
Pinchin File No. 239118.003; L0004	Beige, drywall, wall	Offices (Locations 1-151 to 1-153)	<0.066
Pinchin File No. 239118.003; L0005	White, drywall, wall	Offices (Locations 1-151 to 1-153)	<0.0035
Pinchin File No. 239118.003; L0006	Grey, wood door	Offices (Locations 1-151 to 1-153)	<0.0079

All sampled paints were found to contain lead at concentrations below the City of Toronto action limit of 0.1%. All paints were observed in good condition (i.e. not flaking, peeling, or delaminating).

#### 4.2.2 Lead Products and Applications

Lead-containing batteries may be present in emergency lighting.

#### 4.2.3 Excluded Lead Materials

Lead is known to be present in a number of materials which were not assessed or sampled.



The following materials, where found, should be presumed to contain lead.

- Electrical components, including wiring connectors, grounding conductors, and solder
- Solder on pipe connections
- Glazing on ceramic tiles

#### **4.3 Silica**

Crystalline silica is known to be a component of the following materials:

- Poured or pre-cast concrete
- Masonry and mortar
- Ceramic tiles and grout
- Plaster
- Drywall
- Ceiling tiles
- Asphalt

#### **4.4 Mercury**

##### *4.4.1 Lamps*

Mercury vapour is present in fluorescent lamp tubes.

##### *4.4.2 Mercury-Containing Devices*

Mercury-containing devices were not found during the reassessment.

#### **4.5 Polychlorinated Biphenyls**

##### *4.5.1 Caulking and Sealants*

PCBs were banned in 1980; however, are found to be present in caulking and sealants until 1985.

Caulking and sealants in the assessed area were installed in 1990 and are not suspected to contain PCBs.

##### *4.5.2 Lighting Ballasts*

Based on visual observations (evidence of T-8 fixtures) and year of construction (1990), the building and has been comprehensively re-lamped and will not contain PCB ballasts.



#### **4.5.3 Transformers**

All transformers in the building are dry type transformers and do not contain PCB-containing dielectric fluids.

#### **4.6 Mould and Water Damage**

Visible mould growth and water damage was not observed during the reassessment.

#### **4.7 Urea Formaldehyde Foam Insulation (UFFI)**

Urea Formaldehyde Foam Insulation (UFFI) was not observed within the assessed area during the reassessment.

### **5.0 RECOMMENDATIONS**

#### **5.1 General**

Perform a detailed intrusive assessment prior to building renovation or demolition operations. The assessment should include; destructive testing (i.e. coring and/or removal of building finishes and components), and sampling of materials not previously tested (i.e. roofing materials, caulking, mastics). This report does not provide sufficient detail for most renovation or demolition.

#### **5.2 On-going Management and Maintenance**

The following recommendations are made regarding on-going management and maintenance work involving the hazardous materials identified.

##### **5.2.1 Asbestos**

Perform a reassessment of asbestos materials on an annual basis.

Perform a pre-construction survey and remove asbestos-containing materials (ACM) prior to alteration or maintenance work if ACM may be disturbed by the work. Follow appropriate asbestos precautions for the classification of work being performed.

Asbestos-containing materials must be disposed of at a landfill approved to accept asbestos waste.

Update the asbestos inventory report upon completion of any abatement and removal of asbestos-containing materials.



### 5.2.2 *Lead*

Disturbance of lead in paint and coatings (or other materials) during maintenance activities may result in over-exposure to lead dust or fumes. The need for work procedures, engineering controls and personal protective equipment will need to be assessed on a project-by-project basis and must comply with provincial standards or guidelines. Performing an exposure assessment during work that disturbs lead in paints and coatings may be able to alleviate the use of some of the precautions specified by these standards or guidelines.

Lead-containing items should be recycled when taken out of service.

### 5.2.3 *Silica*

Disturbance of silica-containing products during maintenance activities may result in excessive exposures to airborne silica, especially if performed indoors and dry. Cutting, grinding, drilling or demolition of materials containing silica should be completed only with proper respiratory protection and other worker safety precautions that comply with provincial standards or guidelines.

### 5.2.4 *Mercury*

Do not break lamps. Recycle and reclaim mercury from fluorescent lamps when taken out of service. Mercury is classified as a hazardous waste and must be disposed of in accordance with applicable regulations.

## 6.0 **TERMS AND LIMITATIONS**

The work performed by Pinchin was conducted in accordance with the City of Toronto, Blanket Contract #47024791.

## 7.0 **REFERENCES**

The following legislation and documents were referenced in completing the assessment and this report:

1. Asbestos on Construction Projects and in Buildings and Repair Operations, Ontario Regulation 278/05.
2. Designated Substances, Ontario Regulation 490/09.
3. Lead on Construction Projects, Ministry of Labour Guidance Document.
4. The Environmental Abatement Council of Canada (EACC) Lead Guideline for Construction, Renovation, Maintenance or Repair.
5. Ministry of the Environment Regulation, R.R.O. 1990 Reg. 347 as amended.
6. Ministry of the Environment Regulation, R.R.O. 1990 Reg. 362 as amended.



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7. Silica on Construction Projects, Ministry of Labour Guidance Document.
8. Alert – Mould in Workplace Buildings, Ontario Ministry of Labour.
9. Surface Coating Materials Regulations, SOR/2016-193, Canada Consumer Product Safety Act.
10. Consolidated Transportation of Dangerous Goods Regulations, including Amendment SOR/2019-101, Transportation of Dangerous Goods Act.

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Template: Master Report for Hazardous Materials Assessment (Pre-Construction), HAZ, July 29, 2021

**APPENDIX I**  
**Room-by-Room Inventory Sheet**

APPENDIX IV - SURVEY FORM

Building Address:	4330 Dufferin Street, Toronto, Ontario	Date(s) of Current Reassessment:	October 16, 2023
Building Name:	Toronto Emergency Services Headquarters, TPS Station 53 and Parking Garage	Organization Completing Reassessment:	Pinchin Ltd.
Original Survey Conducted By:	ECOH Management	Name of Surveyor:	Abdullah Qasemzada
Date(s) of Original Survey:	June 20, 21, 22, 25, 26 & 27, 2007		

NOTES:

<i>Location Number</i>	<i>Location Name</i>	<i>Building System</i>	<i>Material Observed</i>	<i>Potential Hazardous Material</i>	<i>Sample ID</i>	<i>Analytical Result</i>	<i>Quantity</i>	<i>Condition</i>	<i>Notes / Recommended Actions</i>
0-000	Exterior	Roof	Roofing Material	Asbestos	Not Sampled	ACM Assumed	68,000 SF	Good	
0-000	Exterior	Roof	Caulking	Asbestos	A0001A-C*	None Detected	N/A	N/A	*From Pinchin File No. 239118.002 (2019)
0-000	Exterior	Roof	Paint	Lead	L0001	0.0076%	N/A	N/A	Silver paint on structural steel *From Pinchin File No. 239118.002
0-000	Exterior	Windows	Window Caulking	Asbestos	Not Sampled	ACM Assumed	All	Good	
0-000	Exterior	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
SOUTH BUILDING									
B-001	Corridor	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-1 to 3	None Detected	N/A	N/A	VFT01, 12" x 12", Light Grey Mosaic
B-001	Corridor	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
B-001	Corridor	Walls	Plaster	N/A	N/A	N/A	N/A	N/A	
B-001	Corridor	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
B-001	Corridor	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
B-001	Corridor	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
B-001	Corridor	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
B-001	Corridor	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
B-002	Storage Cages	Floor	Vinyl Floor Tile (VFT)	Asbestos	2017-A0001A-C	None Detected	N/A	N/A	VFT04, 12" x 12", Grey with White Streaks *Pinchin 2017 Survey
B-002	Storage Cages	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
B-002	Storage Cages	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
B-002	Storage Cages	Ceiling	Tectum	Asbestos	11850-A-01-11A* 11850-A-01-11B* 11850-A-01-11C*	None Detected	N/A	N/A	*From Building Environmental Audit, dated 2007
B-002	Storage Cages	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
B-002	Storage Cages	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
B-002	Storage Cages	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
B-002	Storage Cages	Mechanical	Fibreglass	N/A	N/A	N/A	N/A	N/A	Hot water tanks
B-003	Elevator Machine Room	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
B-003	Elevator Machine Room	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
B-003	Elevator Machine Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
B-003	Elevator Machine Room	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
B-004	Cleaner Storage	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
B-004	Cleaner Storage	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
B-004	Cleaner Storage	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
B-004	Cleaner Storage	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
B-004	Cleaner Storage	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
B-004	Cleaner Storage	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
B-004	Cleaner Storage	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
B-005	Maintenance Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
B-005	Maintenance Office	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
B-005	Maintenance Office	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
B-005	Maintenance Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
B-005	Maintenance Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
B-005	Maintenance Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	



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B-006	Electrical Room	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
B-006	Electrical Room	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
B-006	Electrical Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
B-006	Electrical Room	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
B-007	Central Files Storage	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
B-007	Central Files Storage	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
B-007	Central Files Storage	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
B-007	Central Files Storage	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
B-007	Central Files Storage	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
B-008	Weight Room	Floor	Rubber	N/A	N/A	N/A	N/A	N/A	
B-008	Weight Room	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
B-008	Weight Room	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
B-008	Weight Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
B-008	Weight Room	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
B-008	Weight Room	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
B-008	Weight Room	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
B-009	Women's Changeroom	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-10 to 12	None Detected	N/A	N/A	VFT02, 12" x 12", Grey Mosaic
B-009	Women's Changeroom	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
B-009	Women's Changeroom	Walls	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
B-009	Women's Changeroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
B-010	Men's Changeroom	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-10 to 12	None Detected	N/A	N/A	VFT02, 12" x 12", Grey Mosaic
B-010	Men's Changeroom	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
B-010	Men's Changeroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
B-011	File Storage	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
B-011	File Storage	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
B-011	File Storage	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
B-011	File Storage	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
B-011	File Storage	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
B-012	Public Order Unit Room	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
B-012	Public Order Unit Room	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
B-012	Public Order Unit Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
B-012	Public Order Unit Room	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
B-013	Document Storage	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
B-013	Document Storage	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
B-013	Document Storage	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
B-013	Document Storage	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
B-013	Document Storage	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
B-014	Boiler Room	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
B-014	Boiler Room	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
B-014	Boiler Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
B-014	Boiler Room	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
B-014	Boiler Room	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
B-014	Boiler Room	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
B-014	Boiler Room	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
B-014	Boiler Room	Mechanical	Uninsulated	N/A	N/A	N/A	N/A	N/A	Boiler
B-014	Boiler Room	Mechanical	Fibreglass	N/A	N/A	N/A	N/A	N/A	Hot water tanks
B-015	Women's Locker Room	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-10 to 12	None Detected	N/A	N/A	VFT02, 12" x 12", Grey Mosaic

**APPENDIX IV - SURVEY FORM**

B-015	Women's Locker Room	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
B-015	Women's Locker Room	Walls	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
B-015	Women's Locker Room	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
B-015	Women's Locker Room	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
B-016	Men's Locker Room	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-10 to 12	None Detected	N/A	N/A	VFT02, 12" x 12", Grey Mosaic
B-016	Men's Locker Room	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
B-016	Men's Locker Room	Walls	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
B-016	Men's Locker Room	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
B-016	Men's Locker Room	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
B-017	Printing Shop	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-1 to 3	None Detected	N/A	N/A	VFT01, 12" x 12", Light Grey Mosaic
B-017	Printing Shop	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
B-017	Printing Shop	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
B-017	Printing Shop	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
B-017	Printing Shop	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
B-018	Housekeeping	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
B-018	Housekeeping	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
B-018	Housekeeping	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
B-018	Housekeeping	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
B-018	Housekeeping	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
<b>WEST BUILDING</b>									
1-001	Stores Supervisor Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-001	Stores Supervisor Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-001	Stores Supervisor Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-12A*	None Detected	N/A	N/A	ACT02, 24" x 48", Plain White *From Building Environmental Audit, dated 2007
1-002	Stores General Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-002	Stores General Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-002	Stores General Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-12	None Detected	N/A	N/A	ACT02, 24" x 48", Plain White
1-003	Women's Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-003	Women's Washroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-003	Women's Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-004	Stores Corridor/Stairwell	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-004	Stores Corridor/Stairwell	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-004	Stores Corridor/Stairwell	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-12B*	None Detected	N/A	N/A	ACT02, 24" x 48", Plain White *From Building Environmental Audit, dated 2007
1-005	Men's Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-005	Men's Washroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-005	Men's Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-006	Stores Lunch Room	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-006	Stores Lunch Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-006	Stores Lunch Room	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-12	None Detected	N/A	N/A	ACT02, 24" x 48", Plain White
1-007	Stores Warehouse	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-007	Stores Warehouse	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-007	Stores Warehouse	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
1-008	Stores Electrical Room	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-008	Stores Electrical Room	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
1-008	Stores Electrical Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
1-008	Stores Electrical Room	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-008	Stores Electrical Room	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	

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1-009	Stores Locker Room	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-10 to 12	None Detected	N/A	N/A	VFT02, 12" x 12", Grey Mosaic
1-009	Stores Locker Room	Walls	Drywall Joint Compound (DJC)	Asbestos	12-4832-18*	None Detected	N/A	N/A	*Sampled during 2012 survey
1-009	Stores Locker Room	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
1-009	Stores Locker Room	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-12C*	None Detected	N/A	N/A	ACT02, 24" x 48", Plain White *From Building Environmental Audit, dated 2007
1-010	Stores Storage Room	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-010	Stores Storage Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-010	Stores Storage Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
1-011	Stores Clothing Storage	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-011	Stores Clothing Storage	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
1-011	Stores Clothing Storage	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
1-011	Stores Clothing Storage	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-011	Stores Clothing Storage	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-011	Stores Clothing Storage	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-012	Stores Sprinkler Valve Room	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-10 to 12	None Detected	N/A	N/A	VFT02, 12" x 12", Grey Mosaic
1-012	Stores Sprinkler Valve Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-012	Stores Sprinkler Valve Room	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
1-012	Stores Sprinkler Valve Room	Ceiling	Concrete	N/A	N/A	N/A	N/A	N/A	
1-013	Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-013	Washroom	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
1-013	Washroom	Ceiling	Drywall Joint Compound (DJC)	Not Sampled	None Detected	N/A	N/A	N/A	Based on extensive previous sampling
1-014	Stretcher Repair Area	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-014	Stretcher Repair Area	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
1-014	Stretcher Repair Area	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
1-014	Stretcher Repair Area	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-014	Stretcher Repair Area	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-014	Stretcher Repair Area	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-014	Stretcher Repair Area	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-015	Fleet Garage	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-015	Fleet Garage	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
1-015	Fleet Garage	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
1-015	Fleet Garage	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-015	Fleet Garage	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-015	Fleet Garage	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-016	Station Post 16	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-016	Station Post 16	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
1-016	Station Post 16	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-016	Station Post 16	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-016	Station Post 16	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-016	Station Post 16	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-017	Stairwell #8	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-017	Stairwell #8	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
1-017	Stairwell #8	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-017	Stairwell #8	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-018	Oil Disposal Room	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-018	Oil Disposal Room	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
1-018	Oil Disposal Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above

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1-020	Stores Storage Mezzanine	Floor	Vinyl Sheet Flooring (VSF)	Asbestos	11850-A-01-09A* 11850-A-01-09B* 11850-A-01-09C*	None Detected	N/A	N/A	VSF01, Dark Blue *From Building Environmental Audit, dated 2007
1-020	Stores Storage Mezzanine	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-020	Stores Storage Mezzanine	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
1-021	Stores Storage	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-021	Stores Storage	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-021	Stores Storage	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-16A*	None Detected	N/A	N/A	ACT03, 24" x 24", Wide Pinpoint *From Building Environmental Audit, dated 2007
1-022	Office	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-022	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-022	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-16C*	None Detected	N/A	N/A	ACT03, 24" x 24", Wide Pinpoint *From Building Environmental Audit, dated 2007
1-023	Entrance	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-023	Entrance	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-023	Entrance	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-16	None Detected	N/A	N/A	ACT03, 24" x 24", Wide Pinpoint
1-024	Change Room	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-024	Change Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-024	Change Room	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-16B*	None Detected	N/A	N/A	ACT03, 24" x 24", Wide Pinpoint *From Building Environmental Audit, dated 2007
1-025	Garage Men's W/C	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-025	Garage Men's W/C	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
1-025	Garage Men's W/C	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
1-026	Storage	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-026	Storage	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
1-026	Storage	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-026	Storage	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-026	Storage	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-026	Storage	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-027	Storage	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-027	Storage	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
1-027	Storage	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
1-027	Storage	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-027	Storage	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-027	Storage	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-027	Storage	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-028	Vestibule	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-028	Vestibule	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
1-028	Vestibule	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-029	Stairwell #7	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-029	Stairwell #7	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-029	Stairwell #7	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
1-029	Stairwell #7	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-030	Tool Room	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-030	Tool Room	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
1-030	Tool Room	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-030	Tool Room	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-031	Tool Room	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-031	Tool Room	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
1-031	Tool Room	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling



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1-031	Tool Room	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-031	Tool Room	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-032	Automotive Parts	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-032	Automotive Parts	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-032	Automotive Parts	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-032	Automotive Parts	Structure	Sprayed Fireproofing	Asbestos	2018-A0001A-C*	None Detected	N/A	N/A	*Pinchin 2018 Survey
1-032	Automotive Parts	Pipe	Transite Pipe	Asbestos	Not Sampled	ACM Assumed	All	N/A	NOT OBSERVED
1-033	Fleet Technician Office	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-033	Fleet Technician Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-033	Fleet Technician Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-033	Fleet Technician Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date code 05/14/13	None	N/A	N/A	ACT19, 24" x 48", Textured pinhole (date code: 05/14/13)
1-033	Fleet Technician Office	Structure	Sprayed Fireproofing	Asbestos	2018-A0001A-C	None Detected	N/A	N/A	*Pinchin 2018 Survey
1-033	Fleet Technician Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-033	Fleet Technician Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-034	Corridor	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-034	Corridor	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
1-034	Corridor	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date code 07/27/12	None	N/A	N/A	ACT23, 24" x 48", white pinhole, lay-in
1-034	Corridor	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-034	Corridor	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-035	Fleet Operations Supervisor	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-035	Fleet Operations Supervisor	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
1-035	Fleet Operations Supervisor	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date code 07/27/12	None	N/A	N/A	ACT23, 24" x 48", white pinhole, lay-in
1-035	Fleet Operations Supervisor	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-035	Fleet Operations Supervisor	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-036	Drivers Training	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-036	Drivers Training	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
1-036	Drivers Training	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date code 07/27/12	None	N/A	N/A	ACT23, 24" x 48", white pinhole, lay-in
1-036	Drivers Training	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-036	Drivers Training	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-037	Closet	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-037	Closet	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
1-037	Closet	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-038	Vestibule	Floor	Metal	N/A	N/A	N/A	N/A	N/A	
1-038	Vestibule	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
1-038	Vestibule	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-039	Stairwell	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-039	Stairwell	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
1-039	Stairwell	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-040	Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-040	Washroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-040	Washroom	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
1-040	Washroom	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-040	Washroom	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-040	Washroom	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-041	Housekeeping	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-041	Housekeeping	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling

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1-041	Housekeeping	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
1-041	Housekeeping	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-041	Housekeeping	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-041	Housekeeping	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
<b>CENTRE BUILDING</b>									
1-042	Lunch Room	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-042	Lunch Room	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-042	Lunch Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-042	Lunch Room	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down
1-042	Lunch Room	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-042	Lunch Room	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
1-043	Corridor	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-043	Corridor	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-043	Corridor	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13A*	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down *From Building Environmental Audit, dated 2007
1-043	Corridor	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01G*	None Detected	N/A	N/A	*From Building Environmental Audit, dated 2007
1-044	Women's Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-044	Women's Washroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-044	Women's Washroom	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	*No Access above ceiling
1-045	Men's Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-045	Men's Washroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-045	Men's Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-046	Electrical Room	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-10 to 12	None Detected	N/A	N/A	VFT02, 12" x 12", Grey Mosaic
1-046	Electrical Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-046	Electrical Room	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
1-046	Electrical Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
1-046	Electrical Room	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01E*	None Detected	N/A	N/A	*From Building Environmental Audit, dated 2007
1-046	Electrical Room	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-046	Electrical Room	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-047	Lan Room	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-10 to 12	None Detected	N/A	N/A	VFT02, 12" x 12", Grey Mosaic
1-047	Lan Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-047	Lan Room	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
1-047	Lan Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
1-047	Lan Room	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01D*	None Detected	N/A	N/A	*From Building Environmental Audit, dated 2007
1-048	Stairwell	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-048	Stairwell	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
1-048	Stairwell	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-049	Vestibule	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-049	Vestibule	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-049	Vestibule	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-050	Elevator Mechanical Room	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-050	Elevator Mechanical Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-050	Elevator Mechanical Room	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-050	Elevator Mechanical Room	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
<b>WEST BUILDING</b>									
1-051	Storage	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-051	Storage	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	

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1-051	Storage	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date code 05/14/13	None	N/A	N/A	ACT19, 24" x 48", Textured pinhole (date code: 05/14/13)
1-051	Storage	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
1-051	Storage	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-051	Storage	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-052	Communication Engineering Lab	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-052	Communication Engineering Lab	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
1-052	Communication Engineering Lab	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-052	Communication Engineering Lab	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-052	Communication Engineering Lab	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
CENTRE BUILDING									
1-053	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-053	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-053	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down
1-053	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-053	Office	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
1-054	Electrical Room	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-054	Electrical Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-054	Electrical Room	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
1-054	Electrical Room	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-054	Electrical Room	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-055	Closet	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-055	Closet	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-055	Closet	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-056	Corridor	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-056	Corridor	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-056	Corridor	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down
1-056	Corridor	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
1-057	Electrical Room	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-057	Electrical Room	Walls	Paint	Lead	L0003	<0.0055%	N/A	N/A	Pale green paint on concrete block *From Pinchin File No. 239118.002
1-057	Electrical Room	Walls	Fire Stop	Asbestos	A0002A-C*	None Detected	N/A	N/A	*From Pinchin File No. 239118.002 (2019)
1-057	Electrical Room	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
1-057	Electrical Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
1-058	Stairwell	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-058	Stairwell	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
1-058	Stairwell	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-058	Stairwell	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-059	General Offices	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-059	General Offices	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-059	General Offices	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down
1-059	General Offices	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-059	General Offices	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01C*	None Detected	N/A	N/A	*From Building Environmental Audit, dated 2007
1-060	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-060	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-060	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down
1-060	Office	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
1-061	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-061	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling



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1-061	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down
1-061	Office	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
1-062	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-062	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-062	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down
1-062	Office	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
1-063	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-063	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-063	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down
1-063	Office	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
1-064	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-064	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-064	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down
1-064	Office	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
1-065	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-065	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-065	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down
1-065	Office	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
NORTH BUILDING									
1-066	Stairwell #5	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-066	Stairwell #5	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-066	Stairwell #5	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
1-066	Stairwell #5	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-067	Office	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-067	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-067	Office	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
1-067	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
1-068	Corridor	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-068	Corridor	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-068	Corridor	Pipe	Transite Pipe	Asbestos	Not Sampled	ACM Assumed	100 LF	Good	
1-068	Corridor	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
1-068	Corridor	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-068	Corridor	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-068	Corridor	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-069	Audio Visual Room	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-069	Audio Visual Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-069	Audio Visual Room	Walls	Mastic**	Asbestos	11850-A-01-08A* 11850-A-01-08B* 11850-A-01-08C*	None Detected	N/A	N/A	**From Acoustic Wall Tiles *From Building Environmental Audit, dated 2007
1-069	Audio Visual Room	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-12	None Detected	N/A	N/A	ACT02, 24" x 48", Plain White
1-069	Audio Visual Room	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-070	Secondary Electric Room	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-070	Secondary Electric Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-070	Secondary Electric Room	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
1-070	Secondary Electric Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
1-070	Secondary Electric Room	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-071	Hydro Vault	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	No Access to Room
1-071	Hydro Vault	Walls	Block	N/A	N/A	N/A	N/A	N/A	No Access to Room



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1-071	Hydro Vault	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	No Access to Room
1-072	General Offices	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-072	General Offices	Walls	Drywall Joint Compound (DJC)	Asbestos	12-4832-8*	None Detected	N/A	N/A	*Sampled during 2012 survey
1-072	General Offices	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-20B*	None Detected	N/A	N/A	ACT08, 24" x 72", Wide Pinpoint (24" x 24" appearance) *From Building Environmental Audit, dated 2007
1-073	Corridor	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-073	Corridor	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-073	Corridor	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
1-073	Corridor	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-073	Corridor	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-073	Corridor	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-074	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-074	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-074	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-20	None Detected	N/A	N/A	ACT08, 24" x 72", Wide Pinpoint (24" x 24" appearance)
1-075	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-075	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-075	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-20	None Detected	N/A	N/A	ACT08, 24" x 72", Wide Pinpoint (24" x 24" appearance)
1-076	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-076	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-076	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19A*	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance) *From Building Environmental Audit, dated 2007
1-076	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-20A* 11850-A-01-20C*	None Detected	N/A	N/A	ACT08, 24" x 72", Wide Pinpoint (24" x 24" appearance) *From Building Environmental Audit, dated 2007
1-077	Kitchen/Lunchroom	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-077	Kitchen/Lunchroom	Walls	Drywall Joint Compound (DJC)	Asbestos	12-4832-9*	None Detected	N/A	N/A	*Sampled during 2012 survey
1-077	Kitchen/Lunchroom	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-20	None Detected	N/A	N/A	ACT08, 24" x 72", Wide Pinpoint (24" x 24" appearance)
1-078	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-078	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-078	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-20	None Detected	N/A	N/A	ACT08, 24" x 72", Wide Pinpoint (24" x 24" appearance)
1-079	Kitchen	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-079	Kitchen	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-079	Kitchen	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-080	Electrical Room	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-080	Electrical Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-080	Electrical Room	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
1-080	Electrical Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
1-080	Electrical Room	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-080	Electrical Room	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-080	Electrical Room	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-081	Quiet Room	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-081	Quiet Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-081	Quiet Room	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down
1-082	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-082	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-082	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
1-083	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-083	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling

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1-083	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
1-084	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-084	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-084	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
1-084	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-085	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-085	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-085	Office	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
1-085	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-085	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-085	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-086	Corridor	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-086	Corridor	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-086	Corridor	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-086	Corridor	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
1-087	Multi-media Storage	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-087	Multi-media Storage	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-087	Multi-media Storage	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-21C*	None Detected	N/A	N/A	ACT09, 24" x 72", Fissure Widthwise with Pinpoint *From Building Environmental Audit, dated 2007
1-088	Men's Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-088	Men's Washroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-088	Men's Washroom	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-21B*	None Detected	N/A	N/A	ACT09, 24" x 72", Fissure Widthwise with Pinpoint *From Building Environmental Audit, dated 2007
1-089	Women's Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-089	Women's Washroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-089	Women's Washroom	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-21A*	None Detected	N/A	N/A	ACT09, 24" x 72", Fissure Widthwise with Pinpoint *From Building Environmental Audit, dated 2007
1-090	Kitchen	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-090	Kitchen	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-090	Kitchen	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-090	Kitchen	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-091	Classroom 1	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-091	Classroom 1	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-091	Classroom 1	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-21	None Detected	N/A	N/A	ACT09, 24" x 72", Fissure Widthwise with Pinpoint
1-091	Classroom 1	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	S0001A-C*	None Detected	N/A	N/A	ACT10, 24" x 72", Sparse Fissure Widthwise with Pinpoint *From Pinchin File No. 239118.003 (2019)
1-092	Classroom 2	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-092	Classroom 2	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-092	Classroom 2	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-21	None Detected	N/A	N/A	ACT09, 24" x 72", Fissure Widthwise with Pinpoint
1-092	Classroom 2	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	S0001A-C*	None Detected	N/A	N/A	ACT10, 24" x 72", Sparse Fissure Widthwise with Pinpoint *From Pinchin File No. 239118.003 (2019)
1-093	Storage	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-1 to 3	None Detected	N/A	N/A	VFT01, 12" x 12", Light Grey Mosaic
1-093	Storage	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-093	Storage	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-21	None Detected	N/A	N/A	ACT09, 24" x 72", Fissure Widthwise with Pinpoint
1-093	Storage	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-093	Storage	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-093	Storage	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-094	Stairwell #4	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	

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1-094	Stairwell #4	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-094	Stairwell #4	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-095	Corridor	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-095	Corridor	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-095	Corridor	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-096	Museum / Storage	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-096	Museum / Storage	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-096	Museum / Storage	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
1-097	Classroom 3	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-097	Classroom 3	Walls	Paint	Lead	L0001*	<0.0058%	N/A	N/A	Dark beige paint on drywall *From Pinchin File No. 239118.003 (2019)
1-097	Classroom 3	Walls	Paint	Lead	L0002*	<0.00061%	N/A	N/A	White paint on drywall bulkhead *From Pinchin File No. 239118.003 (2019)
1-097	Corridor	Walls	Paint	Lead	L0003*	<0.0055%	N/A	N/A	Beige paint on drywall *From Pinchin File No. 239118.003 (2019)
1-097	Classroom 3	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-097	Classroom 3	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-21	None Detected	N/A	N/A	ACT09, 24" x 72", Fissure Widthwise with Pinpoint
1-097	Classroom 3	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	S0001A-C*	None Detected	N/A	N/A	ACT10, 24" x 72", Sparse Fissure Widthwise with Pinpoint *From Pinchin File No. 239118.003 (2019)
1-097	Classroom 3	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-097	Classroom 3	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-098	Corridor	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-098	Corridor	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
1-098	Corridor	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
1-098	Corridor	Pipe	Transite Pipe	Asbestos	Not Sampled	ACM Assumed	30 LF	Good	
1-098	Corridor	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-098	Corridor	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-099	Garage	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	<b>No Access to Room</b>
1-099	Garage	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	<b>No Access to Room</b> Based on extensive previous sampling
1-099	Garage	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	<b>No Access to Room</b> Based on extensive previous sampling
1-099	Garage	Pipe	Transite Pipe	Asbestos	Not Sampled	ACM Assumed	20 LF	Unknown	<b>No Access to Room</b>
1-100	Bell Room	Floor	Vinyl Floor Tile (VFT)	Asbestos	2018-A0002A-C*	None Detected	N/A	N/A	VFT03, 12" x 12", Rust Mosaic and mastic *Pinchin 2018 Survey
1-100	Bell Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-100	Bell Room	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
1-100	Bell Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
1-100	Bell Room	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-100	Bell Room	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-100	Bell Room	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-101	Corridor	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-101	Corridor	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-101	Corridor	Walls	Block	N/A	N/A	N/A	N/A	N/A	
1-101	Corridor	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-21	None Detected	N/A	N/A	ACT09, 24" x 72", Fissure Widthwise with Pinpoint
1-102	Women's Locker Room	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-1 to 3	None Detected	N/A	N/A	VFT01, 12" x 12", Light Grey Mosaic
1-102	Women's Locker Room	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-102	Women's Locker Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-102	Women's Locker Room	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-103	Men's Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-103	Men's Washroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-103	Men's Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-104	Housekeeping	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-1 to 3	None Detected	N/A	N/A	VFT01, 12" x 12", Light Grey Mosaic



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1-104	Housekeeping	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-104	Housekeeping	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-104	Housekeeping	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-104	Housekeeping	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-105	Corridor	Floor	Vinyl Sheet Flooring (VSF)	Asbestos	2018-A0003A-C*	None Detected	N/A	N/A	VSF02, Beige Mosaic *Pinchin 2018 Survey
1-105	Corridor	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-105	Corridor	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
1-106	Mechanical Room	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-106	Mechanical Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-106	Mechanical Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
1-106	Mechanical Room	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-106	Mechanical Room	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-107	Server Room	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-107	Server Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-107	Server Room	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-22	None Detected	N/A	N/A	ACT11, 24" x 72", Plain Textured Drop-Down
1-108	Office	Floor	Vinyl Sheet Flooring (VSF)	Asbestos	Not Sampled	None Detected	200 SF	Unknown	Not Observed VSF04, 12" x 12", grey, white streaks,
1-108	Office	Floor	Raised Flooring	N/A	N/A	N/A	N/A	N/A	
1-108	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-108	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-23B* 11850-A-01-23C*	None Detected	N/A	N/A	ACT12, 24" x 72", Plain Drop-Down (appearance as 24" x 24") *From Building Environmental Audit, dated 2007
1-109	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-109	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-109	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-20	None Detected	N/A	N/A	ACT08, 24" x 72", Wide Pinpoint (24" x 24" appearance)
1-109	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-110	Meeting Room	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-110	Meeting Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-110	Meeting Room	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-20	None Detected	N/A	N/A	ACT08, 24" x 72", Wide Pinpoint (24" x 24" appearance)
1-111	Lunch/Break Room	Floor	Vinyl Sheet Flooring (VSF)	Asbestos	2018-A0003A-C	None Detected	N/A	N/A	VSF02, Beige Mosaic *Pinchin 2018 Survey
1-111	Lunch/Break Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-111	Lunch/Break Room	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
1-111	Lunch/Break Room	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-112	Men's Locker Room	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-1 to 3	None Detected	N/A	N/A	VFT01, 12" x 12", Light Grey Mosaic
1-112	Men's Locker Room	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-112	Men's Locker Room	Walls	Drywall Joint Compound (DJC)	Asbestos	12-4832-7*	None Detected	N/A	N/A	*Sampled during 2012 survey
1-112	Men's Locker Room	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
1-112	Men's Locker Room	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-113	Sprinkler & Pump Room	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	<b>No Access to Room</b>
1-113	Sprinkler & Pump Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	<b>No Access to Room</b> Based on extensive previous sampling
1-113	Sprinkler & Pump Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	<b>No Access to Room</b> Open to metal above
1-114	Training Room	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-114	Training Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-114	Training Room	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-23	None Detected	N/A	N/A	ACT12, 24" x 72", Plain Drop-Down (24" x 24" appearance)
1-115	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-115	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-115	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-23	None Detected	N/A	N/A	ACT12, 24" x 72", Plain Drop-Down (24" x 24" appearance)
1-116	Corridor	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-116	Corridor	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling

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1-116	Corridor	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-119	Communications Center	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-119	Communications Center	Walls	Drywall Joint Compound (DJC)	Asbestos	13-6484-04 to 09*	None Detected	N/A	N/A	*From Fisher Project No.13-6592, dated July 2013
1-119	Communications Center	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-23	None Detected	N/A	N/A	ACT12, 24" x 72", Plain Drop-Down (24" x 24" appearance)
1-120	Vehicle Bays 1-4	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	<b>No Access to Room</b>
1-120	Vehicle Bays 1-4	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	<b>No Access to Room</b> Based on extensive previous sampling
1-120	Vehicle Bays 1-4	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	<b>No Access to Room</b> Based on extensive previous sampling
1-120	Vehicle Bays 1-4	Pipe	Parging Cement	Asbestos	11850-A-01-04	None Detected	N/A	N/A	<b>No Access to Room</b>
1-120	Vehicle Bays 1-4	Pipe	Transite Pipe	Asbestos	Not Sampled	ACM Assumed	45 LF	Unknown	<b>No Access to Room</b>
1-121	Vehicle Bays 5-10	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	<b>No Access to Room</b>
1-121	Vehicle Bays 5-10	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	<b>No Access to Room</b> Based on extensive previous sampling
1-121	Vehicle Bays 5-10	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	<b>No Access to Room</b> Based on extensive previous sampling
1-121	Vehicle Bays 5-10	Pipe	Parging Cement	Asbestos	11850-A-01-04	None Detected	N/A	N/A	<b>No Access to Room</b>
1-121	Vehicle Bays 5-10	Pipe	Transite Pipe	Asbestos	Not Sampled	ACM Assumed	45 LF	Unknown	<b>No Access to Room</b>
<b>SOUTH BUILDING</b>									
1-122	Stairwell #2	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-1 to 3	None Detected	N/A	N/A	VFT01, 12" x 12", Light Grey Mosaic Present on Basement Landing
1-122	Stairwell #2	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-122	Stairwell #2	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
1-122	Stairwell #2	Walls	Plaster	N/A	N/A	N/A	N/A	N/A	
1-122	Stairwell #2	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-122	Stairwell #2	Ceiling	Plaster	N/A	N/A	N/A	N/A	N/A	
1-122	Stairwell #2	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	*No Access to Room above ceiling
1-123	Stairwell #1	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-1 to 3	None Detected	N/A	N/A	VFT01, 12" x 12", Light Grey Mosaic Present on Basement Landing
1-123	Stairwell #1	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-123	Stairwell #1	Walls	Plaster	N/A	N/A	N/A	N/A	N/A	
1-123	Stairwell #1	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
1-123	Stairwell #1	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
1-123	Stairwell #1	Ceiling	Plaster	N/A	N/A	N/A	N/A	N/A	
1-124	Main Foyer	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-124	Main Foyer	Walls	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-124	Main Foyer	Walls	Plaster	N/A	N/A	N/A	N/A	N/A	
1-124	Main Foyer	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-124	Main Foyer	Ceiling	Drywall Joint Compound (DJC)	Asbestos	12-4788-1* 12-4788-2* 12-4788-3*	None Detected	N/A	N/A	*Sampled during 2012 survey
1-124	Main Foyer	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to Above
1-125	Vestibule	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-125	Vestibule	Walls	Metal	N/A	N/A	N/A	N/A	N/A	
1-125	Vestibule	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
1-125	Vestibule	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-126	Vending Machine Area	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-126	Vending Machine Area	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-126	Vending Machine Area	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-127	Storage	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-10 to 12	None Detected	N/A	N/A	VFT02, 12" x 12", Grey Mosaic
1-127	Storage	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-127	Storage	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-128	Housekeeping	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-10 to 12	None Detected	N/A	N/A	VFT02, 12" x 12", Grey Mosaic

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1-128	Housekeeping	Walls	Drywall Joint Compound (DJC)	Asbestos	10-1303-1* 10-1303-2* 10-1303-3*	None Detected	N/A	N/A	*From 2010 Annual Designated Substances Reassessment Survey
1-128	Housekeeping	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-129	Corridor	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-129	Corridor	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-129	Corridor	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
1-129	Corridor	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-129	Corridor	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-129	Corridor	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-129	Corridor	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-130	Kitchen	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-130	Kitchen	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-130	Kitchen	Walls	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-130	Kitchen	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-131	Electrical Room	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-1 to 3	None Detected	N/A	N/A	VFT01, 12" x 12", Light Grey Mosaic
1-131	Electrical Room	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
1-131	Electrical Room	Walls	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-131	Electrical Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
1-131	Electrical Room	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-132	General Offices	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-132	General Offices	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-132	General Offices	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
1-132	General Offices	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-132	General Offices	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-132	General Offices	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-132	General Offices	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-132	General Offices	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-133	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-133	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-133	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
1-133	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-133	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-133	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-133	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-133	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-134	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-134	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-134	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
1-134	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-134	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-134	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-134	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-134	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-135	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-135	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-135	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
1-136	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	



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1-136	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-136	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
1-136	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-137	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-137	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-137	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
1-137	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-137	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-137	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-137	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-137	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-138	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-138	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-138	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
1-138	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-138	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-138	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-138	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-139	Office	Floor	Ceramic Tile	Asbestos	2019-A0003A-C*	None Detected	N/A	N/A	*From Pinchin File No. 239118.001 (2019)
1-139	Office	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-139	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-139	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
1-139	Office	Walls	Fire Stop	Asbestos	2019-A0001A-C*	None Detected	N/A	N/A	*From Pinchin File No. 239118.000 (2019)
1-139	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-139	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-139	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-139	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-140	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-140	Office	Floor	Mastic	Asbestos	2019-A0002A-C*	N/A	N/A	N/A	*From Pinchin File No. 239118.001 (2019)
1-140	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-140	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
1-141	Office	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-141	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-141	Office	Walls	Paint	Lead	2019-L0005	<0.0074	N/A	N/A	Beige paint on drywall *From Pinchin File No. 239118.001
1-141	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-141	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
1-141	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date Code 2019	N/A	N/A	N/A	ACT22, 24" x 48", pinhole and random fissure (Date Code: 2019)
1-142	LAN Room	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-1 to 3	None Detected	N/A	N/A	VFT01, 12" x 12", Light Grey Mosaic
1-142	LAN Room	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
1-142	LAN Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
1-143	Women's Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-143	Women's Washroom	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
1-143	Women's Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-144	Men's Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-144	Men's Washroom	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
1-144	Men's Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-145	Shower Room	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	

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1-145	Shower Room	Walls	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-145	Shower Room	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-146	Housekeeping	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-10 to 12	None Detected	N/A	N/A	VFT02, 12" x 12", Grey Mosaic
1-146	Housekeeping	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
1-146	Housekeeping	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-146	Housekeeping	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-146	Housekeeping	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-147	Corridor	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-147	Corridor	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-147	Corridor	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-147	Corridor	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-148	Corridor	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-148	Corridor	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-148	Corridor	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date Code 08/20/16	N/A	N/A	N/A	ACT20, 24" x 48", random fissure and pinhole (Date Code: 08/20/16)
1-148	Corridor	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-148	Corridor	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-148	Corridor	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-149	Kitchen	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-149	Kitchen	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-149	Kitchen	Walls	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-149	Kitchen	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date Code 08/20/16	N/A	N/A	N/A	ACT20, 24" x 48", random fissure and pinhole (Date Code: 08/20/16)
1-149	Kitchen	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-149	Kitchen	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-150	Office	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-150	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-150	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date Code 08/20/16	N/A	N/A	N/A	ACT20, 24" x 48", random fissure and pinhole (Date Code: 08/20/16)
1-150	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-150	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-150	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-151	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-151	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-151	Office	Walls	Paint	Lead	L0004*	<0.0066%	N/A	N/A	Beige paint on drywall *From Pinchin File No. 239118.003 (2019)
1-151	Office	Walls	Paint	Lead	L0005*	<0.0035%	N/A	N/A	White paint on drywall *From Pinchin File No. 239118.003 (2019)
1-151	Office	Walls	Paint	Lead	L0006*	<0.0079%	N/A	N/A	Grey paint on wood door *From Pinchin File No. 239118.003 (2019)
1-151	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date Code 08/20/16	N/A	N/A	N/A	ACT20, 24" x 48", random fissure and pinhole (Date Code: 08/20/16)
1-151	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-151	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-152	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-152	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-152	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date Code 08/20/16	N/A	N/A	N/A	ACT20, 24" x 48", random fissure and pinhole (Date Code: 08/20/16)
1-153	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-153	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-153	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date Code 08/20/16	N/A	N/A	N/A	ACT20, 24" x 48", random fissure and pinhole (Date Code: 08/20/16)
1-153	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-153	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-154	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-154	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling



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1-154	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date Code 08/20/16	N/A	N/A	N/A	ACT20, 24" x 48", random fissure and pinhole (Date Code: 08/20/16)
1-155	Office	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
1-155	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-155	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-155	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date Code 08/20/16	N/A	N/A	N/A	ACT20, 24" x 48", random fissure and pinhole (Date Code: 08/20/16)
1-156	First Aid Room	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-156	First Aid Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-156	First Aid Room	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date Code 08/20/16	N/A	N/A	N/A	ACT20, 24" x 48", random fissure and pinhole (Date Code: 08/20/16)
1-156	First Aid Room	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-156	First Aid Room	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-157	Server Room	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-157	Server Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-157	Server Room	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date Code 08/20/16	N/A	N/A	N/A	ACT20, 24" x 48", random fissure and pinhole (Date Code: 08/20/16)
1-158	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-158	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-158	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date Code 08/20/16	N/A	N/A	N/A	ACT20, 24" x 48", random fissure and pinhole (Date Code: 08/20/16)
1-158	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-158	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-159	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-159	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-159	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date Code 08/20/16	N/A	N/A	N/A	ACT20, 24" x 48", random fissure and pinhole (Date Code: 08/20/16)
1-159	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-159	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
1-160	Storage	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-160	Storage	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-160	Storage	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date Code 08/20/16	N/A	N/A	N/A	ACT20, 24" x 48", random fissure and pinhole (Date Code: 08/20/16)
1-160	Storage	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
1-160	Storage	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
CENTRE BUILDING									
1-161	IT Storage	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-161	IT Storage	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-161	IT Storage	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down
1-161	IT Storage	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
1-162	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-162	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-162	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down
1-162	Office	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
1-163	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
1-163	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-163	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down
1-163	Office	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
WEST BUILDING									
1-164	Storage	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-164	Storage	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
1-164	Storage	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
1-165	Bay	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
1-165	Bay	Walls	Block	N/A	N/A	N/A	N/A	N/A	

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1-165	Bay	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
WEST BUILDING									
2-001	Vestibule	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-001	Vestibule	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-001	Vestibule	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-002	Kitchen/Lounge	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
2-002	Kitchen/Lounge	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-002	Kitchen/Lounge	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-003	Women's Washroom	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-1 to 3	None Detected	N/A	N/A	VFT01, 12" x 12", Light Grey Mosaic
2-003	Women's Washroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-003	Women's Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-004	Men's Washroom	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-1 to 3	None Detected	N/A	N/A	VFT01, 12" x 12", Light Grey Mosaic
2-004	Men's Washroom	Walls	Drywall Joint Compound (DJC)	Asbestos	12-4832-17*	None Detected	N/A	N/A	*Sampled during 2012 survey
2-004	Men's Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-005	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-005	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-005	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-006	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-006	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-006	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14B*	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down *From Building Environmental Audit, dated 2007
2-007	Storage	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-1 to 3	None Detected	N/A	N/A	VFT01, 12" x 12", Light Grey Mosaic
2-007	Storage	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-007	Storage	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-15A* 11850-A-01-15B* 11850-A-01-15C*	None Detected	N/A	N/A	ACT13, 24" x 48", Short Random Fissure with Pinpoint *From Building Environmental Audit, dated 2007
2-007	Storage	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-007	Storage	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-007	Storage	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-008	Housekeeping	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
2-008	Housekeeping	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-008	Housekeeping	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
2-008	Housekeeping	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-008	Housekeeping	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-009	Lunch/Break Room	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
2-009	Lunch/Break Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-009	Lunch/Break Room	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
2-009	Lunch/Break Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
2-010	Housekeeping	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-1 to 3	None Detected	N/A	N/A	VFT01, 12" x 12", Light Grey Mosaic
2-010	Housekeeping	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-010	Housekeeping	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-010	Housekeeping	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-010	Housekeeping	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-011	Women's Washroom	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-1 to 3	None Detected	N/A	N/A	VFT01, 12" x 12", Light Grey Mosaic
2-011	Women's Washroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-011	Women's Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-012	Men's Washroom	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-1 to 3	None Detected	N/A	N/A	VFT01, 12" x 12", Light Grey Mosaic
2-012	Men's Washroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling

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2-012	Men's Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-013	Corridor	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-1 to 3	None Detected	N/A	N/A	VFT01, 12" x 12", Light Grey Mosaic
2-013	Corridor	Floor	Vinyl Sheet Flooring (VSF)	Asbestos	11850-A-01-10A* 11850-A-01-10B* 11850-A-01-10C*	None Detected	N/A	N/A	VSF03, Grey with Black Fleck *From Building Environmental Audit, dated 2007
2-013	Corridor	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-013	Corridor	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-12	None Detected	N/A	N/A	ACT02, 24" x 48", Plain White
2-013	Corridor	Other	Fire Stop	Asbestos	11850-A-01-07A* 11850-A-01-07B* 11850-A-01-07C*	None Detected	N/A	N/A	White *From Building Environmental Audit, dated 2007
2-014	Mechanical Room	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-1 to 3	None Detected	N/A	N/A	VFT01, 12" x 12", Light Grey Mosaic
2-014	Mechanical Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-014	Mechanical Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
2-014	Mechanical Room	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-014	Mechanical Room	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-014	Mechanical Room	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-014	Mechanical Room	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-015	General Offices	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-015	General Offices	Walls	Drywall Joint Compound (DJC)	Asbestos	12-4832-16*	None Detected	N/A	N/A	*Sampled during 2012 survey
2-015	General Offices	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
2-015	General Offices	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-016	Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
2-016	Washroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-016	Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-017	Manager Fleet Operation	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-017	Manager Fleet Operation	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-017	Manager Fleet Operation	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-018	Friendship Fund Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-018	Friendship Fund Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-018	Friendship Fund Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14A*	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down *From Building Environmental Audit, dated 2007
2-019	Storage	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
2-019	Storage	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-019	Storage	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
2-020	Corridor	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-020	Corridor	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-020	Corridor	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
2-021	Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
2-021	Washroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-021	Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-022	Corridor	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-022	Corridor	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-022	Corridor	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-023	Kitchen	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-10 to 12	None Detected	N/A	N/A	VFT02, 12" x 12", Grey Mosaic
2-023	Kitchen	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-023	Kitchen	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
2-023	Kitchen	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-023	Kitchen	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
<b>CENTRE BUILDING</b>									
2-024	Corridor	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	



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2-024	Corridor	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-024	Corridor	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-024	Corridor	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
2-025	Men's Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
2-025	Men's Washroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-025	Men's Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-025	Men's Washroom	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01B*	None Detected	N/A	N/A	*From Building Environmental Audit, dated 2007
2-026	Women's Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
2-026	Women's Washroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-026	Women's Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-026	Women's Washroom	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
2-027	Server Room	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-10* 12-4832-11* 12-4832-12*	None Detected	N/A	N/A	VFT02, 12" x 12", Grey Mosaic *Sampled during 2012 survey
2-027	Server Room	Walls	Drywall Joint Compound (DJC)	Asbestos	12-4832-15*	None Detected	N/A	N/A	*Sampled during 2012 survey
2-027	Server Room	Walls	Paint	Lead	L0002	<0.0058%	N/A	N/A	Off-white paint on drywall *From Pinchin File No. 239118.002
2-027	Server Room	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down
2-027	Server Room	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
2-027	Server Room	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-027	Server Room	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-027	Server Room	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-028	Corridor	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-028	Corridor	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-028	Corridor	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13B*	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down *From Building Environmental Audit, dated 2007
2-028	Corridor	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-028	Corridor	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
2-029	Electrical Room	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
2-029	Electrical Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-029	Electrical Room	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
2-029	Electrical Room	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
2-029	Electrical Room	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-029	Electrical Room	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-030	LAN Room	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
2-030	LAN Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-030	LAN Room	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
2-030	LAN Room	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
2-030	LAN Room	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-030	LAN Room	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-031	Police Communications	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-031	Police Communications	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-031	Police Communications	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down
2-031	Police Communications	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-031	Police Communications	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
2-032	Sprinkler Room	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-10 to 12	None Detected	N/A	N/A	VFT02, 12" x 12", Grey Mosaic
2-032	Sprinkler Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-032	Sprinkler Room	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
2-032	Sprinkler Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	

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2-032	Sprinkler Room	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-032	Sprinkler Room	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-032	Sprinkler Room	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-033	Vestibule	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
2-033	Vestibule	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-033	Vestibule	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-033	Vestibule	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-033	Vestibule	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
NORTH BUILDING									
2-036	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-036	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-036	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-036	Office	Pipe	Transite Pipe	Asbestos	Not Sampled	ACM Assumed	16 LF	Good	
2-037	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-037	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-037	Office	Ceiling	Acoustic Ceiling Tile (ACT)	N/A	N/A	N/A	N/A	N/A	
2-037	Office	Pipe	Transite Pipe	Asbestos	Not Sampled	ACM Assumed	8 LF	Good	
2-039	Women's Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
2-039	Women's Washroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-039	Women's Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-040	Men's Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
2-040	Men's Washroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-040	Men's Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-041	Storage	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-041	Storage	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-041	Storage	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-042	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-042	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-042	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-043	Women's Locker Room	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
2-043	Women's Locker Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-043	Women's Locker Room	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-044	Men's Locker Room	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
2-044	Men's Locker Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-044	Men's Locker Room	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-045	Corridor	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-045	Corridor	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-045	Corridor	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-046	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-046	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-046	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-047	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-047	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-047	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-048	Corridor	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-048	Corridor	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-048	Corridor	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling

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2-049	Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
2-049	Washroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-049	Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-050	Kitchen	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
2-050	Kitchen	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-050	Kitchen	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-051	Housekeeping	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-10 to 12	None Detected	N/A	N/A	VFT02, 12" x 12", Grey Mosaic
2-051	Housekeeping	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-051	Housekeeping	Walls	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
2-051	Housekeeping	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
2-051	Housekeeping	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-051	Housekeeping	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-051	Housekeeping	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-052	Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
2-052	Washroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-052	Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-053	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-053	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-053	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-054	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-054	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-054	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-055	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-055	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-055	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-056	Accounting	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-056	Accounting	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-056	Accounting	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-057	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-057	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-057	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-058	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-058	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-058	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-059	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-059	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-059	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-060	Closet	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-10 to 12	None Detected	N/A	N/A	VFT02, 12" x 12", Grey Mosaic
2-060	Closet	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-060	Closet	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-061	Professional Standards	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-061	Professional Standards	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-061	Professional Standards	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-062	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-062	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-062	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-063	Internal Relation	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	



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2-063	Internal Relation	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-063	Internal Relation	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-064	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-064	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-064	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-065	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-065	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-065	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-066	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-066	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-066	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-067	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-067	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-067	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-068	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-068	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-068	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-069	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-069	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-069	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-070	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-070	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-070	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-071	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-071	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-071	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-072	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-072	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-072	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-073	Education & Development	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-073	Education & Development	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-073	Education & Development	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-074	Meeting Room	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-074	Meeting Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-074	Meeting Room	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-075	Copy Room	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-075	Copy Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-075	Copy Room	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-076	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-076	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-076	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-077	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-077	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-077	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-078	Corridor	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-078	Corridor	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-078	Corridor	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date code: 2019	None	N/A	N/A	ACT22, 24" x 48", pinhole and random fissure (Date Code: 2019)

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2-079	General Offices	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-079	General Offices	Walls	Drywall Joint Compound (DJC)	Asbestos	13-7419-01 to 03*	None Detected	N/A	N/A	*From Fisher Project No.13-6761, dated December 2013
2-079	General Offices	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-14	None Detected	N/A	N/A	ACT06, 24" x 48", Short Random Fissure with Pinpoint Drop-Down
2-080	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-080	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-080	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date code: 2019	None	N/A	N/A	ACT22, 24" x 48", pinhole and random fissure (Date Code: 2019)
2-081	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-081	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-081	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date code: 2019	None	N/A	N/A	ACT22, 24" x 48", pinhole and random fissure (Date Code: 2019)
2-082	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-082	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-082	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date code: 2019	None	N/A	N/A	ACT22, 24" x 48", pinhole and random fissure (Date Code: 2019)
2-083	General Offices	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-083	General Offices	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-083	General Offices	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date code: 2019	None	N/A	N/A	ACT22, 24" x 48", pinhole and random fissure (Date Code: 2019)
2-83	General Offices	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-18A* 11850-A-01-18B* 11850-A-01-18C*	None Detected	N/A	N/A	ACT05, 24" x 48", Short Uniform Fissure *From Building Environmental Audit, dated 2007
2-083	General Offices	Pipe	Transite Pipe	Asbestos	Not Sampled	ACM Assumed	30 LF	Good	
2-084	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-084	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-084	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date code: 2019	None	N/A	N/A	ACT22, 24" x 48", pinhole and random fissure (Date Code: 2019)
2-085	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-085	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-085	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date code: 2019	None	N/A	N/A	ACT22, 24" x 48", pinhole and random fissure (Date Code: 2019)
2-086	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-086	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-086	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date code: 2019	None	N/A	N/A	ACT22, 24" x 48", pinhole and random fissure (Date Code: 2019)
2-087	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-087	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-087	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date code: 2019	None	N/A	N/A	ACT22, 24" x 48", pinhole and random fissure (Date Code: 2019)
2-088	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-088	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-088	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date code: 2019	None	N/A	N/A	ACT22, 24" x 48", pinhole and random fissure (Date Code: 2019)
2-088	Office	Pipe	Transite Pipe	Asbestos	Not Sampled	ACM Assumed	12 LF	Good	
2-089	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-089	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-089	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date code: 2019	None	N/A	N/A	ACT22, 24" x 48", pinhole and random fissure (Date Code: 2019)
2-089	Office	Pipe	Transite Pipe	Asbestos	Not Sampled	ACM Assumed	12 LF	Good	
2-090	General Offices	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-090	General Offices	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-090	General Offices	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date code: 2019	None	N/A	N/A	ACT22, 24" x 48", pinhole and random fissure (Date Code: 2019)
2-090	General Offices	Pipe	Transite Pipe	Asbestos	Not Sampled	ACM Assumed	80 LF	Good	
2-091	Kitchen	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
2-091	Kitchen	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-091	Kitchen	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date code: 2019	None	N/A	N/A	ACT22, 24" x 48", pinhole and random fissure (Date Code: 2019)
2-091	Kitchen	Pipe	Transite Pipe	Asbestos	Not Sampled	ACM Assumed	10 LF	Good	
2-092	Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	



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2-092	Washroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-092	Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-092	Washroom	Pipe	Transite Pipe	Asbestos	Not Sampled	ACM Assumed	6 LF	Good	
2-093	Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
2-093	Washroom	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
2-093	Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-093	Washroom	Pipe	Transite Pipe	Asbestos	Not Sampled	ACM Assumed	10 LF	Good	
2-094	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-094	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-094	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date code: 2019	None	N/A	N/A	ACT22, 24" x 48", pinhole and random fissure (Date Code: 2019)
2-094	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-095	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-095	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-095	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date code: 2019	None	N/A	N/A	ACT22, 24" x 48", pinhole and random fissure (Date Code: 2019)
2-096	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-096	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-096	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date code: 2019	None	N/A	N/A	ACT22, 24" x 48", pinhole and random fissure (Date Code: 2019)
2-097	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-097	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-097	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date code: 2019	None	N/A	N/A	ACT22, 24" x 48", pinhole and random fissure (Date Code: 2019)
2-098	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-098	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-098	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date code: 2019	None	N/A	N/A	ACT22, 24" x 48", pinhole and random fissure (Date Code: 2019)
2-099	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-099	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-099	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date code: 2019	None	N/A	N/A	ACT22, 24" x 48", pinhole and random fissure (Date Code: 2019)
2-100	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-100	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-100	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date code: 2019	None	N/A	N/A	ACT22, 24" x 48", pinhole and random fissure (Date Code: 2019)
2-101	Boardroom	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-101	Boardroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-101	Boardroom	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date code: 2019	None	N/A	N/A	ACT22, 24" x 48", pinhole and random fissure (Date Code: 2019)
2-102	Stairwell #3	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-102	Stairwell #3	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
2-102	Stairwell #3	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-102	Stairwell #3	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-103	Corridor	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
2-103	Corridor	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
2-103	Corridor	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
2-104	Main Switch Room	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	<b>No access to room</b>
2-104	Main Switch Room	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	<b>No access to room</b>
2-104	Main Switch Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	<b>No access to room</b> Open to metal above
2-104	Main Switch Room	Pipe	Parging Cement	Asbestos	11850-A-01-02A* 11850-A-01-02B* 11850-A-01-02C*	None Detected	N/A	N/A	<b>No access to room</b> White from Generator *From Building Environmental Audit, dated 2007
2-104	Main Switch Room	Pipe	Parging Cement	Asbestos	11850-A-01-03C*	None Detected	N/A	N/A	<b>No access to room</b> Beige from fitting - powder like *From Building Environmental Audit, dated 2007
2-106	UPS Room	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	<b>No access to room</b>

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2-106	UPS Room	Walls	Drywall Joint Compound (DJC)	Asbestos	13-6484-01 to 09	None Detected	N/A	N/A	<b>No access to room</b> *From Fisher Project No.13-6592, dated July 2013
2-106	UPS Room	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	<b>No access to room</b>
2-106	UPS Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	<b>No access to room</b> Open to metal above
2-106	UPS Room	Pipe	Parging Cement	Asbestos	11850-A-01-04A*	None Detected	N/A	N/A	<b>No access to room</b> Beige from fitting - non-powder *From Building Environmental Audit, dated 2007
2-106	UPS Room	Pipe	Transite Pipe	Asbestos	Not Sampled	ACM Assumed	1 SF	Unknown	<b>No access to room</b>
2-107	Mechanical Room	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	<b>No access to room</b>
2-107	Mechanical Room	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	<b>No access to room</b>
2-107	Mechanical Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	<b>No access to room</b> Open to metal above
2-107	Mechanical Room	Pipe	Parging Cement	Asbestos	11850-A-01-04B* 11850-A-01-04C*	None Detected	N/A	N/A	<b>No access to room</b> Beige from fitting - non-powder *From Building Environmental Audit, dated 2007
2-108	Cooling Tower Room	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	<b>No access to room</b> Outside
2-108	Cooling Tower Room	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	<b>No access to room</b> Outside
2-108	Cooling Tower Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	<b>No access to room</b> Open to above
2-108	Cooling Tower Room	Pipe	Parging Cement	Asbestos	11850-A-01-03A* 11850-A-01-03B*	None Detected	N/A	N/A	<b>No access to room</b> Beige from fitting - powder like *From Building Environmental Audit, dated 2007
<b>SOUTH BUILDING</b>									
2-109	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-109	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-109	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19B*	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance) *From Building Environmental Audit, dated 2007
2-109	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-109	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-109	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-110	Corridor	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
2-110	Corridor	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-110	Corridor	Walls	Plaster	N/A	N/A	N/A	N/A	N/A	
2-110	Corridor	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
2-111	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-111	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	12-4832-4* 12-4832-5*	None Detected	N/A	N/A	*Sampled during 2012 survey
2-111	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
2-111	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-111	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-111	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-111	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-112	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-112	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-112	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
2-112	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-112	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-112	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-112	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-113	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-113	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-113	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
2-113	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-114	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	

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2-114	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-114	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
2-114	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-114	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-114	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-114	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-114	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-115	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-115	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-115	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
2-115	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-115	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-115	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-115	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-115	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-116	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-116	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	12-4832-6*	None Detected	N/A	N/A	*Sampled during 2012 survey
2-116	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
2-116	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-116	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-116	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-116	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-116	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-117	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-117	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-117	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
2-117	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-117	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-117	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-117	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-118	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-118	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-118	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
2-118	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-118	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-118	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-118	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-119	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-119	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-119	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
2-119	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-119	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-119	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-119	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-120	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-120	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-120	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)



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2-120	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-120	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-120	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-120	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-120	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-121	Housekeeping	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-1 to 3	None Detected	N/A	N/A	VFT01, 12" x 12", Light Grey Mosaic
2-121	Housekeeping	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-121	Housekeeping	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
2-121	Housekeeping	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
2-121	Housekeeping	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-121	Housekeeping	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-122	File Storage	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-1* 12-4832-2* 12-4832-3*	None Detected	N/A	N/A	Not observed during 2020 survey VFT01, 12" x 12", Light Grey Mosaic *Sampled during 2012 survey.
2-122	File Storage	Floor	Vinyl Floor Tile (VFT)	Asbestos	Not Sampled	ACM Assumed	80 SF	Good	VFT05, 12" x 12", dark green rippled
2-122	File Storage	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-122	File Storage	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
2-122	File Storage	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-122	File Storage	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-122	File Storage	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-122	File Storage	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-123	Server Room	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-1 to 3	None Detected	N/A	N/A	VFT01, 12" x 12", Light Grey Mosaic
2-123	Server Room	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
2-123	Server Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
2-124	File Storage	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-124	File Storage	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-124	File Storage	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
2-124	File Storage	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-124	File Storage	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-124	File Storage	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-124	File Storage	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-125	General Offices	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-125	General Offices	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-125	General Offices	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
2-125	General Offices	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-125	General Offices	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-125	General Offices	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-125	General Offices	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-125	General Offices	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-126	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-126	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-126	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
2-126	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-126	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-126	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-126	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-127	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-127	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling

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2-127	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
2-128	Women's Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
2-128	Women's Washroom	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
2-128	Women's Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-129	Electrical Room	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-1 to 3	None Detected	N/A	N/A	VFT01, 12" x 12", Light Grey Mosaic
2-129	Electrical Room	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
2-129	Electrical Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
2-130	Men's Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
2-130	Men's Washroom	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
2-130	Men's Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-131	Kitchen/Lounge	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
2-131	Kitchen/Lounge	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-131	Kitchen/Lounge	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
2-131	Kitchen/Lounge	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-131	Kitchen/Lounge	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-132	Copy Room	Room doesn't exist (combined with 2-131)							
2-132	Copy Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-132	Copy Room	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
2-133	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-133	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-133	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
2-133	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-133	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-133	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-133	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-133	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-134	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-134	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-134	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-134	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
2-135	Room doesn't exist.								
2-136	Film Room	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-136	Film Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-136	Film Room	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
2-136	Film Room	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-126	Film Room	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-136	Film Room	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-137	Boardroom	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-137	Boardroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-137	Boardroom	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
2-138	Boardroom	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	No Access to Room
2-138	Boardroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	No Access to Room Based on extensive previous sampling
2-138	Boardroom	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	No Access to Room
2-139	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-139	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-139	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling

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2-139	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-23A*	None Detected	N/A	N/A	ACT12, 24" x 72", Plain Drop-Down (24" x 24" appearance) *From Building Environmental Audit, dated 2007
NORTH BUILDING									
2-140	Corridor	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-140	Corridor	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-140	Corridor	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date Code 03/09/16	N/A	N/A	N/A	ACT21, 24" x 48", random fissure and pinhole (Date Code: 03/09/16)
2-140	Corridor	Pipe	Transite Pipe	Asbestos	Not Sampled	ACM Assumed	25 LF	Good	
2-141	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-141	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-141	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date Code 03/09/16	N/A	N/A	N/A	ACT21, 24" x 48", random fissure and pinhole (Date Code: 03/09/16)
2-141	Office	Pipe	Transite Pipe	Asbestos	Not Sampled	ACM Assumed	16 LF	N/A	NOT OBSERVED
2-142	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-142	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-142	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
WEST BUILDING									
2-143	Storage Room	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-10 to 12	None Detected	N/A	N/A	VFT02, 12" x 12", Grey Mosaic
2-143	Storage Room	Walls	Drywall Panel	N/A	N/A	N/A	N/A	N/A	
2-143	Storage Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
2-144	Office	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-10 to 12	None Detected	N/A	N/A	VFT02, 12" x 12", Grey Mosaic
2-144	Office	Walls	Drywall Panel	N/A	N/A	N/A	N/A	N/A	
2-144	Office	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
2-145	Men's / Women's Change Room	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-10 to 12	None Detected	N/A	N/A	VFT02, 12" x 12", Grey Mosaic
2-145	Men's / Women's Change Room	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
2-145	Men's / Women's Change Room	Walls	Drywall Panel	N/A	N/A	N/A	N/A	N/A	
2-145	Men's / Women's Change Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
2-145	Men's / Women's Change Room	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-145	Men's / Women's Change Room	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
2-145	Men's / Women's Change Room	Pipe	Transite Pipe	Asbestos	Not Sampled	ACM Assumed	30 LF	Good	
2-145	Men's / Women's Change Room	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
NORTH BUILDING									
2-146	Electrical Closet	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
2-146	Electrical Closet	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
2-146	Electrical Closet	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date Code 03/09/16	N/A	N/A	N/A	ACT21, 24" x 48", random fissure and pinhole (Date Code: 03/09/16)
2-146	Electrical Closet	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
2-146	Electrical Closet	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
CENTRE BUILDING									
3-001	Vestibule	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-001	Vestibule	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
3-001	Vestibule	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-001	Vestibule	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-003	Corridor	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-003	Corridor	Walls	Drywall Joint Compound (DJC)	Asbestos	13-6174-01 to 03*	None Detected	N/A	N/A	*From Fisher Project No.13-6570, dated June 2013
3-003	Corridor	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13C*	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down *From Building Environmental Audit, dated 2007
3-003	Corridor	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
3-003	Corridor	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-003	Corridor	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	



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3-003	Corridor	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-003	Corridor	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-004	LAN Room	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-10 to 12	None Detected	N/A	N/A	VFT02, 12" x 12", Grey Mosaic
3-004	LAN Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-004	LAN Room	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
3-004	LAN Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
3-004	LAN Room	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
3-005	Electrical Room	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-10 to 12	None Detected	N/A	N/A	VFT02, 12" x 12", Grey Mosaic
3-005	Electrical Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-005	Electrical Room	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
3-005	Electrical Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
3-005	Electrical Room	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
3-005	Electrical Room	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-006	Unisex Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
3-006	Unisex Washroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-006	Unisex Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-007	Men's Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
3-007	Men's Washroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-007	Men's Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-008	Women's Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
3-008	Women's Washroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-008	Women's Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-009	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-009	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-009	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down
3-009	Office	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
3-009	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-009	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-009	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-009	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-010	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-010	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-010	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down
3-010	Office	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
3-010	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-010	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-010	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-010	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-011	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-011	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-011	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down
3-011	Office	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
3-011	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-011	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-011	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-011	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-012	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	

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3-012	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-012	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down
3-012	Office	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
3-012	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-012	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-012	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-012	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-013	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-013	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-013	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down
3-013	Office	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
3-014	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-014	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-014	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down
3-014	Office	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
3-015	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-015	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-015	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down
3-015	Office	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
3-015	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-015	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-015	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-015	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-016	Lunch/Break Room	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
3-016	Lunch/Break Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-016	Lunch/Break Room	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down
3-016	Lunch/Break Room	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
3-017	Housekeeping	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-10 to 12	None Detected	N/A	N/A	VFT02, 12" x 12", Grey Mosaic
3-017	Housekeeping	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-017	Housekeeping	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-017	Housekeeping	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01A*	None Detected	N/A	N/A	*From Building Environmental Audit, dated 2007
3-018	Storage	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-018	Storage	Walls	Drywall Joint Compound (DJC)	Asbestos	12-4832-13* 12-4832-14*	None Detected	N/A	N/A	*Sampled during 2012 survey
3-018	Storage	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down
3-018	Storage	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-018	Storage	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-018	Storage	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-018	Storage	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-019	Chief's Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-019	Chief's Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-019	Chief's Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-13	None Detected	N/A	N/A	ACT07, 24" x 48", Plain White Drop-Down
3-019	Chief's Office	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
3-020	EMS Communications	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-020	EMS Communications	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-020	EMS Communications	Walls	Paint	Lead	14-8019-12*	0.003%	N/A	N/A	Off-white paint *From Fisher Project No.14-6825, dated Feb. 2014
3-020	EMS Communications	Ceiling	Acoustic Ceiling Tile (ACT)	N/A	N/A	N/A	N/A	N/A	ACT16, 24" x 48", Plain textured (Fibreglass)



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3-020	EMS Communications	Structure	Sprayed Fireproofing	Asbestos	11850-A-01-01	None Detected	N/A	N/A	
3-020	EMS Communications	Walls	Duct Insulation	Asbestos	14-8019-01* 14-8019-02* 14-8019-03*	None Detected	N/A	N/A	*From Fisher Project No.14-6825, dated Feb. 2014
3-020	EMS Communications	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	14-8019-04* 14-8019-05* 14-8019-06*	None Detected	N/A	N/A	ACT17, 24" x 48", Plain Textured *From Fisher Project No.14-6825, dated Feb. 2014
3-020	EMS Communications	Walls	Drywall Joint Compound (DJC)	Asbestos	14-8019-07 to 11*	None Detected	N/A	N/A	*From Fisher Project No.14-6825, dated Feb. 2014
SOUTH BUILDING									
3-021	Vestibule	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
3-021	Vestibule	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
3-021	Vestibule	Walls	Plaster	N/A	N/A	N/A	N/A	N/A	
3-021	Vestibule	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-022	Reception	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-022	Reception	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-022	Reception	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-022	Reception	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
3-022	Reception	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-022	Reception	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-022	Reception	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-023	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-023	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-023	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-023	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
3-024	General Offices	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-024	General Offices	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-024	General Offices	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
3-024	General Offices	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-024	General Offices	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-024	General Offices	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-024	General Offices	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-025	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-025	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-025	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
3-025	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-025	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-025	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-025	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-026	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-026	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-026	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19C*	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance) *From Building Environmental Audit, dated 2007
3-026	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-026	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-026	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-026	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-027	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-027	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-027	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)

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3-027	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-027	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-027	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-027	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-028	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-028	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-028	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
3-028	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-028	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-028	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-028	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-029	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-029	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-029	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
3-029	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-029	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-029	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-029	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-030	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-030	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-030	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance) *From Building Environmental Audit, dated 2007
3-030	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-030	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-030	Office	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-030	Office	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-031	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-031	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-031	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
3-032	Housekeeping	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-1 to 3	None Detected	N/A	N/A	VFT01, 12" x 12", Light Grey Mosaic
3-032	Housekeeping	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-032	Housekeeping	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
3-033	Server Room	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-1 to 3	None Detected	N/A	N/A	VFT01, 12" x 12", Light Grey Mosaic
3-033	Server Room	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
3-033	Server Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
3-034	Copy Room	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-034	Copy Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-034	Copy Room	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
3-034	Copy Room	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-034	Copy Room	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-034	Copy Room	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-034	Copy Room	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-035	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-035	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-035	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
3-036	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-036	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling

# APPENDIX IV - SURVEY FORM

3-036	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-036	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
3-037	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-037	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-037	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-037	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
3-038	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-038	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-038	Office	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-038	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
3-039	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	<b>No Access to Room</b>
3-039	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	<b>No Access to Room</b> Based on extensive previous sampling
3-039	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	<b>No Access to Room</b> ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
3-039	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	<b>No Access to Room</b>
3-039	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	<b>No Access to Room</b>
3-040	Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	<b>No Access to Room</b>
3-040	Washroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	<b>No Access to Room</b> Based on extensive previous sampling
3-040	Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	<b>No Access to Room</b> Based on extensive previous sampling
3-040	Washroom	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	<b>No Access to Room</b>
3-040	Washroom	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	<b>No Access to Room</b>
3-041	Corridor	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-041	Corridor	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-041	Corridor	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
3-041	Corridor	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-24A* 11850-A-01-24B*	None Detected	N/A	N/A	ACT14, 24" x 72", Large random fissure with pinpoint *From Building Environmental Audit, dated 2007
3-041	Corridor	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-041	Corridor	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-042	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-042	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-042	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
3-042	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-24C*	None Detected	N/A	N/A	ACT14, 24" x 72", Large random fissure with pinpoint *From Building Environmental Audit, dated 2007
3-042	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-042	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-043	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-043	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-043	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
3-044	Office	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-044	Office	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-044	Office	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
3-044	Office	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
3-044	Office	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
3-045	Boardroom	Floor	Carpet	N/A	N/A	N/A	N/A	N/A	
3-045	Boardroom	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-045	Boardroom	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-25A* 11850-A-01-25B* 11850-A-01-25C*	None Detected	N/A	N/A	ACT15, 24" x 24", Plain white *From Building Environmental Audit, dated 2007
3-046	File Storage	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-1 to 3	None Detected	N/A	N/A	VFT01, 12" x 12", Light Grey Mosaic



APPENDIX IV - SURVEY FORM

3-046	File Storage	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-046	File Storage	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	11850-A-01-19	None Detected	N/A	N/A	ACT01, 24" x 72", short random fissure and pinpoint (24" x 24" appearance)
3-047	Men's Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
3-047	Men's Washroom	Walls	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
3-047	Men's Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-048	Women's Washroom	Floor	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
3-048	Women's Washroom	Walls	Ceramic Tile	N/A	N/A	N/A	N/A	N/A	
3-048	Women's Washroom	Ceiling	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-049	Electrical Room	Floor	Vinyl Floor Tile (VFT)	Asbestos	12-4832-1 to 3	None Detected	N/A	N/A	VFT01, 12" x 12", Light Grey Mosaic
3-049	Electrical Room	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
3-049	Electrical Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
3-050	Kitchen	Floor	Laminate	N/A	N/A	N/A	N/A	N/A	Wood
3-050	Kitchen	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
3-050	Kitchen	Ceiling	Acoustic Ceiling Tile (ACT)	Asbestos	Date Code 03/09/16	N/A	N/A	N/A	ACT21, 24" x 48", random fissure and pinhole (Date Code: 03/09/16)
SOUTH BUILDING									
4-001	Mechanical Room	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
4-001	Mechanical Room	Walls	Drywall Joint Compound (DJC)	Asbestos	Not Sampled	None Detected	N/A	N/A	Based on extensive previous sampling
4-001	Mechanical Room	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
4-001	Mechanical Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
4-001	Mechanical Room	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
4-001	Mechanical Room	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
4-001	Mechanical Room	Duct	Uninsulated	N/A	N/A	N/A	N/A	N/A	
4-001	Mechanical Room	Duct	Fibreglass	N/A	N/A	N/A	N/A	N/A	
4-002	Mechanical Room	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
4-002	Mechanical Room	Walls	Masonry	N/A	N/A	N/A	N/A	N/A	
4-002	Mechanical Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	Open to metal above
PARKING GARAGE									
P-000	Exterior	Roof	Not Found	N/A	N/A	N/A	N/A	N/A	
P-000	Exterior	Windows	Not Found	N/A	N/A	N/A	N/A	N/A	
P-000	Exterior	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
P-001	Parking Lower Level	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
P-001	Parking Lower Level	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
P-001	Parking Lower Level	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
P-001	Parking Lower Level	Pipe	Uninsulated	N/A	N/A	N/A	N/A	N/A	
P-001	Parking Lower Level	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
P-002	Mechanical Room	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
P-002	Mechanical Room	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
P-002	Mechanical Room	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	
P-002	Mechanical Room	Pipe	Fibreglass	N/A	N/A	N/A	N/A	N/A	
P-003	Parking Upper Level	Floor	Concrete	N/A	N/A	N/A	N/A	N/A	
P-003	Parking Upper Level	Walls	Concrete	N/A	N/A	N/A	N/A	N/A	
P-003	Parking Upper Level	Ceiling	Not Found	N/A	N/A	N/A	N/A	N/A	

**APPENDIX II-A**

**Asbestos Analytical Certificates (No Information to Report)**

**APPENDIX II-B**

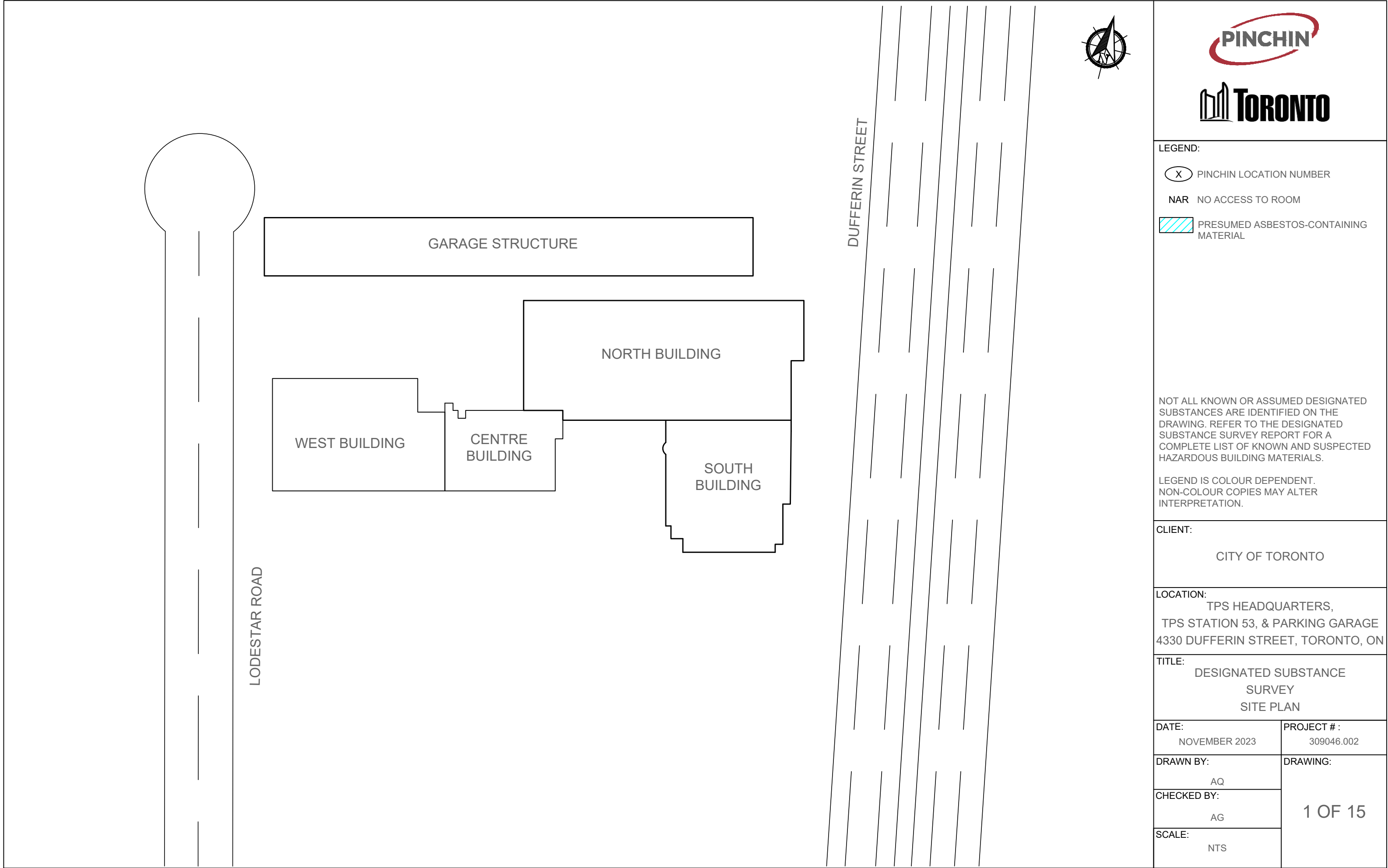
**Lead Analytical Certificates (No Information to Report)**



**APPENDIX II-C**

**PCB Analytical Certificates (No Information to Report)**

**APPENDIX III**  
**Drawings**





LEGEND:

(X) PINCHIN LOCATION NUMBER

NAR NO ACCESS TO ROOM

 PRESUMED ASBESTOS-CONTAINING MATERIAL

NOT ALL KNOWN OR ASSUMED DESIGNATED SUBSTANCES ARE IDENTIFIED ON THE DRAWING. REFER TO THE DESIGNATED SUBSTANCE SURVEY REPORT FOR A COMPLETE LIST OF KNOWN AND SUSPECTED HAZARDOUS BUILDING MATERIALS.

LEGEND IS COLOUR DEPENDENT.  
NON-COLOUR COPIES MAY ALTER INTERPRETATION.

CLIENT:

CITY OF TORONTO

LOCATION:

TPS HEADQUARTERS,  
TPS STATION 53, & PARKING GARAGE  
4330 DUFFERIN STREET, TORONTO, ON

TITLE:

DESIGNATED SUBSTANCE  
SURVEY  
WEST BUILDING - GROUND FLOOR

DATE:

NOVEMBER 2023

PROJECT # :

309046.002

DRAWN BY:

AQ

CHECKED BY:

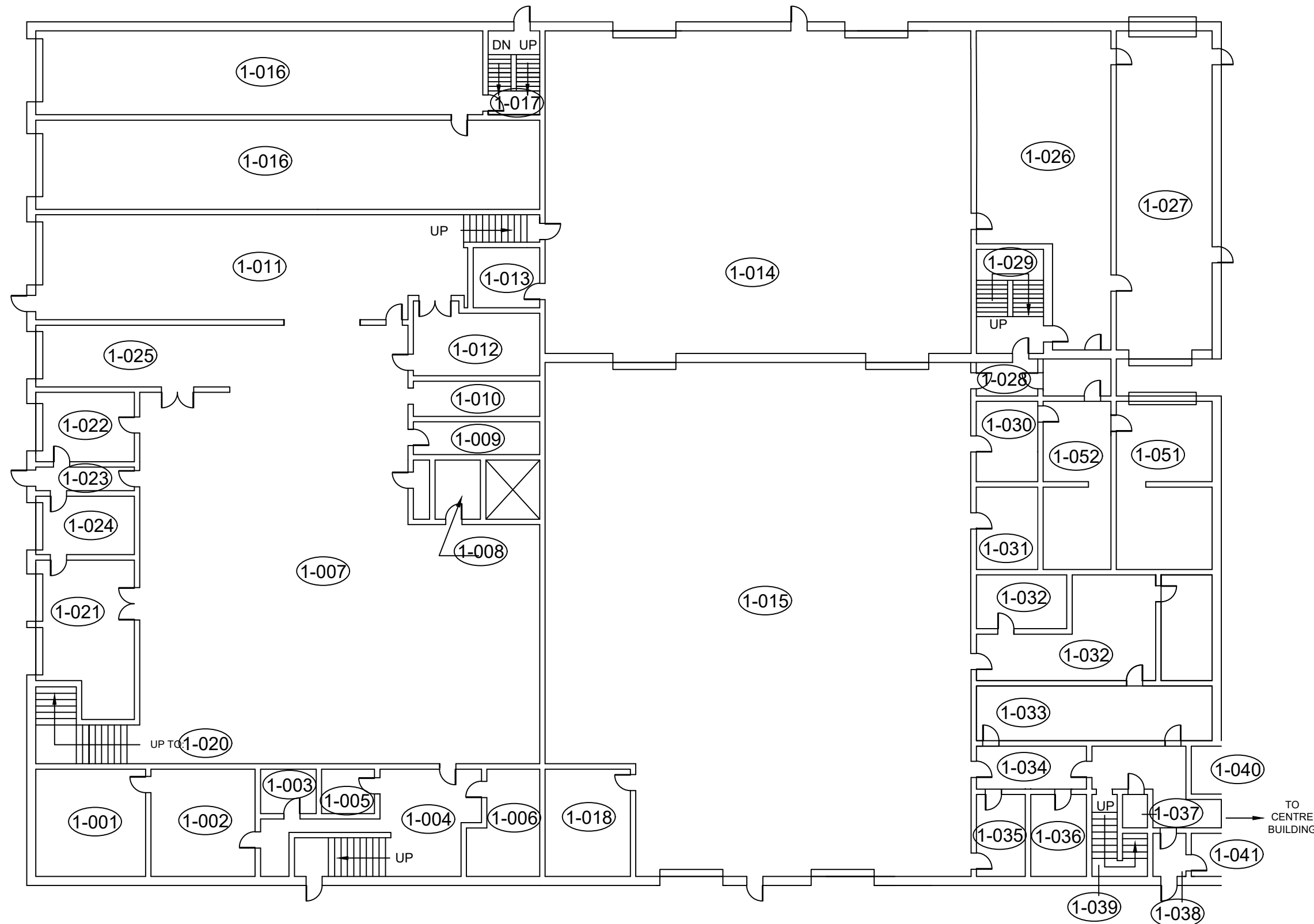
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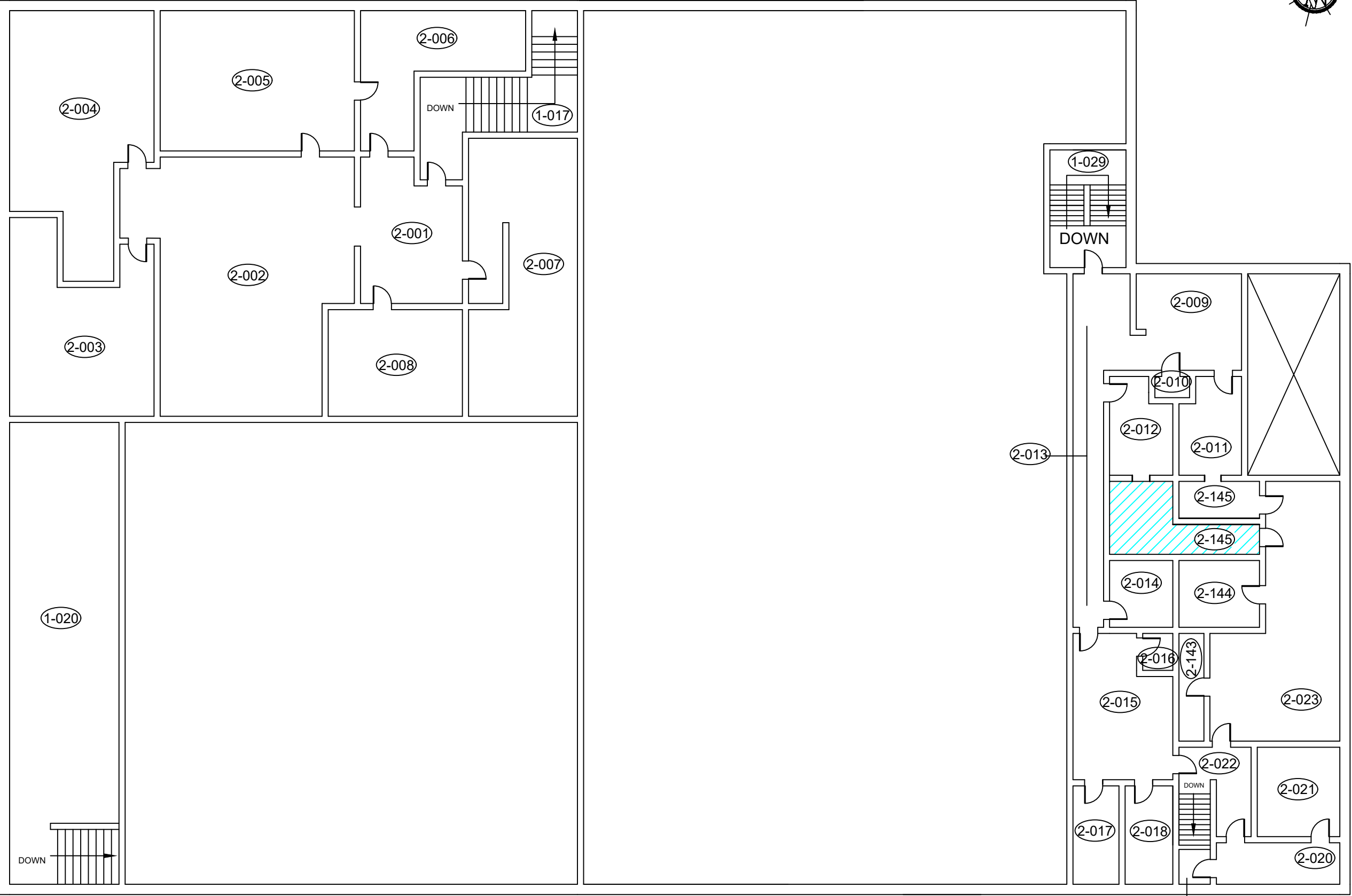
SCALE:


NTS

DRAWING:

2 OF 15





- LEGEND:
- (X) PINCHIN LOCATION NUMBER
  - NAR NO ACCESS TO ROOM
  -  PRESUMED ASBESTOS-CONTAINING MATERIAL

NOT ALL KNOWN OR ASSUMED DESIGNATED SUBSTANCES ARE IDENTIFIED ON THE DRAWING. REFER TO THE DESIGNATED SUBSTANCE SURVEY REPORT FOR A COMPLETE LIST OF KNOWN AND SUSPECTED HAZARDOUS BUILDING MATERIALS.

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CLIENT:

CITY OF TORONTO

LOCATION:

TPS HEADQUARTERS,  
TPS STATION 53, & PARKING GARAGE  
4330 DUFFERIN STREET, TORONTO, ON

TITLE:

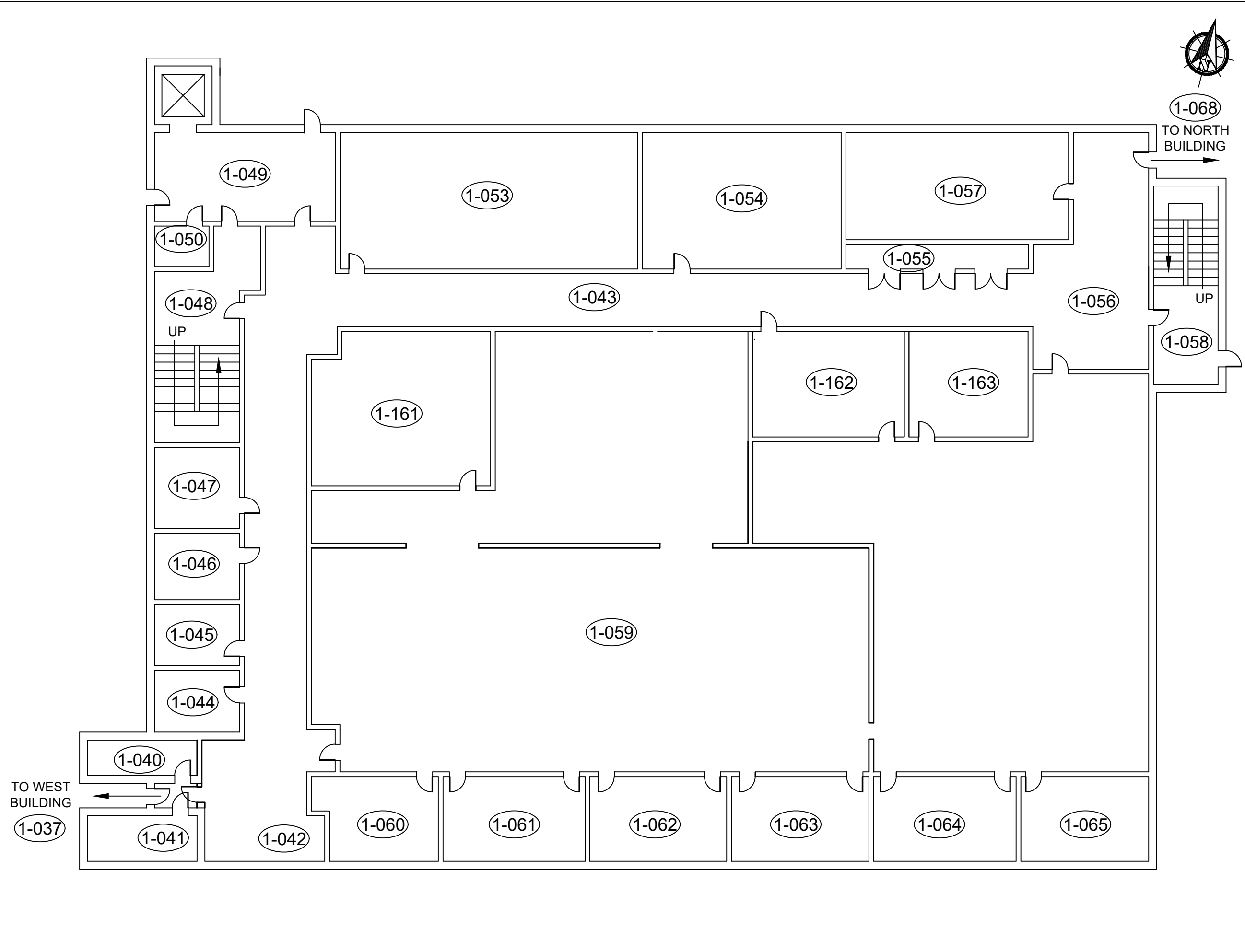
DESIGNATED SUBSTANCE  
SURVEY  
WEST BUILDING - 2ND FLOOR


DATE:	PROJECT # :
NOVEMBER 2023	309046.002

DRAWN BY:	DRAWING:
CHECKED BY:	
SCALE:	

3 OF 15
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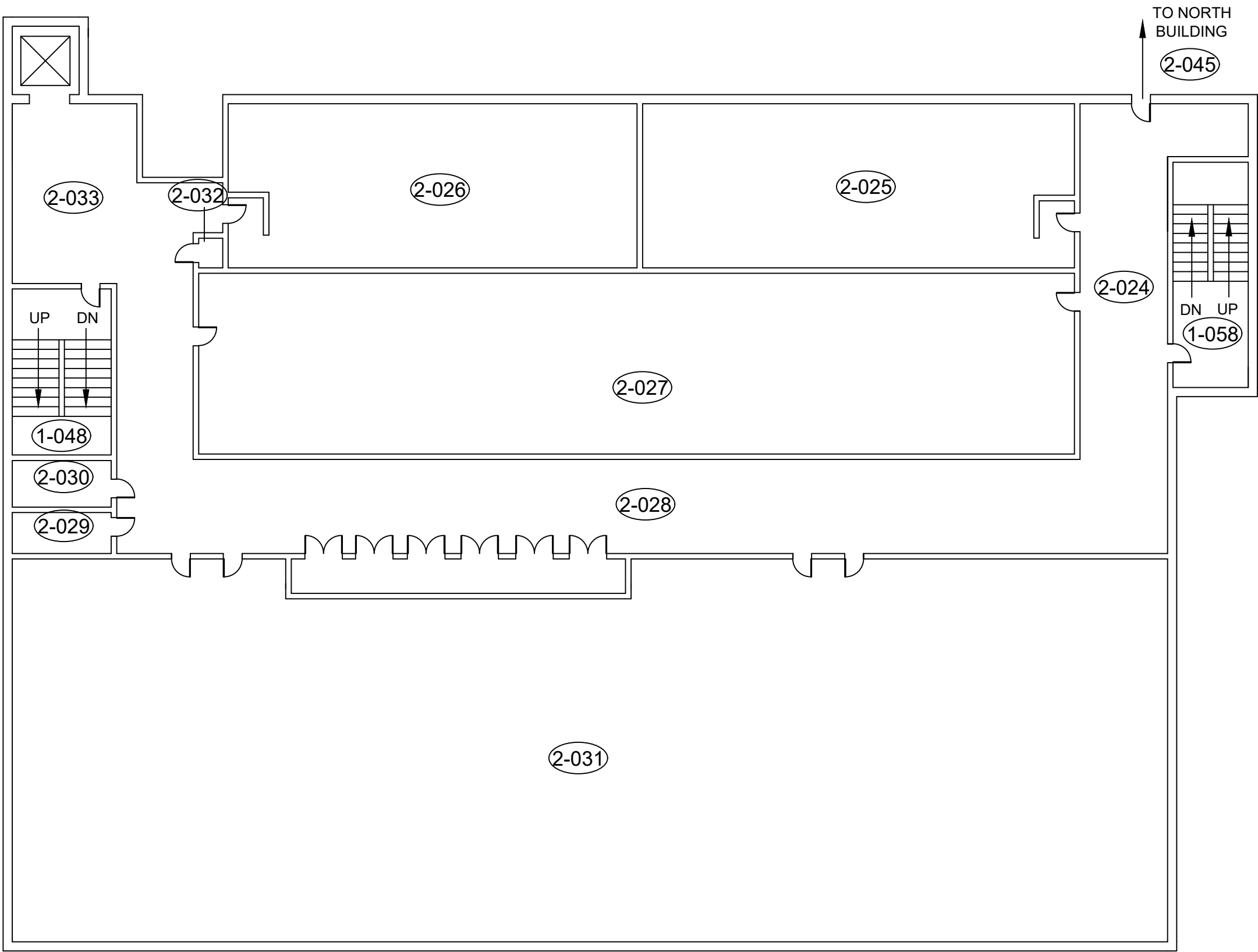


- LEGEND:
- (X) PINCHIN LOCATION NUMBER
  - NAR NO ACCESS TO ROOM
  -  PRESUMED ASBESTOS-CONTAINING MATERIAL

NOT ALL KNOWN OR ASSUMED DESIGNATED SUBSTANCES ARE IDENTIFIED ON THE DRAWING. REFER TO THE DESIGNATED SUBSTANCE SURVEY REPORT FOR A COMPLETE LIST OF KNOWN AND SUSPECTED HAZARDOUS BUILDING MATERIALS.

LEGEND IS COLOUR DEPENDENT. NON-COLOUR COPIES MAY ALTER INTERPRETATION.


CLIENT:  CITY OF TORONTO	
LOCATION: TPS HEADQUARTERS, TPS STATION 53, & PARKING GARAGE 4330 DUFFERIN STREET, TORONTO, ON	
TITLE: DESIGNATED SUBSTANCE SURVEY CENTRE BUILDING - GROUND FLOOR	
DATE: NOVEMBER 2023	PROJECT # : 309046.002
DRAWN BY: AQ	DRAWING:  4 OF 15
CHECKED BY: AG	
SCALE: NTS	



LEGEND:

(X) PINCHIN LOCATION NUMBER

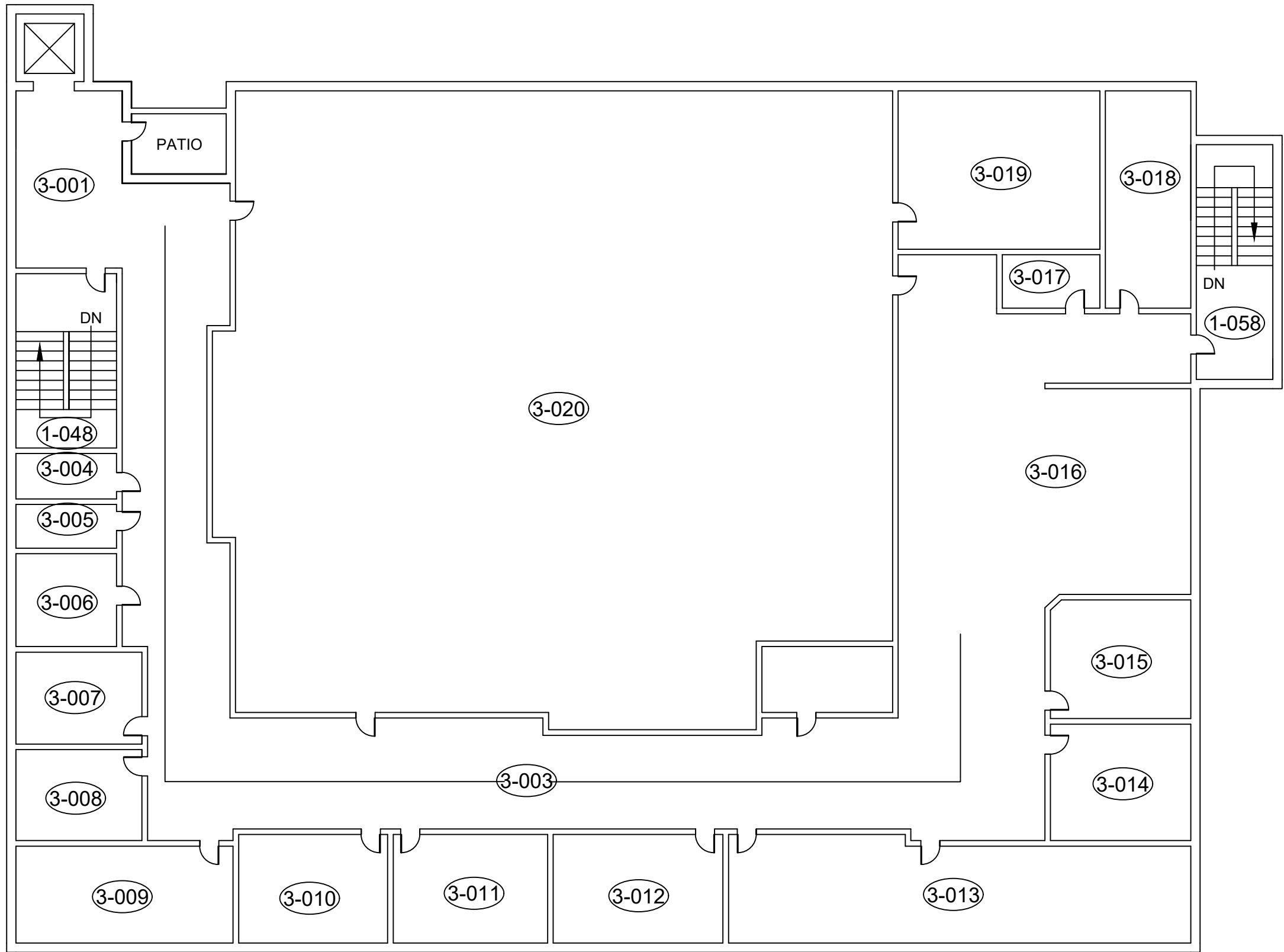
NAR NO ACCESS TO ROOM

 PRESUMED ASBESTOS-CONTAINING MATERIAL

NOT ALL KNOWN OR ASSUMED DESIGNATED SUBSTANCES ARE IDENTIFIED ON THE DRAWING. REFER TO THE DESIGNATED SUBSTANCE SURVEY REPORT FOR A COMPLETE LIST OF KNOWN AND SUSPECTED HAZARDOUS BUILDING MATERIALS.

LEGEND IS COLOUR DEPENDENT. NON-COLOUR COPIES MAY ALTER INTERPRETATION.


CLIENT:	
CITY OF TORONTO	
LOCATION:	
TPS HEADQUARTERS, TPS STATION 53, & PARKING GARAGE 4330 DUFFERIN STREET, TORONTO, ON	
TITLE:	
DESIGNATED SUBSTANCE SURVEY CENTRE BUILDING - 2ND FLOOR	
DATE:	PROJECT # :
NOVEMBER 2023	309046.002
DRAWN BY:	DRAWING:
AQ	
CHECKED BY:	
AG	5 OF 15
SCALE:	
NTS	



LEGEND:

(X) PINCHIN LOCATION NUMBER

NAR NO ACCESS TO ROOM

 PRESUMED ASBESTOS-CONTAINING MATERIAL

NOT ALL KNOWN OR ASSUMED DESIGNATED SUBSTANCES ARE IDENTIFIED ON THE DRAWING. REFER TO THE DESIGNATED SUBSTANCE SURVEY REPORT FOR A COMPLETE LIST OF KNOWN AND SUSPECTED HAZARDOUS BUILDING MATERIALS.

LEGEND IS COLOUR DEPENDENT. NON-COLOUR COPIES MAY ALTER INTERPRETATION.


CLIENT:	
CITY OF TORONTO	
LOCATION:	
TPS HEADQUARTERS, TPS STATION 53, & PARKING GARAGE 4330 DUFFERIN STREET, TORONTO, ON	
TITLE:	
DESIGNATED SUBSTANCE SURVEY CENTRE BUILDING - 3RD FLOOR	
DATE:	PROJECT # :
NOVEMBER 2023	309046.002
DRAWN BY:	DRAWING:
AQ	
CHECKED BY:	
AG	6 OF 15
SCALE:	
NTS	



LEGEND:

(X) PINCHIN LOCATION NUMBER

NAR NO ACCESS TO ROOM

 PRESUMED ASBESTOS-CONTAINING MATERIAL

NOT ALL KNOWN OR ASSUMED DESIGNATED SUBSTANCES ARE IDENTIFIED ON THE DRAWING. REFER TO THE DESIGNATED SUBSTANCE SURVEY REPORT FOR A COMPLETE LIST OF KNOWN AND SUSPECTED HAZARDOUS BUILDING MATERIALS.

LEGEND IS COLOUR DEPENDENT.  
NON-COLOUR COPIES MAY ALTER INTERPRETATION.

CLIENT:

CITY OF TORONTO

LOCATION:

TPS HEADQUARTERS,  
TPS STATION 53, & PARKING GARAGE  
4330 DUFFERIN STREET, TORONTO, ON

TITLE:

DESIGNATED SUBSTANCE  
SURVEY  
NORTH BUILDING - GROUND FLOOR

DATE:

NOVEMBER 2023

PROJECT # :

309046.002

DRAWN BY:

AQ

CHECKED BY:

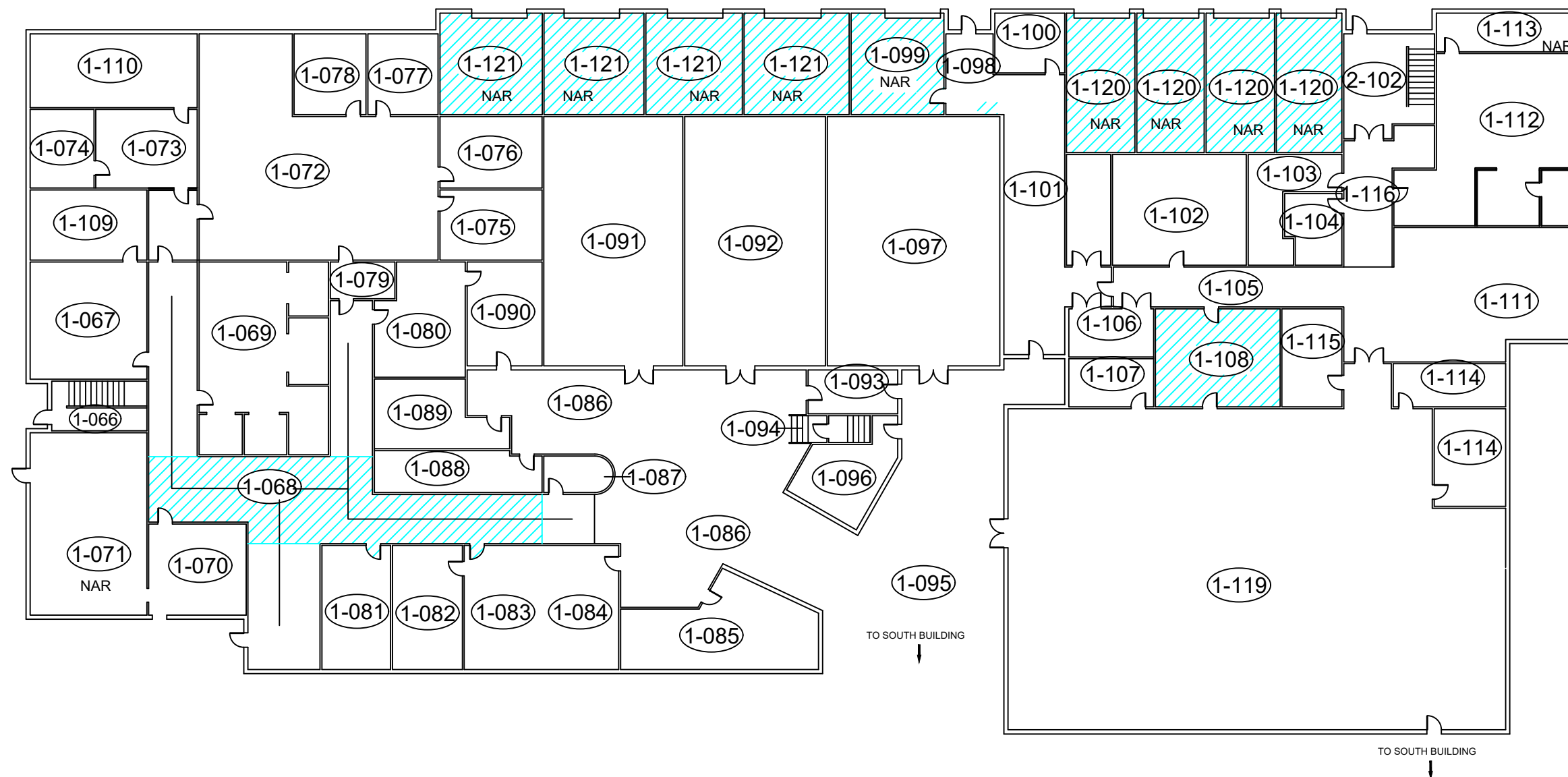
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SCALE:

NTS

DRAWING:

7 OF 15






LEGEND:

(X) PINCHIN LOCATION NUMBER

NAR NO ACCESS TO ROOM

 PRESUMED ASBESTOS-CONTAINING MATERIAL

NOT ALL KNOWN OR ASSUMED DESIGNATED SUBSTANCES ARE IDENTIFIED ON THE DRAWING. REFER TO THE DESIGNATED SUBSTANCE SURVEY REPORT FOR A COMPLETE LIST OF KNOWN AND SUSPECTED HAZARDOUS BUILDING MATERIALS.

LEGEND IS COLOUR DEPENDENT.  
NON-COLOUR COPIES MAY ALTER INTERPRETATION.

CLIENT:

CITY OF TORONTO

LOCATION:

TPS HEADQUARTERS,  
TPS STATION 53, & PARKING GARAGE  
4330 DUFFERIN STREET, TORONTO, ON

TITLE:

DESIGNATED SUBSTANCE  
SURVEY  
NORTH BUILDING - 2ND FLOOR

DATE:

NOVEMBER 2023

PROJECT # :

309046.002

DRAWN BY:

AQ

CHECKED BY:

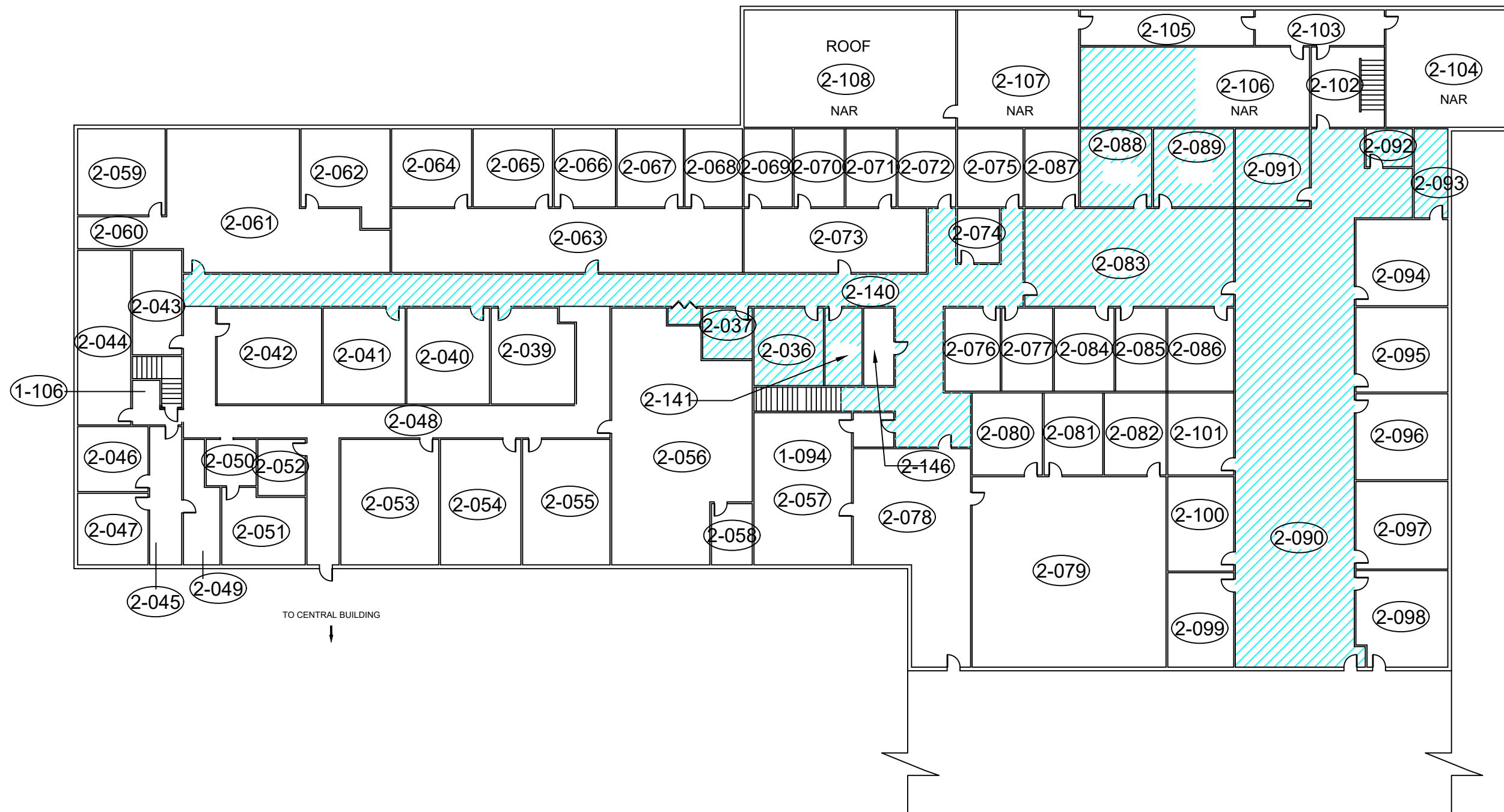
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SCALE:

NTS

DRAWING:

8 OF 15








LEGEND:

X PINCHIN LOCATION NUMBER

NAR NO ACCESS TO ROOM

 PRESUMED ASBESTOS-CONTAINING MATERIAL

NOT ALL KNOWN OR ASSUMED DESIGNATED  
SUBSTANCES ARE IDENTIFIED ON THE  
DRAWING. REFER TO THE DESIGNATED  
SUBSTANCE SURVEY REPORT FOR A  
COMPLETE LIST OF KNOWN AND SUSPECTED  
HAZARDOUS BUILDING MATERIALS.

LEGEND IS COLOUR DEPENDENT.  
NON-COLOUR COPIES MAY ALTER  
INTERPRETATION.

CLIENT:

CITY OF TORONTO

LOCATION:  
TPS HEADQUARTERS,  
TPS STATION 53, & PARKING GARAGE  
4330 DUFFERIN STREET, TORONTO, ON

TITLE: DESIGNATED SUBSTANCE  
SURVEY  
SOUTH BUILDING - BASEMENT

DATE: NOVEMBER 2023

PROJECT #:	309046.002
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DRAWN BY: AQ

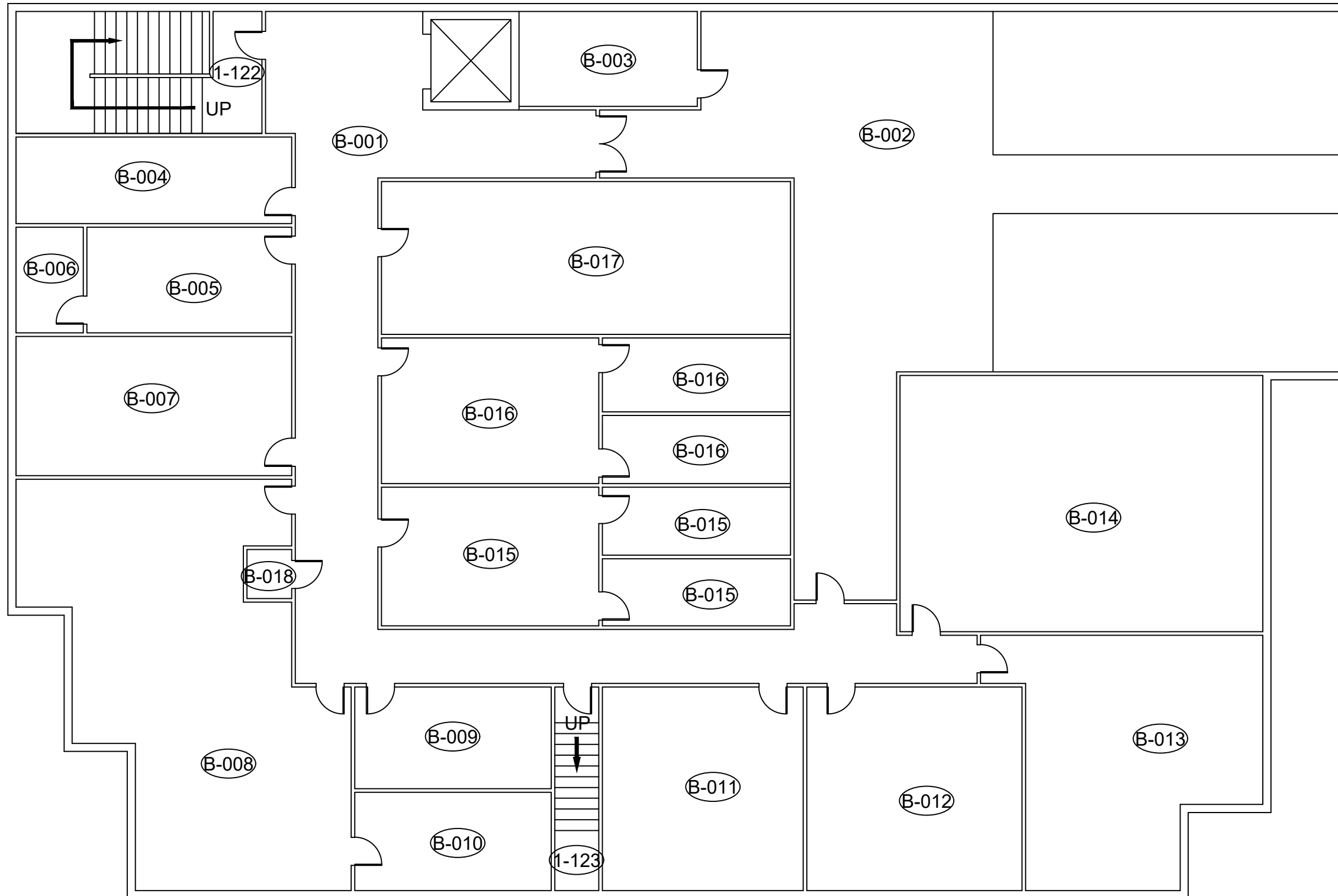
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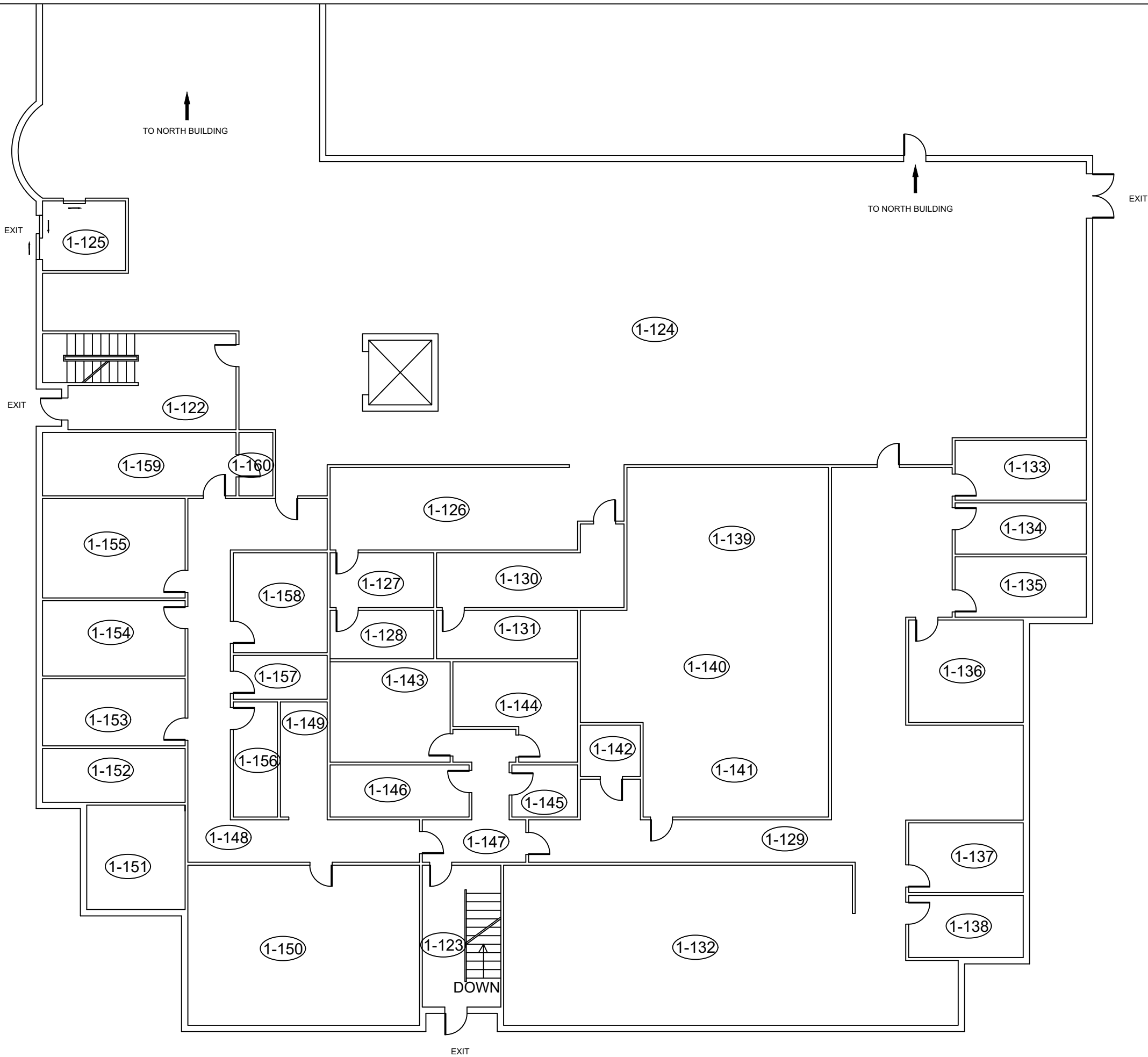
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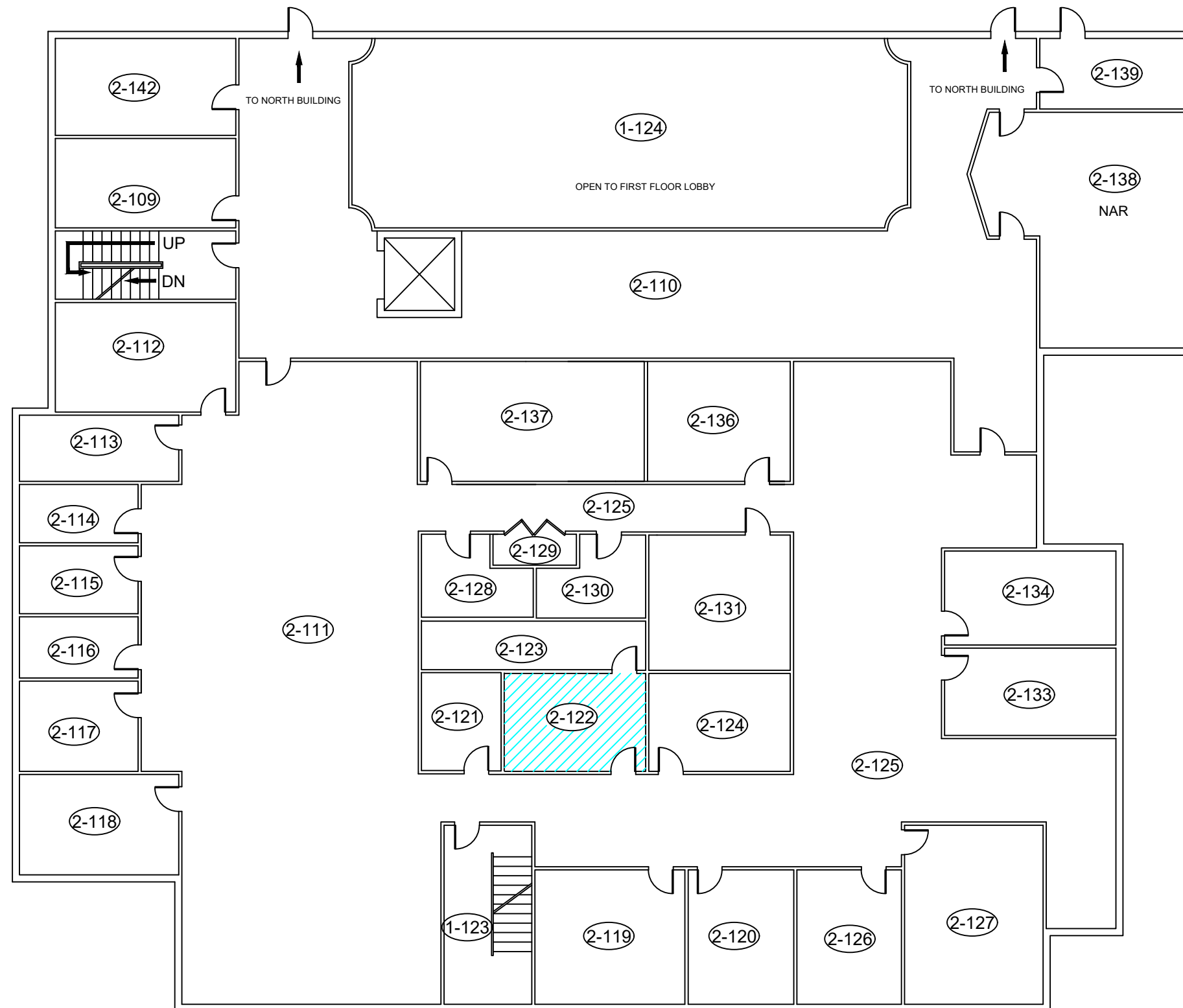
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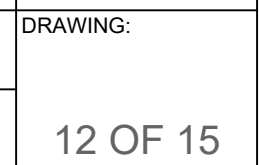


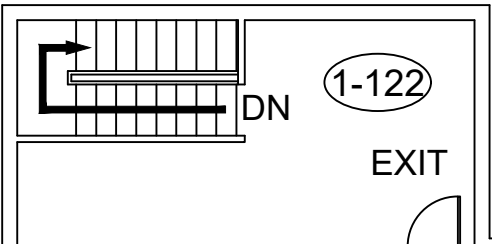


LEGEND:	
<div><div>X</div> PINCHIN LOCATION NUMBER</div>	
<div>NAR NO ACCESS TO ROOM</div>	
<div><div></div> PRESUMED ASBESTOS-CONTAINING MATERIAL</div>	
NOT ALL KNOWN OR ASSUMED DESIGNATED SUBSTANCES ARE IDENTIFIED ON THE DRAWING. REFER TO THE DESIGNATED SUBSTANCE SURVEY REPORT FOR A COMPLETE LIST OF KNOWN AND SUSPECTED HAZARDOUS BUILDING MATERIALS.	
LEGEND IS COLOUR DEPENDENT. NON-COLOUR COPIES MAY ALTER INTERPRETATION.	
CLIENT:	
CITY OF TORONTO	
LOCATION:	
TPS HEADQUARTERS, TPS STATION 53, & PARKING GARAGE 4330 DUFFERIN STREET, TORONTO, ON	
TITLE:	
DESIGNATED SUBSTANCE SURVEY SOUTH BUILDING - GROUND FLOOR	
DATE:	PROJECT # :
NOVEMBER 2023	309046.002
DRAWN BY:	DRAWING:
AQ	
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AG	10 OF 15
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LEGEND:	
<div><div>X</div>PINCHIN LOCATION NUMBER</div>	
NAR NO ACCESS TO ROOM	
<div><div></div>PRESUMED ASBESTOS-CONTAINING MATERIAL</div>	
NOT ALL KNOWN OR ASSUMED DESIGNATED SUBSTANCES ARE IDENTIFIED ON THE DRAWING. REFER TO THE DESIGNATED SUBSTANCE SURVEY REPORT FOR A COMPLETE LIST OF KNOWN AND SUSPECTED HAZARDOUS BUILDING MATERIALS.	
LEGEND IS COLOUR DEPENDENT. NON-COLOUR COPIES MAY ALTER INTERPRETATION.	
CLIENT:	
CITY OF TORONTO	
LOCATION:	
TPS HEADQUARTERS, TPS STATION 53, & PARKING GARAGE 4330 DUFFERIN STREET, TORONTO, ON	
TITLE:	
DESIGNATED SUBSTANCE SURVEY SOUTH BUILDING - 2ND FLOOR	
DATE:	PROJECT # :
NOVEMBER 2023	309046.002
DRAWN BY:	DRAWING:
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AG	11 OF 15
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- LEGEND:
- PINCHIN LOCATION NUMBER
  - NAR NO ACCESS TO ROOM
  - PRESUMED ASBESTOS-CONTAINING MATERIAL

NOT ALL KNOWN OR ASSUMED DESIGNATED SUBSTANCES ARE IDENTIFIED ON THE DRAWING. REFER TO THE DESIGNATED SUBSTANCE SURVEY REPORT FOR A COMPLETE LIST OF KNOWN AND SUSPECTED HAZARDOUS BUILDING MATERIALS.

LEGEND IS COLOUR DEPENDENT. NON-COLOUR COPIES MAY ALTER INTERPRETATION.

CLIENT:

CITY OF TORONTO

LOCATION:

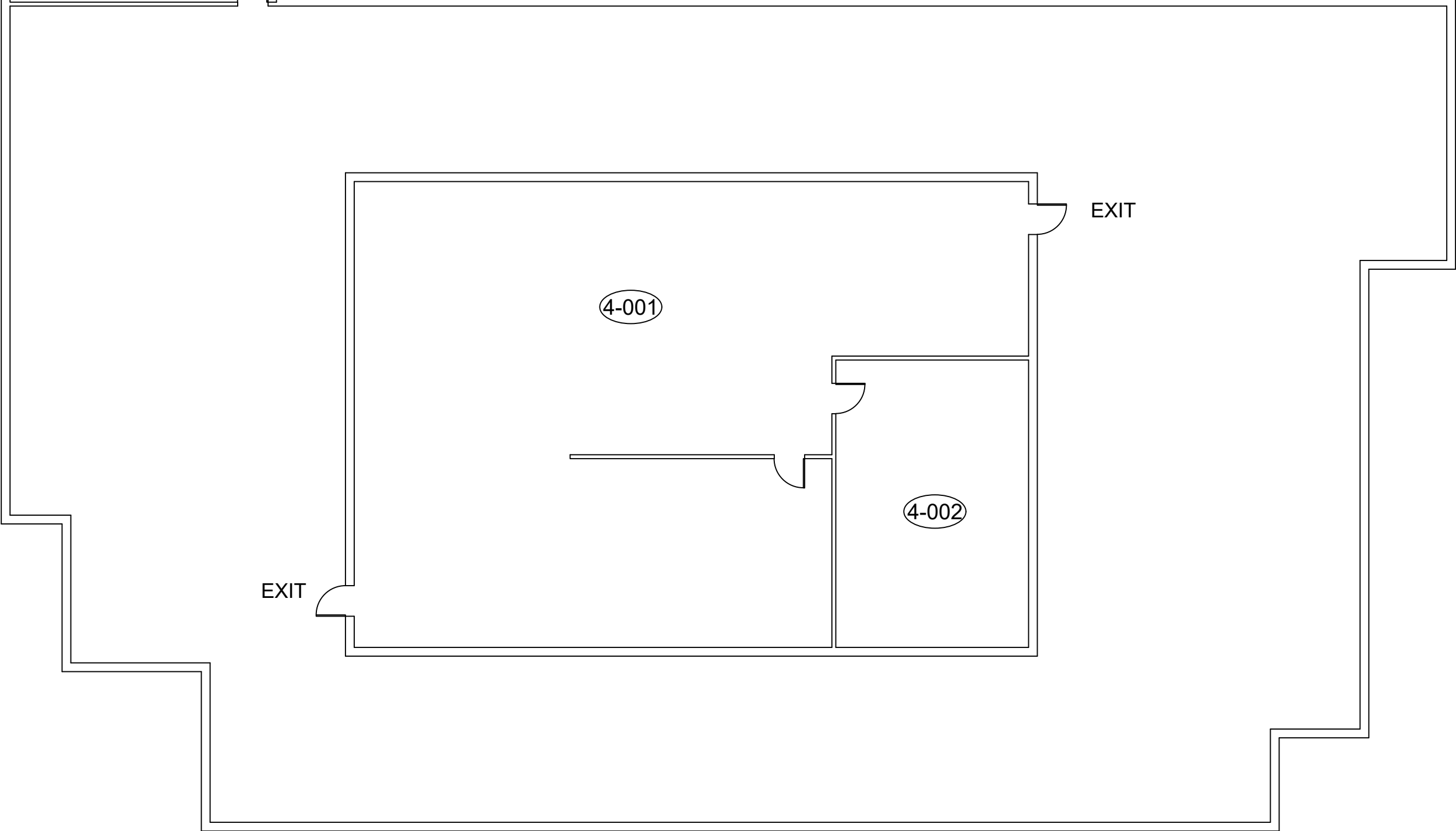
TPS HEADQUARTERS,  
TPS STATION 53, & PARKING GARAGE  
4330 DUFFERIN STREET, TORONTO, ON

TITLE:

DESIGNATED SUBSTANCE  
SURVEY  
SOUTH BUILDING - PENTHOUSE



DATE: NOVEMBER 2023	PROJECT # : 309046.002
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DRAWN BY: AQ	DRAWING:  13 OF 15
CHECKED BY: AG	
SCALE: NTS	





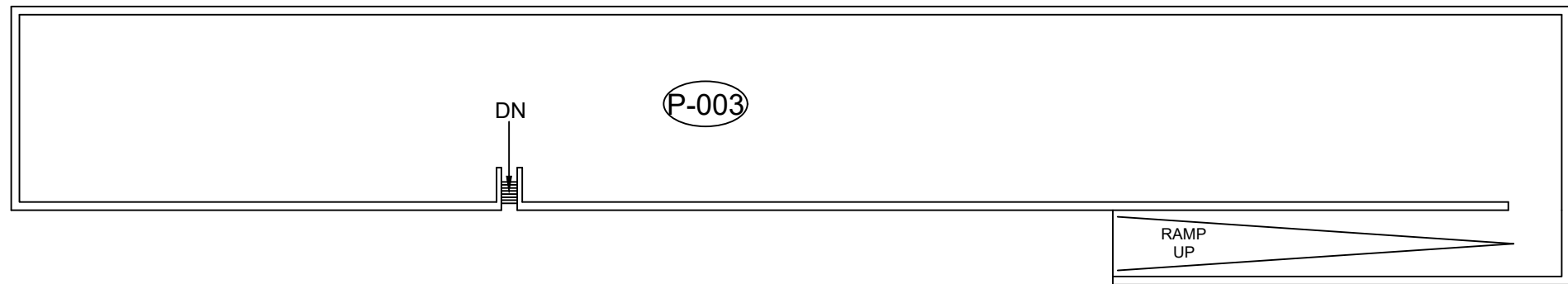


- LEGEND:
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  -  PRESUMED ASBESTOS-CONTAINING MATERIAL



NOT ALL KNOWN OR ASSUMED DESIGNATED SUBSTANCES ARE IDENTIFIED ON THE DRAWING. REFER TO THE DESIGNATED SUBSTANCE SURVEY REPORT FOR A COMPLETE LIST OF KNOWN AND SUSPECTED HAZARDOUS BUILDING MATERIALS.

LEGEND IS COLOUR DEPENDENT. NON-COLOUR COPIES MAY ALTER INTERPRETATION.

CLIENT:		CITY OF TORONTO
LOCATION: TPS HEADQUARTERS, TPS STATION 53, & PARKING GARAGE 4330 DUFFERIN STREET, TORONTO, ON		
TITLE: DESIGNATED SUBSTANCE SURVEY PARKING STRUCTURE - UPPER LEVEL		
DATE: NOVEMBER 2023	PROJECT # : 309046.002	
DRAWN BY: AQ	14 OF 15	
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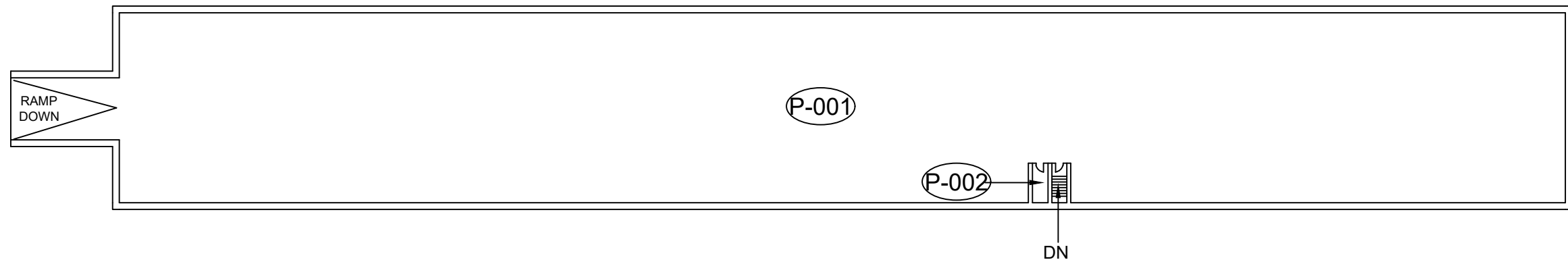


- LEGEND:
-  PINCHIN LOCATION NUMBER
  - NAR NO ACCESS TO ROOM
  -  PRESUMED ASBESTOS-CONTAINING MATERIAL

NOT ALL KNOWN OR ASSUMED DESIGNATED SUBSTANCES ARE IDENTIFIED ON THE DRAWING. REFER TO THE DESIGNATED SUBSTANCE SURVEY REPORT FOR A COMPLETE LIST OF KNOWN AND SUSPECTED HAZARDOUS BUILDING MATERIALS.

LEGEND IS COLOUR DEPENDENT. NON-COLOUR COPIES MAY ALTER INTERPRETATION.

CLIENT:  CITY OF TORONTO	
LOCATION: TPS HEADQUARTERS, TPS STATION 53, & PARKING GARAGE 4330 DUFFERIN STREET, TORONTO, ON	
TITLE: DESIGNATED SUBSTANCE SURVEY PARKING STRUCTURE - LOWER LEVEL	
DATE: NOVEMBER 2023	PROJECT # : 309046.002
DRAWN BY: AQ	DRAWING:  15 OF 15
CHECKED BY: AG	
SCALE: NTS	



**APPENDIX IV**  
**Methodology**



## 1.0 GENERAL

The following survey methodology is based on the requirements of the *Standard Operation Procedure for Designated Substance Surveys*, dated April, 2014, provided by the City of Toronto (the "SOP").

Pinchin conducted a room-by-room survey (rooms, corridors, service areas, exterior, etc.) to identify the hazardous building materials as defined in Section 1.1. Information regarding the approximate quantity, location, and condition of hazardous building materials encountered and visually estimated quantities were recorded on the *Survey Form*, provided by the City of Toronto, found in Appendix IV. The locations of any samples collected were recorded on small-scale plans, found in Appendix I.

Drawings (i.e., floor plans), previous reports, and Survey Forms, were referenced where provided.

### 1.1 Limitations on Scope

The survey excludes the following:

- Owner or occupant articles (e.g. stored items, furniture, appliances, etc.);
- Underground materials or equipment (e.g. vessels, drums, underground storage tanks, pipes, etc.);
- Building envelope, structural components, inaccessible or concealed materials or other items where sampling may cause consequential damage to the property.
- Energized systems (e.g. internal boiler components, elevators, mechanical or electrical components);
- Controlled products (e.g. stored chemicals, operational or process-related substances); and
- Materials not typically associated with construction (e.g. settled dust, spills, residual contamination from prior spills, etc.).

The survey was limited to non-intrusive testing. Concealed spaces such as those above solid ceilings and within shafts and pipe chases were accessed via existing access panels only. Pinchin did not conduct demolition of walls, solid ceilings, structural items, interior finishes or exterior building finishes, to determine the presence of concealed materials.

### 1.2 Asbestos

Pinchin conducted an inspection for the presence of friable and non-friable asbestos-containing materials (ACM). A friable material is a material that when dry can be crumbled, pulverized or powdered by hand pressure.

Pinchin collected samples at a rate that is in compliance with Table 1 of O.Reg. 278/05. A separate set of samples was collected of each of homogenous material sampled. A homogenous material is defined by the US EPA<sup>1</sup> as material that is uniform in texture and appearance, was installed at one time, and is unlikely to consist of more than one type or formulation of material. The homogeneous materials are determined by visual examination, available information on the phases of the construction and prior renovations.

The following materials were sampled:

- All friable materials historically known to contain asbestos, regardless of year of installation, not identified in previous reports;
- Friable materials previously sampled in insufficient quantity to conclude the materials are non-asbestos, in accordance with the requirements of O.Reg. 278/05;
- Friable materials previously reported to contain less than 1% asbestos, if sampled prior to the Ministry of Labour defining an asbestos-containing material as a material containing contains 0.5 percent or more asbestos by weight;
- Non-friable acoustic ceiling tiles;
- Non-friable vinyl floor tiles and mastic.

The following materials were **not** sampled:

- Materials previously identified in previous reports provided as asbestos-containing;
- Materials previously confirmed to be non-asbestos in accordance with O.Reg. 278/05;
- Unless damaged the following materials were not sampled: plaster, drywall joint compound, mastic, window caulking, roofing materials, vinyl sheet flooring. Materials not sampled are assumed to contain asbestos.
- Materials where sampling poses an inherent, imminent danger to the Assessor such as high voltage wiring, materials present at heights greater than 12 feet, or those in confined spaces. These materials are assumed to be asbestos-containing.

In some cases, manufactured products such as asbestos cement pipe are visually identified without sample confirmation.

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<sup>1</sup> Environmental Protection Agency





Pinchin submits the bulk samples to a NVLAP<sup>2</sup> accredited laboratory for analysis. The analysis is performed in accordance with Test Method EPA/600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials, July 1993.

The asbestos analysis is completed using a stop positive approach. Only one result of greater than the regulated criteria (0.5%) is required to determine that a material is asbestos-containing, but all samples must be analyzed to conclusively determine that a material is non-asbestos. The laboratory stops analyzing samples from a homogeneous material once a result greater than the regulated criteria is detected in any of the samples of that material. All samples of a homogeneous material are analyzed if no asbestos is detected. In some cases, all samples are analyzed in the sample set regardless of result. Where building materials are described in the report as non-asbestos, or described as containing no asbestos, this is subject to the limitations of the analytical method used, and should be understood to mean no asbestos was detected.

Asbestos materials are evaluated in order to make recommendations regarding remedial work. The priority for remedial action is based on several factors:

- Friability (friable or non-friable).
- Condition (good, fair, poor, debris, based on definitions in the SOP).
- Accessibility (ranking from accessible to all building users to inaccessible).
- Visibility (whether the material is obscured by other building components).
- Efficiency of the work (for example, if damaged ACM is being removed in an area, it may be most practical to remove all ACM in the area even if it is in good condition).

This includes friability, condition and efficiency and practicality of the work.

### 1.3 Lead

Pinchin collected samples of damaged paint not identified in a previous report. Drawings included show sample locations.

Analysis for lead in paints or surface coatings is performed in accordance with EPA Method No. 3050B/Method No. 7420; flame atomic absorption at an accredited laboratory.

For this report, all paints containing lead at a concentration 0.1% or greater are discussed. Paint was evaluated for condition.

Lead building products (e.g. batteries, lead sheeting, flashing) are identified by visual observation only.

---

<sup>2</sup> National Voluntary Laboratory Accreditation Program

#### **1.4 Silica**

Pinchin identifies building materials suspected of containing crystalline silica (e.g. concrete, cement, tile, brick, masonry, mortar) by knowledge of current and historic applications and visual inspection only.

Pinchin does not perform sampling of these materials for laboratory analysis of crystalline silica content.

#### **1.5 Mercury**

Building materials/products/equipment (e.g. thermostats, barometers, pressure gauges, light tubes), suspected to contain mercury were identified by visual inspection only. Dismantling of equipment suspected of containing mercury was not performed. Sampling of these materials for laboratory analysis of mercury content was not performed.

Mercury spills or damaged mercury-containing equipment was recorded where observed.

#### **1.6 Polychlorinated Biphenyls**

Pinchin determines the potential for light ballast and wet transformers to contain PCBs based on the age of the building, a review of maintenance records and examination of labels or nameplates on equipment, where present and accessible. The information is compared to known ban dates of PCBs and Environment Canada publications.

Dry type transformers are assumed to be free of dielectric fluids and hence non-PCB.

Pinchin records spills or leakage of suspect PCB-containing fluids where observed.

Fluids (mineral oil, hydraulic or Askaral) in transformers or other equipment are not sampled for PCB content.

Non-liquid forms of PCBs (i.e. sealants or caulking) are not sampled for PCB content.

#### **1.7 Visible Mould**

Pinchin identifies the presence of mould if visibly present in a significant quantity on exposed building surfaces. If any mould growth is concealed within wall cavities it is not addressed in this survey.

## **APPENDIX V**

### **Corrective Action Inspection Report (No Information to Report)**

# **DESIGNATED SUBSTANCES AND HAZARDOUS BUILDING MATERIALS ASSESSMENT REPORT**

**Interior Alterations Project  
Rooms 1-108, 1-114 and 1-115  
Toronto Emergency Headquarters  
4330 Dufferin Street  
Toronto, Ontario**

***Prepared for:*  
Dean Hanley, PMP  
Project Manager/ Estimator**

**South Central Inc.  
5 Carson Street  
Etobicoke, Ontario**

***Prepared by:*  
Safetech Environmental Limited**

A handwritten signature in black ink, appearing to read 'Amit Kaul'.

**Amit Kaul, B.Eng., EIT, WRT  
Occupational Hygiene Technician**

***Reviewed by:***

A handwritten signature in black ink, appearing to read 'John Mazzulli'.

**John Mazzulli, B.A.  
Project Coordinator**

**Safetech Project Number: 1-3230898**

**Date of Site Work: November 3, 2023  
Date of Issue: November 15, 2023**

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## EXECUTIVE SUMMARY

Safetech Environmental Limited (Safetech) was commissioned by South Central Inc. to conduct a designated substances and hazardous materials assessment in Rooms 1-108, 1-114 and 1-115 of 4330 Dufferin Street, Toronto, Ontario.

The objective of the assessment was to determine the presence, location, condition and quantities of designated substances and other hazardous materials that have the potential to be disturbed as part of planned construction activities (i.e. Interior Alterations Project) so that appropriate control measures can be implemented to protect workers during the work.

A summary of the assessment results and general recommendations based on our findings are provided in the following table. This table should be considered a summary only. Please refer to the Results (Section 2.0), Conclusions and Recommendations (Section 3.0), Summary of ACM Occurrences (Appendix A) and Site Drawings (Appendix B) of our report for additional details.

**Table 1: Summary of Hazardous Materials and Designated Substances**

Designated Substance	Findings	Recommendations
Asbestos	No asbestos-containing materials were identified in the areas assessed that would be impacted during the project.	No action required.
Lead	<p>White paint was confirmed to be a non-lead containing paint (<math>\leq 0.0090\%</math> lead content).</p> <p>The following materials are assumed to be lead-containing:</p> <ul style="list-style-type: none"> <li>- paints and surface coatings (not sampled)</li> <li>- batteries associated with emergency lighting</li> <li>- solder in electrical components</li> </ul>	Disturbance of lead-containing materials must be conducted in accordance with the Ontario Ministry of Labour, Training and Skills Development (MLTSD) <i>Lead on Construction Projects</i> guideline (2011) and/or the Environmental Abatement Council of Canada (EACC) <i>Lead Guideline</i> (October 2014). For additional details, refer to Section 2.1.2 (Results) and Section 3.1.2 (Conclusions and Recommendations). Lead-containing wastes should be recycled if practicable or handled and disposed of according to R.R.O. 1990, Regulation 347, <i>General- Waste Management</i> .
Mercury	<p>Sources of mercury were observed in the subject area and include the following:</p> <ul style="list-style-type: none"> <li>- vapour in fluorescent lamps</li> </ul>	If required, handle lamps with care and keep intact. All waste lamps are recommended to be sent to a lamp recycling facility.

Silica	Building materials identified that are suspected to contain crystalline silica and may be disturbed as part of the planned construction project include:  - drywall walls/drywall joint compound - concrete	Any work involving the disturbance of silica-containing materials should follow the procedures outlined in the Ontario Ministry of Labour, Training and Skills Development “ <i>Silica on Construction Projects</i> ” guideline. For additional information, refer to Section 2.1.4 (Results) and Section 3.1.4 (Conclusions and Recommendations).
Other Designated Substances	No other designated substances are expected to be present in any significant quantities or in a form that would represent an exposure concern.	No protective measures or procedures specific to acrylonitrile, arsenic, benzene, coke oven emissions, ethylene oxide, isocyanates, and vinyl chloride are considered necessary.
<b>Other Hazardous Materials</b>	<b>Findings</b>	<b>Recommendations</b>
Urea Formaldehyde Foam Insulation	NoUFFI was identified or is suspected in the subject area.	No action required.
Mould Contamination	No suspect mould contamination was observed on building finishes in the subject area.	No action required.
Pest Infestation	No pest infestations were observed in the areas assessed.	No action required.
Polychlorinated Biphenyls	No equipment was observed that is suspected to contain PCBs.	No action required.
Ozone Depleting and Global Warming Substances	No equipment was observed that is suspected to contain ozone depleting and/or global warming substances	No action required.

This assessment satisfies the Owner’s requirements under Section 30 of the Ontario Occupational Health and Safety Act (OHSA), Revised Statutes of Ontario 1990, as amended.

Should you have any questions regarding the information contained in the report, please contact our office.

#### Safetech Environmental Limited



**Amit Kaul, B.Eng., EIT, WRT**  
**Occupational Hygiene Technician**



November 15, 2023

**South Central Inc.**

5 Carson Street  
Etobicoke, Ontario

**Attention: Dean Hanley, PMP**  
Project Manager/ Estimator

**RE: Designated Substances and Hazardous Materials Assessment  
Interior Alterations Project  
Toronto Emergency Headquarters – Rooms 1-108, 1-114 and 1-115  
4330 Dufferin Street, Toronto, Ontario**

---

## **1.0 INTRODUCTION**

### **1.1 Background and Objectives**

Safetech Environmental Limited (Safetech) was commissioned by South Central Inc. to conduct a designated substances and hazardous materials assessment in Rooms 1-108, 1-114 and 1-115 at 4330 Dufferin Street, Toronto, Ontario. The objective of the assessment was to determine the presence, location, condition and quantities of designated substances and other hazardous materials in the subject areas that have the potential to be disturbed as part of planned construction activities (i.e. Interior Alterations Project) so that appropriate control measures can be implemented to protect workers during the work.

This assessment satisfies the Owner's requirements under Section 30 of the Ontario Occupational Health and Safety Act (OHSA), Revised Statutes of Ontario 1990, as amended. Section 30(1) requires a building owner to determine if there are any designated substances present at a project site prior to construction or demolition activities. Sections 30(2), (3) and (4) require the Owner and constructors for a project to provide the findings in this report as part of the tendering information for any tendered project or to prospective contractors (and subcontractors) of a project before entering into a binding contract.

This report documents findings of our on-site inspection that was conducted on November 3, 2023 and provides conclusions and recommendations based on our findings and knowledge of the planned construction project.

## 1.2 Scope of Work

In accordance with our fee proposal document, our scope of work included the following activities:

- A review of existing documents, including renovation documents and drawings, floor plans and existing environmental assessment reports, etc., where available;
- A visual assessment of accessible area(s) in the subject areas to identify the presence, location, condition and quantities of designated substances and other hazardous materials;
- Collection, analysis and interpretation of representative bulk samples of suspect asbestos-containing building materials for the determination of asbestos content and material classification;
- Collection, analysis and interpretation of representative paint chip samples for the determination of lead content; and
- Preparation of a report to document findings and provide recommendations regarding control measures and/or special handling procedures for designated substances or specific hazardous materials that may be disturbed as part of planned construction activities.

Documents reviewed to aid in the assessment included the following:

- Report prepared by Pinchin Ltd. for City of Toronto, “*Designated Substance Survey Report, Toronto Emergency Headquarters, Paramedic Services Station 53 and Parking Garage, 4330 Dufferin Street, Toronto, Ontario*” dated October 23, 2020.
- Drawings CoT - 4330 Dufferin St, 1st FI - ARCH - PERMIT\_2023-08-23, CoT - 4330 Dufferin St, Grd FI - MECH ENG - PERMIT\_2023-08-21 and CoT - 4330 Dufferin St, Grd FI - ELEC ENG - PERMIT\_2023-08-21 were provided.

This assessment only identified designated substances and hazardous materials that were deemed to be part of the building or somehow otherwise incorporated into the building structure and its finishes. **The following items were not included in our scope of work:**

- Assessing occupant items such as stored products, furnishings, items and materials used or produced as part of a manufacturing process;
- Investigating underground materials or equipment (vessels, drums, underground storage tanks, duct-banks, pipes, or cables);
- Assessing enclosed wall or ceiling cavities; and
- Assessing risers, pipe chases or elevator shafts.



### 1.3 Description of Area(s) Assessed

The area(s) investigated included all accessible locations of the subject areas. The extent of the area investigated is indicated on the floor plan(s) provided in Appendix B.

Refer to the following table for a general description of the subject building.

**Table 2: Building Description**

<b>Estimated Year of Construction</b>	1990
---------------------------------------	------

## 2.0 RESULTS

Results of our visual assessment and bulk sample analytical findings are summarized in the sections below.

### 2.1 Designated Substances

#### 2.1.1 Asbestos


Results of bulk sample analysis for the determination of asbestos content are summarized in the following table. Materials have been classified as “ACM”, “Non-ACM”, “Suspected ACM” or “Presumed Non-ACM” based on analytical results. Materials classified as Suspected ACM or Presumed Non-ACM may require further analysis (depending on site-specific conditions) to verify whether the material should be classified as ACM or Non-ACM. Please refer to the Limitations section of this report (Section 4.0) for additional details. The Laboratory Certificate of Analysis is included in Appendix C.

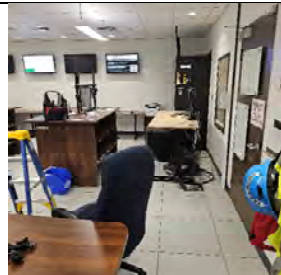

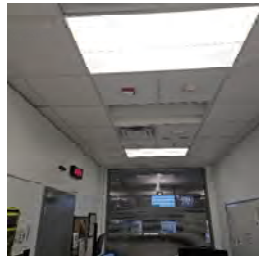
**Table 3: Bulk Sample Analytical Results for Determination of Asbestos Content**

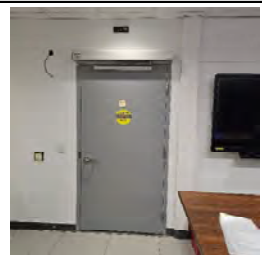
Sample No.	Material Description	Sample Location	Asbestos Content	Material Classification
1A	Drywall Joint Compound	1-108	None Detected	Non-ACM
1B		1-119		
1C				
2A	Caulking on Door Frame	1-108	None Detected	Non-ACM
2B				
2C				
3A	2'x2' ceiling tile – textured	1-114	None Detected	Non-ACM
3B				
3C				

Materials assessed for asbestos content are summarized in the following table based on the type/use of the material.

**Table 4: Results of Assessment for Asbestos-Containing Materials**

<b>Sprayed and Loose Fill Insulating Materials</b>	<b>Location/Description</b>	
Sprayed Fireproofing	None identified in subject areas.	
Sprayed Insulation	None identified in subject areas.	
Loose Fill / Vermiculite Insulation	None identified in subject areas. Interior portions of concrete block walls could not be assessed. However, it is not expected that these walls are insulated with loose fill or vermiculite insulation	
<b>Thermal System Insulation</b>	<b>Location/Description</b>	
Mechanical Pipe Insulation – Straights	Mechanical pipe fittings were observed to be not insulated.	
Mechanical Pipe Insulation – Fittings (elbows, valves, tees, hangars, etc.)	Mechanical pipe fittings were observed to be not insulated.	
HVAC Duct Insulation	Ducts were observed to be insulated with fiberglass insulation.	
Breeching / Exhaust Insulation	None identified in subject areas.	
Tank Insulation	None identified in subject areas.	
Boiler Insulation	None identified in subject areas.	
Other Mechanical Equipment Insulation	None identified in subject areas.	
<b>Architectural Finishes &amp; Finishing Materials</b>	<b>Location/Description</b>	

Sprayed Texture / Stucco Finishes	None identified in subject areas.	
Plaster Finishes	None identified in subject areas.	
Drywall Joint Compound	Drywall joint compound was observed in the subject areas. Bulk samples were collected during the assessment and results of analysis confirmed that this building material is not asbestos-containing. Refer to sample set 1 in Table 3.	
<b>Ceiling Tiles</b>	<b>Location/Description</b>	
Lay-in Acoustic Ceiling Tiles	2'x2' ceiling tile – textured were observed in the subject areas. Bulk samples were collected during the assessment and results of analysis confirmed that this building material is not asbestos-containing. Refer to sample set 3 in Table 3.	
Lay-in Acoustic Ceiling Tiles	2'x2' ceiling tile – fiberglass based were observed in the subject areas. Based on the material the ceiling tiles are expected to be not asbestos-containing.	
Glued-on Acoustic Ceiling Tiles	None identified in subject areas.	
Cement Ceiling Panels	None identified in subject areas.	
<b>Flooring</b>	<b>Location/Description</b>	
Vinyl Floor Tiles	None identified in subject areas.	
Vinyl Sheet Flooring	None identified in subject areas.	
Mastic	None identified in subject areas.	
<b>Asbestos Cement Products</b>	<b>Location/Description</b>	
Piping	None identified in subject area.	
Roofing, Siding, Wallboard	None identified in subject areas.	

Other Cement Products	None identified in subject areas.	
<b>Exterior Building Materials</b>	<b>Location/Description</b>	
Caulking	None identified in subject areas.	
Shingles	None identified in subject areas.	
<b>Misc. Materials</b>	<b>Location/Description</b>	
Caulking	Caulking on door was observed in the subject areas. Bulk samples were collected during the assessment and results of analysis confirmed that this building material is not asbestos-containing. Refer to sample set 2 in Table 3.	

### 2.1.2 Lead

Laboratory analytical results for paints tested to determine lead content are summarized in the following table. The Laboratory Certificate of Analysis is included in Appendix D. Refer to Section 3.1.2 of this report for recommended lead abatement procedures (if any) that correspond to the type of proposed construction, renovation, or demolition work.

**Table 5: Results of Paint Condition and Lead Content Assessment**

Sample No.	Location	Surface	Paint Colour	Condition	Lead Conc. (% by wt.)	Material Classification
P-1	1-119	Wall	White	Good	<0.0081	Not Lead-Containing

Lead-Containing Material:  $\geq 0.1\%$  Lead Content  
Low-Level Lead-Containing Materials: 0.009 to 0.1% Lead Content  
Not Lead-Containing:  $<0.009\%$  Lead Content

**Suspect lead-containing materials** observed in the subject areas included the following:

- paints and surface coatings (not sampled)
- batteries associated with emergency lighting
- solder in electrical components

### 2.1.3 Mercury

Mercury is present in the subject areas in the form of:

- vapour in fluorescent lamps

#### **2.1.4 Silica**

A number of building materials were identified in the subject areas that are ***suspected to contain crystalline silica***. This includes the following materials:

- drywall walls/drywall joint compound
- concrete

#### **2.1.5 Other Designated Substances**

Acrylonitrile, arsenic, benzene, coke oven emissions, ethylene oxide, isocyanates, and vinyl chloride were not included in the assessment as these substances are not expected to be a significant component of building materials or present in a form that would represent an exposure concern. Additionally, no specific information regarding their use was provided to us.

### **2.2 Other Hazardous Materials**

#### **2.2.1 Chemical Hazards**

No visible evidence of UFFI installation (i.e. injection openings) or overspray of foam insulation at wall/ceiling joints was identified in the subject areas.

#### **2.2.2 Biological Hazards**

##### ***2.2.2.1 Mould Contamination***

There was no visible evidence of obvious mould growth on building finishes in the subject areas at the time of the assessment. In addition, there was no visible evidence of any significant water staining or discolouration to building finishes in the subject areas that would suggest the potential for hidden mould growth behind these finishes.

##### ***2.2.2.2 Pest Infestation***

There was no visible evidence of a pest infestation in the subject areas.

#### **2.2.3 Environmental Hazards**

##### ***2.2.3.1 Polychlorinated Biphenyls (PCBs)***

No sources of polychlorinated biphenyls (PCBs) were observed in the subject areas.

##### ***2.2.3.2 Ozone Depleting and Global Warming Substances***

No fixed equipment suspected to contain ODS/GWS was observed in the subject areas.

### 3.0 CONCLUSIONS AND RECOMMENDATIONS

#### 3.1 Designated Substances

##### 3.1.1 Asbestos

As results summarized in Table 3 indicate, no asbestos was detected in any of the bulk samples of drywall joint compound, ceiling tiles or caulking retrieved for analysis. Therefore, these building materials are considered to be Non-ACM and there are no requirements for management, disturbance or removal of these materials under O. Reg. 278/05.

##### 3.1.2 Lead

Results of paint chip analysis for the determination of lead content indicated that sampled white paint contain concentration of lead below the limit of detection (<0.0090%) and is not considered to be lead-containing. No lead related precautions are considered necessary for the removal or disturbance of this material.

***Paints and surface coatings not sampled are assumed to be lead-containing*** (>0.1% lead content) in the subject area. Any disturbance of the lead-containing paints or surface coatings should be conducted in accordance with the procedures outlined in the Environmental Abatement Council of Canada (EACC) "Lead Guideline" (October 2014) and/or the Ontario Ministry of Labour, Training and Skills Development (MLTSD) "Lead on Construction Projects" guideline (April 2011). The extent of procedures required depends on the type of work to be conducted.

Emergency lighting is present on perimeter walls in the subject areas and are suspected to contain lead-acid batteries. If emergency lighting is removed/replaced as part of the scheduled work activities, the batteries are recommended to be sent to a recycling facility for proper treatment.

***Additional suspect lead-containing products*** not anticipated to be disturbed during construction includes solder on pipe fittings and electrical components. Future testing of these materials and specific handling/disposal requirements may be necessary if/when these materials are to be disturbed.

At this time the method of disturbance, if any, of lead-containing materials is unknown. It is recommended that any contractor whose work requires lead-containing materials to be disturbed consult the EACC or Ontario MLTSD guidelines prior to the start of work to determine the Class/Type of operation(s) and the corresponding control measures (engineering controls, work/hygiene practices, protective clothing and equipment and worker training) necessary to conduct the work in a manner that will prevent worker overexposure to lead. The following table outlines the classification of lead disturbance based on the EACC guideline.



Operation	Description
Class 1	<ol style="list-style-type: none"> <li>1. Removal of lead-containing or lead-based paints and surface coatings with a chemical gel/stripper or paste;</li> <li>2. Application of lead-containing or lead-based paints and surface coatings with a brush, roller or sponge.</li> <li>3. Installation or removal of lead sheeting or flashing.</li> <li>4. Installation or removal of lead-containing packing, babbitt, caulking, gasket or similar material.</li> <li>5. Removal of materials coated with lead-containing or lead-based paints and surface coatings, using non-powered hand tools, where the material remains chiefly intact and is not crumbled, pulverized or powdered.</li> <li>6. Operating construction or demolition equipment (e.g. excavator, bulldozer) during building renovation or demolition where lead-based paints or surface coatings are present on building materials and are being disturbed.</li> <li>7. Soldering with lead solder.</li> <li>8. Removing lead-containing or lead-based paints or surface coatings with a heat gun.</li> <li>9. Removing lead-containing and lead-based paints and surface coatings using a high-pressure water jet (e.g. pressure washer).</li> </ol>
Class 2a	<ol style="list-style-type: none"> <li>1. Removal of lead-containing or lead-based paints and surface coatings or lead-containing materials using a power tool that has an effective dust collection system equipped with a HEPA filter*.</li> <li>2. Welding, torching or high temperature cutting of lead-containing materials indoors when using an effective fume collector or smoke eater that filters and exhausts lead fume and expels it directly outdoors (away from occupants, entrances, walkways, rest areas, etc.). Fume collector or smoke eater must have effective source control and capture velocity, minimum of 0.5 metres per second (100 feet per minute) at the work surface.</li> <li>3. Welding, torching or high temperature cutting of lead-containing and lead-based paints and surface coatings or lead-containing materials outdoors.</li> <li>4. Removal of lead-containing mortar using handheld non-powered tools.</li> <li>5. Removal of lead-containing and lead-based paints and surface coatings or lead-containing materials by scraping or sanding (including wet sanding) using non-powered hand tools.</li> <li>6. Demolition of plaster or building components that crumble, pulverize or powder and are covered with lead-containing or lead-based paints or surface coatings.</li> <li>7. Clean up and removal of a significant amount of lead-containing dust and debris (that can be made easily airborne) using wet methods or HEPA vacuums.</li> </ol>
Class 2b	<ol style="list-style-type: none"> <li>1. Spray application of lead-containing paints and surface coatings</li> </ol>

Operation	Description
Class 3a	<ol style="list-style-type: none"> <li>1. Removal of lead-containing or lead-based paints and surface coatings or lead-containing materials using a power tool without an effective dust collection system equipped with a HEPA filter.</li> <li>2. Welding, torching or high temperature cutting of lead-containing materials indoors or in a confined space (e.g. within a ditch or pit).</li> <li>3. Removal of lead-containing mortar using a powered cutting device.</li> <li>4. Burning of a material containing lead.</li> <li>5. Removal, cleaning or repair of a ventilation system or ductwork used for controlling lead exposure.</li> <li>6. Spray application of lead-based paints and surface coatings.</li> <li>7. In the absence of an exposure assessment: <ol style="list-style-type: none"> <li>a. demolition or cleanup of a facility where lead-containing products were manufactured and significant dust and debris, which can be made easily airborne, is present.</li> <li>b. cleanup of dust and debris down range of a firing station in an indoor firing range. an operation that may expose a worker to lead dust, fume or mist that is not a Class 1, Class 2, or Class 3B operation.</li> </ol> </li> </ol>
Class 3b	<ol style="list-style-type: none"> <li>1. Abrasive blasting of lead-containing and lead-based paints and surface coatings or lead-containing materials (including wet, slurry and dry abrasive blasting and dry-ice blasting).</li> </ol>

\* Effective implies that the dust collection system should be capable of controlling airborne lead concentration levels to below 0.05 mg/m<sup>3</sup>. Employers should follow manufacturer's recommendations and maintenance specifications for optimal function.

If practicable, all bulk lead waste materials should be separated from other wastes and sent to a recycling facility. If not practicable, lead-containing waste should be handled and disposed of according to R.R.O. 1990, Regulation 347, *General - Waste Management* (Reg. 347) made under the Environmental Protection Act. Under this regulation (and depending on the quantity of waste generated) the waste may be subject to analysis following the Toxicity Characteristic Leaching Procedure (TCLP) to determine if it is a "leachate toxic waste" based on the leachate quality criteria provided in Schedule 4 of the regulation. Such wastes must meet specific treatment requirements (Schedule 5) or undergo alternative treatment for hazardous debris (Schedule 8) prior to land disposal.

### 3.1.3 Mercury

Fluorescent lamps that require removal should be handled with care and kept intact to avoid potential exposure to mercury vapour present within the lamps. Under Reg. 347, waste mercury produced in amounts less than 5 kilograms (kg) in any month or otherwise accumulated in an amount less than 5 kg are exempt from hazardous waste registration, treatment and disposal requirements and can be disposed of in landfill as regular waste. Larger quantities of waste mercury must be treated and disposed of in accordance with the requirements of Reg. 347. Although it is anticipated that less than 5 kg of waste lamps will be produced as part of the Interior Alterations Project, to prevent the release of mercury into the environment, Safetech recommends that all waste lamps be sent to a lamp recycling facility and not disposed of in landfill.

Although no mercury was visibly identified in other equipment, dismantling of equipment was not conducted to verify the presence/absence of mercury. It is cautioned that thermometers, barometers and other measuring devices (pressure gauges/sensors, vacuum gauges, manometers, etc.), thermostats and a variety of other electrical switches (temperature sensitive, tilt switches, float switches, etc.) may contain mercury that may not be visible without dismantling the equipment. Such devices should be assumed to contain mercury until proven otherwise and similar precautions to those outlined above should be taken if any of these items are to be disturbed or taken out of service in the future.

### 3.1.4 Silica

Suspect silica-containing materials were identified to be present in the subject areas. In their current state, building materials containing silica do not represent a risk to building occupants or construction workers. Risks associated with exposure to silica arise during demolition activities that cause silica dust to be created (particularly grinding, drilling or cutting operations and during major demolition), resulting in a crystalline silica inhalation hazard.

If any materials suspected to contain silica are to be removed or otherwise disturbed as a result of renovation/demolition activities it is recommended that procedures be put in place to control the generation of dust (such as routine water misting) and thus reduce the potential for worker exposure. Workers that have the potential to be exposed to airborne silica should also wear appropriate protective clothing and respiratory protection. Any work involving the disturbance of silica-containing materials should follow the procedures outlined in the Ontario MLTSD "Silica on Construction Projects" guideline (April 2011). The appropriate engineering controls, work practices, hygiene practices, personal protective measures and training necessary to conduct the work in a safe manner are provided in this guideline. The general measures and procedures (or Type of operation) necessary depends on the type of work to be conducted. The following table outlines the classification of silica disturbance based on the Ontario MLTSD guideline.

Operation	Description
Type 1	<ol style="list-style-type: none"> <li>1. The drilling of holes in concrete or rock that is not part of a tunneling operation or road construction.</li> <li>2. Milling of asphalt from concrete highway pavement</li> <li>3. Charging mixers and hoppers with silica sand (sand consisting of at least 95% silica) or silica flour (finely ground sand consisting of at least 95% silica)</li> <li>4. Any other operation at a project that requires the handling of silica-containing material in a way that may results in a worker being exposed to airborne silica.</li> <li>5. Entry into a dry mortar removal or abrasive blasting area while airborne dust is visible for less than 15 minutes for inspection and/or sampling.</li> <li>6. Working within 25 metres of an area where compressed air is being used to remove silica-containing dust outdoors.</li> </ol>

Operation	Description
Type 2	<ol style="list-style-type: none"> <li>1. Removal of silica containing refractory materials with a jackhammer</li> <li>2. The drilling of holes in concrete or rock that is part of a tunneling or road construction.</li> <li>3. The use of a power tool to cut, grind, or polish concrete, masonry, terrazzo or refractory materials.</li> <li>4. The use of a power tool to remove silica containing materials.</li> <li>5. Tunneling (operation of the tunnel boring machine, tunnel drilling, and tunnel mesh installation).</li> <li>6. Tuckpoint and surface grinding</li> <li>7. Dry mortar removal with an electric or pneumatic cutting device</li> <li>8. Dry method dust cleanup from abrasive blasting operations</li> <li>9. The use of compress air outdoors for removing silica dust</li> <li>10. Entry into area where abrasive blasting is being carried out for more than 15 minutes</li> </ol>
Type 3	<ol style="list-style-type: none"> <li>1. Abrasive blasting with an abrasive that contains &gt;1% silica</li> <li>2. Abrasive blasting of a material that contains &gt;1% silica</li> </ol>

### 3.1.5 Other Designated Substances

No other designated substances are expected to be a component of building materials in the subject areas in a form that would represent an exposure concern. Therefore, no protective measures or procedures specific to acrylonitrile, arsenic, benzene, coke oven emissions, ethylene oxide, isocyanates, and vinyl chloride are considered necessary.

## 3.2 Other Hazardous Materials

### 3.2.1 Chemical Hazards

As no UFFI was identified or is suspected to be present in the subject areas, no further action is required. However, given that no destructive testing was conducted, there is a remote possibility that UFFI could be hidden within locations such as exterior wall cavities. If suspect foam insulation is identified during renovation/demolition activities work should be stopped and the area should be re-assessed to evaluate conditions and determine appropriate control measures and worker protection, if necessary.

### 3.2.2 Biological Hazards

#### 3.2.2.1 Mould Contamination

No mould contamination was identified in the subject areas and no further action is required at this time. Although no obvious mould contamination or evidence to suggest possible hidden mould contamination was identified in the subject areas, there is still a potential for hidden mould growth to exist behind or underneath building finishes. Should suspect mould growth be discovered during the course of renovation or demolition work, Safetech recommends that all work stop so that the area can be assessed to evaluate proper control measures and remediation protocols in order to avoid worker exposure to mould and possible contamination of adjacent areas.

### **3.2.2.2 Pest Infestation**

No visual evidence of any significant pest infestation was observed in the subject areas. Therefore, no additional precautionary measures are deemed necessary for protection against biological contaminants potentially associated with pest infestation.

### **3.2.3 Environmental Hazards**

#### **3.2.3.1 Polychlorinated Biphenyls (PCBs)**

No equipment was identified in the subject areas that is expected to be PCB-containing.

#### **3.2.3.2 Ozone Depleting and Global Warming Substances**

No equipment was identified in the subject areas that is expected to contain ozone depleting or global warming substances. As such, no recommendations are considered necessary at this time.

## **4.0 LIMITATIONS**

The information and recommendations detailed in this report were carried out by trained professional and technical staff in accordance with generally accepted environmental and industrial hygiene work practices and procedures. Recommendations provided in this report have been generated in accordance with accepted industry guidelines and practices. These guidelines and practices are considered acceptable as of the date of this report.

In preparation of this report, Safetech relied on information supplied by others, including without limitation, information pertaining to the history and operation of the site, test results and reports of other consultants and testing services provided by independent laboratories. Except as expressly set out in this report, Safetech has not made any independent verification of information provided by independent entities.

The collection of samples at the location noted was consistent with the scope of work agreed-upon with the person or entity to whom this report is addressed and the information obtained concerning prior site investigations. As conditions between samples may vary, the potential remains for the presence of unknown additional contaminants for which there were no known indicators.

The analytical method used for determination of asbestos content meets the requirements of O. Reg. 278/05. However, small asbestos fibres may be missed by PLM due to resolution limitations of the optical microscope. Interfering binder/matrix and/or low asbestos content may also hinder positive identification by PLM. These conditions are common for vermiculite attic insulation (VAI) and non-friable organically bound (NOB) materials such as vinyl floor tiles, roofing materials, mastics and caulking and can lead to “false negative” results. If PLM analytical results for these types of materials indicate no asbestos detected they have been reported as “Presumed Non-ACM”. Due to limitations

of the analytical method we cannot confirm that low quantities of asbestos are not present in these samples using solely PLM analysis. Additional analytical procedures should be considered for such materials to rule out false negative results.

Conclusions are based on site conditions at the time of inspection and can only be extrapolated to an undefined limited area around inspected locations. The extent of the limited area depends on building construction and conditions. Building materials that are not detailed within this survey due to inaccessibility during the time of survey and/or are uncovered during renovation/demolition activities should be properly assessed by a qualified person prior to their disturbance. Safetech cannot warrant against undiscovered environmental liabilities. If any information becomes available that differs from the findings in this report, we request that we be notified immediately to reassess the conclusions provided herein.

No other person or entity is entitled to use or rely upon this report without the express written consent of Safetech and the person or entity to who it is addressed. Any use that a third party makes of this report, or any reliance based on conclusions and recommendations made, are the responsibility of such third parties. Safetech accepts no responsibility for damages suffered by third parties as a result of actions based on this report.



## **Appendix A: Summary of ACM Occurrences**

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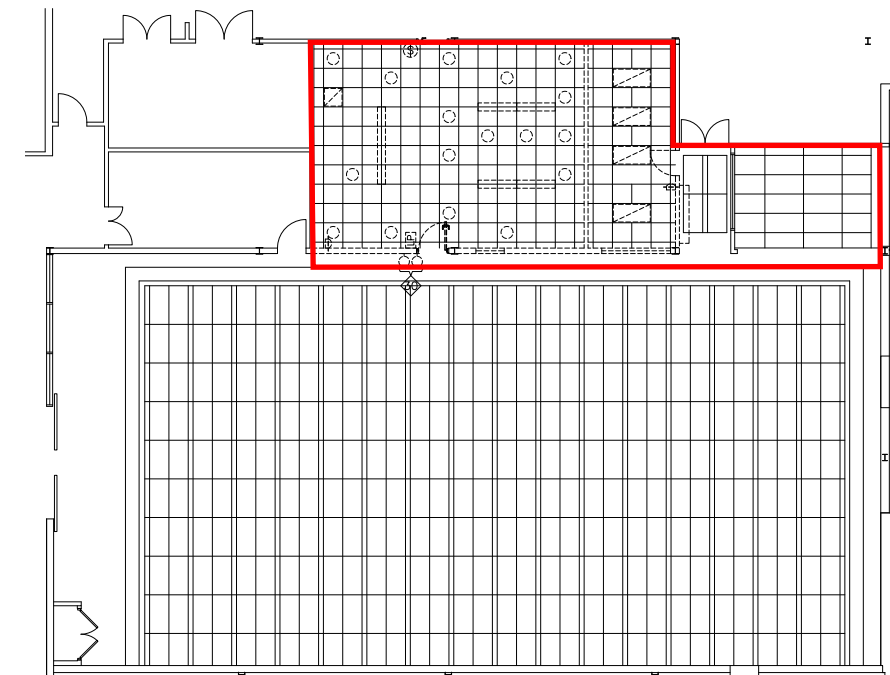
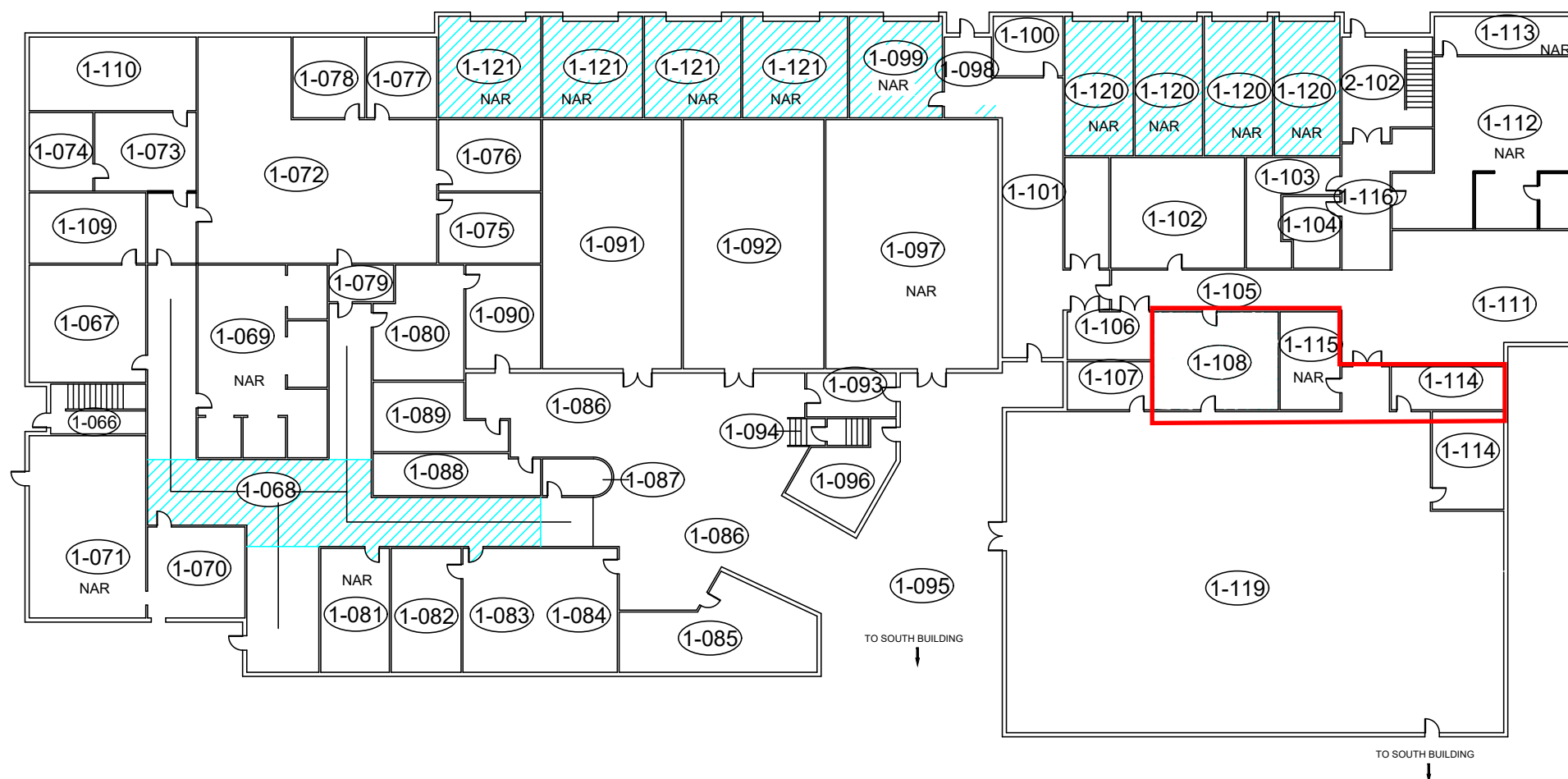
Floor	Room Description	System	Material	Description	Classification	Friable/ Non- Friable	Condition	Est. Quantity	Unit	Access	Action
No Asbestos-Containing Materials Identified within the Project Specific Surveyed Areas.											

## **Appendix B: Site Drawings**

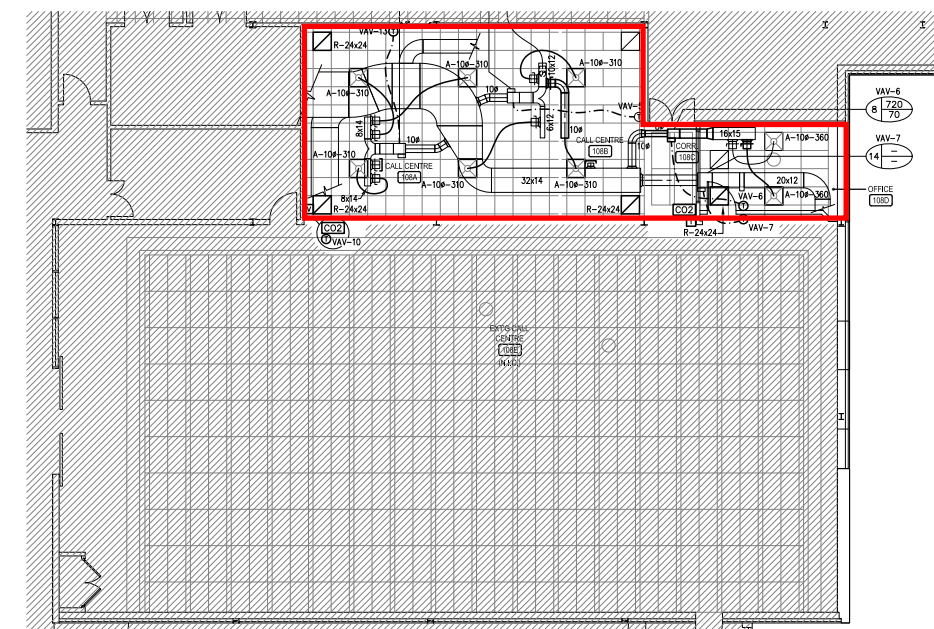
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LEGEND

AREA ASSESSED



PARTIAL GROUND FLOOR PLAN - LIGHTINGDEMOLITION



PARTIAL GND FLOOR PLAN - HVAC NEW INSTALLATION

- 1) THIS FLOOR PLAN MUST BE READ IN CONJUNCTION WITH THE DESIGNATED SUBSTANCE AND HAZARDOUS MATERIALS ASSESSMENT REPORT.
- 2) NOT ALL ASBESTOS-CONTAINING MATERIALS ARE INDICATED IN THE FLOOR PLAN. REFER TO THE DESIGNATED SUBSTANCE AND HAZARDOUS MATERIALS REPORT FOR FURTHER DETAILS.
- 3) REMOVAL OR DISTURBANCE OF ASBESTOS-CONTAINING BUILDING MATERIALS MUST BE CONDUCTED IN ACCORDANCE WITH ONTARIO REGULATION 278/05 "DESIGNATED SUBSTANCE - ASBESTOS ON CONSTRUCTION PROJECTS AND IN BUILDINGS AND REPAIR OPERATIONS".

FLOOR 1

INTERIOR ALTERATIONS PROJECT

TORONTO EMERGENCY  
HEADQUARTERS  
4330 DUFFERIN STREET  
TORONTO, ONTARIO

DRAWING NO.

DS-1

DATE: NOV 13, 2023

SAFETECH PROJECT NO.  
1-3230898



3045 SOUTHCREEK RD, UNIT 14  
MISSISSAUGA, ONTARIO  
L4X 2X7

## **Appendix C: Laboratory Certificate of Analysis – Asbestos**

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# EMSL Canada Inc.

2756 Slough Street Mississauga, ON L4T 1G3  
Phone/Fax: (289) 997-4602 / (289) 997-4607  
<http://www.EMSL.com> / [torontolab@emsl.com](mailto:torontolab@emsl.com)

EMSL Canada Order 552317104  
Customer ID: 55SELI62  
Customer PO: 1-3230898  
Project ID:

**Attn:** Amit Kaul  
Safetech Environmental Limited  
3045 Southcreek Road  
Unit 14  
Mississauga, ON L4X 2X7  
**Proj:** 4330 Dufferin / 1-3230898

**Phone:** (905) 624-2722  
**Fax:** (905) 624-4306  
**Collected:**  
**Received:** 11/06/2023  
**Analyzed:** 11/09/2023

## Summary Test Report for Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05

**Client Sample ID:** 1A **Lab Sample ID:** 552317104-0001  
**Sample Description:** Drywall Joint Compound/1-108

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	11/09/2023	White	0.0%	100.0%	None Detected	

**Client Sample ID:** 1B **Lab Sample ID:** 552317104-0002  
**Sample Description:** Drywall Joint Compound/1-119

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	11/09/2023	White	0.0%	100.0%	None Detected	

**Client Sample ID:** 1C **Lab Sample ID:** 552317104-0003  
**Sample Description:** Drywall Joint Compound/1-119

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	11/09/2023	White	0.0%	100.0%	None Detected	

**Client Sample ID:** 2A **Lab Sample ID:** 552317104-0004  
**Sample Description:** Caulking on Door Frame/1-108

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	11/08/2023	White	0.0%	100%	None Detected	

**Client Sample ID:** 2B **Lab Sample ID:** 552317104-0005  
**Sample Description:** Caulking on Door Frame/1-108

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	11/08/2023	White	0.0%	100%	None Detected	

**Client Sample ID:** 2C **Lab Sample ID:** 552317104-0006  
**Sample Description:** Caulking on Door Frame/1-108

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	11/08/2023	White	0.0%	100%	None Detected	

**Client Sample ID:** 3A **Lab Sample ID:** 552317104-0007  
**Sample Description:** 2'x2' ceiling tile – textured/1-114

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	11/09/2023	Gray	80.0%	20.0%	None Detected	





# EMSL Canada Inc.

2756 Slough Street Mississauga, ON L4T 1G3  
Phone/Fax: (289) 997-4602 / (289) 997-4607  
<http://www.EMSL.com> / [torontolab@emsl.com](mailto:torontolab@emsl.com)

EMSL Canada Order 552317104  
Customer ID: 55SELI62  
Customer PO: 1-3230898  
Project ID:

## Summary Test Report for Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05

Client Sample ID: 3B

Lab Sample ID: 552317104-0008

Sample Description: 2'x2' ceiling tile – textured/1-114

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	11/09/2023	Gray	80.0%	20.0%	None Detected	

Client Sample ID: 3C

Lab Sample ID: 552317104-0009

Sample Description: 2'x2' ceiling tile – textured/1-114

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	11/09/2023	Gray	80.0%	20.0%	None Detected	

### Analyst(s):

Ashley Brito PLM (2)  
PLM Grav. Reduction (1)  
Kira Ramphal PLM (4)  
Nickesh Mistry PLM Grav. Reduction (2)

### Reviewed and approved by:

Matthew Davis or other approved signatory  
or Other Approved Signatory

None Detected = <0.1%. EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This is a summary report; official reports are available on LabConnect or upon request and relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method") but augmented with procedures outlined in the 1993 ("final") version of the method. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Canada Inc. Mississauga, ON NVLAP Lab Code 200877-0

Initial report from: 11/09/2023 09:37:11

## **Appendix D: Laboratory Certificate of Analysis – Lead**

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**EMSL Canada Inc.**

2756 Slough Street, Mississauga, ON L4T 1G3

Phone/Fax: (289) 997-4602 / (289) 997-4607

<http://www.EMSL.com>[torontolab@emsl.com](mailto:torontolab@emsl.com)

EMSL Canada Or 552317088

CustomerID: 55SELI62

CustomerPO: 1-3230898

ProjectID:

Attn: **Amit Kaul**  
**Safetech Environmental Limited**  
**3045 Southcreek Road**  
**Unit 14**  
**Mississauga, ON L4X 2X7**

Phone: (905) 624-2722  
Fax: (905) 624-4306  
Received: 11/3/2023 05:28 PM  
Collected:

Project: 4330 Dufferin St./ 1-3230898

**Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)\***

<i>Client Sample Description</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Weight</i>	<i>RDL</i>	<i>Lead Concentration</i>
P-1 552317088-0001		11/6/2023	0.2469 g	0.0081 % wt	<0.0081 % wt
	Site: White Paint - 1-119				

Rowena Fanto, Lead Supervisor  
or other approved signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted.

\* Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.008% wt based on the minimum sample weight per our SOP. "<" (less than) result signifies the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request. Definitions of modifications are available upon request.

Samples analyzed by EMSL Canada Inc. Mississauga, ON AIHA LAP, LLC-ELLAP Accredited #196142

Initial report from 11/07/2023 08:48:50

## **Appendix E: Methodology**

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## A. METHODOLOGY

The presence of hazardous materials was assessed by visual inspection. For the purpose of this assessment and this document, hazardous materials include designated substances as well as other chemical, biological and environmental hazards as defined below:

- Designated Substances (as prescribed by Ontario Regulation 490/09):
  - Acrylonitrile, Arsenic, Asbestos, Benzene, Coke Oven Emissions, Ethylene Oxide, Isocyanates, Lead, Mercury, Silica and Vinyl Chloride.
- Other Hazardous Materials:
  - **Chemical Hazards** – Urea Formaldehyde Foam Insulation (UFFI)
  - **Biological Hazards** – Mould Contamination and Pest Infestation
  - **Environmental Hazards** – Polychlorinated Biphenyls (PCBs) and Ozone Depleting & Global Warming Substances

Concealed locations such as above solid plaster or drywall ceilings, within plaster or drywall wall cavities, enclosed mechanical/pipe shafts and bulkheads, etc. were not investigated, unless otherwise stated in Section 1.3. Similarly, motors, blowers, electrical panels, etc., were not de-energized or disassembled to examine concealed conditions. Building materials that are not detailed within this assessment due to inaccessibility at the time of our site visit and/or uncovered during renovation/demolition activities should be assessed by a qualified person prior to their disturbance.

Bulk sampling followed by laboratory analysis was also conducted to confirm the presence/absence of select hazardous materials. Bulk sampling was limited to asbestos in building materials and lead in paint on building finishes (if flaking paint was present). All other hazardous materials were identified by visual inspection only. Where possible, observations regarding the location, quantity and condition of the hazardous materials identified were made in order to determine the potential for exposure and provide appropriate recommendations for remedial action, if necessary. Specific methodology for each individual hazardous material assessed is further detailed below.

### A.1 Designated Substances

#### A.1.1 Asbestos

A visual inspection for the presence of both friable and non-friable asbestos-containing material (ACM) was performed in the subject area.

If an existing asbestos survey was available for review, Safetech relied on the information present. Building materials that were visually similar to materials previously tested and that were confirmed to be either ACM or non-ACM were considered to have consistent content and were not re-sampled. Additional sampling was only conducted where the investigator believed a need existed.

Bulk samples of building materials suspected to contain asbestos were retrieved by Safetech only for materials that were deemed to have a potential to be disturbed as part

of the construction project. Some suspect materials may not have been sampled during our investigation. Bulk samples were retrieved in accordance with Section 3 and Table 1 of Ontario Regulation 278/05, "Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations". The number of samples collected for each material was based on the type and quantity of the material present in the subject area. Each individual sample was placed in a labeled zip-lock bag for transportation to an independent laboratory (EMSL). EMSL is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) for bulk asbestos fiber analysis.

Analysis for asbestos content was performed by the independent laboratory in accordance with the U.S. Environmental Protection Agency (EPA) Test Method *EPA/600/R-93-116: Method for the Determination of Asbestos in Bulk Building Materials (June 1993)*. This method identifies the asbestos fibre content of building materials using polarized light microscopy (PLM) analytical techniques, with confirmation of presence and type of asbestos made by dispersion staining optical microscopy. This analytical method meets the requirements set forth in Section 3 of O. Reg. 278/05.

In accordance with O. Reg. 278/05, an asbestos-containing material is defined as material that contains 0.5 per cent or more asbestos by dry weight. The laboratory was instructed to conduct "stop-positive" analysis for all materials. If a sample was found to be asbestos-containing no further analysis was conducted for samples taken from the same homogeneous material.

Locations where ACM have been identified are detailed in this report. Recommendations pertaining to ACM were made based on the friability, accessibility and condition of the material in conjunction with the potential for the planned renovation work to disturb the ACM.

### ***A.1.2 Assessment of Asbestos-Containing Building Materials***

Accessibility, Condition and Action (Priority) ratings for individual items, or defined areas were developed by Safetech to determine remedial action plans specific to the facility's needs.

#### ***A.1.2.1 Accessibility***

Accessibility has been assessed as: (A) Accessible to all non-maintenance occupants of the building; (B) Accessible to maintenance staff without a ladder; (C) Accessible to maintenance staff with a ladder and exposed to view without moving a building component; (D) Accessible to maintenance staff with a ladder and concealed from view due to a building component; (E) Not accessible without demolition or removal of fixed building components or building systems



### A.1.2.2 Condition

The condition of asbestos-containing materials identified in the subject area was assessed as Good (G), Fair (F) or Poor (P). The assessment criteria used to determine condition is dependent on material characteristics, such as friability. The following table summarizes the criteria used by Safetech to evaluate the condition of ACM.

<b>Sprayed Fireproofing, Sprayed Insulation and Sprayed Texture Finishes</b>	
<b>Good</b>	<ul style="list-style-type: none"> <li>Surface shows no significant signs of damage, deterioration, or delamination (i.e. &lt;1%).</li> <li>Unencapsulated or unpainted fireproofing or texture finishes, where no delamination or damage is observed.</li> <li>Encapsulated fireproofing or texture finishes where encapsulation applied after damage or fallout.</li> </ul>
<b>Fair</b>	<ul style="list-style-type: none"> <li>Not utilized as part of condition assessment for these materials.</li> </ul>
<b>Poor</b>	<ul style="list-style-type: none"> <li>Greater than 1% damage, delamination, or deterioration to surface.</li> </ul>
<b>In areas where damage exists in isolated locations, both Good and Poor may be applicable.</b>	
<b>Mechanical Insulation (boilers, breeching, ductwork, piping, tanks, equipment, etc.)</b>	
<b>Good</b>	<ul style="list-style-type: none"> <li>Insulation completely covered in jacketing and exhibits no evidence of damage or deterioration.</li> <li>Jacketing may have minor damage (i.e. scuffs or stains), but is not penetrated.</li> </ul>
<b>Fair</b>	<ul style="list-style-type: none"> <li>Minor penetrating damage to jacketed insulation (cuts, tears, nicks, deterioration or delamination).</li> <li>Undamaged insulation that had never been jacketed.</li> <li>Insulation is exposed but not showing surface disintegration.</li> <li>Extent of missing insulation ranges from minor to none.</li> <li>Damage that can be repaired.</li> </ul>
<b>Poor</b>	<ul style="list-style-type: none"> <li>Original insulation jacket is missing, damaged, deteriorated, or delaminated.</li> <li>Insulation is exposed and significant areas have been dislodged.</li> <li>Damage that cannot be easily repaired.</li> </ul>
<b>Non-Friable and Potentially Friable Materials (includes materials such as plaster finishes, drywall compound, ceiling tiles, asbestos cement products, vinyl asbestos tile and asbestos paper backed vinyl sheet flooring, etc., which have the potential to become friable when handled)</b>	
<b>Good</b>	<ul style="list-style-type: none"> <li>No significant damage.</li> <li>Material may be cracked or broken but is stable and not likely to become friable upon casual contact.</li> <li>No friable debris present</li> </ul>
<b>Fair</b>	<ul style="list-style-type: none"> <li>Not utilized as part of condition assessment for these materials.</li> </ul>
<b>Poor</b>	<ul style="list-style-type: none"> <li>Material is severely damaged.</li> <li>Debris is present or binder has disintegrated to the point where the material has become friable.</li> </ul>
<b>Asbestos-Containing Debris (noted separately from the presumed source material)</b>	
<b>Poor</b>	<ul style="list-style-type: none"> <li>Debris is always considered to be in Poor condition.</li> </ul>

### A.1.2.3 Action

Recommended ACTION for compliance and for management of identified asbestos-containing materials has been provided for each condition and component outlined in the above table. Recommendations have been classified under the following 8 ACTIONS:

1. Action dealing with the immediate clean-up of fallen ACM likely to be disturbed.

2. Action dealing with the need to use Type 2 asbestos procedures to enter an area (other than a ceiling space).
3. Action dealing with performing asbestos removal for compliance with regulations.
4. Action dealing with Type 2 asbestos procedures for ceiling entry where friable ACM debris is present on the top side of a ceiling system.
5. Action dealing with the removal of asbestos that goes beyond compliance requirements but simplifies the asbestos management.
6. Action dealing with the repair of asbestos.
7. Action dealing with ACM surveillance requirements of the regulation.
8. Action for dealing with material that may contain asbestos but was not conclusively identified in the survey.

#### **A.1.2.4 Quantity**

The approximate quantity and the units of measure related to the quantity (i.e.: linear feet (LF), square feet (SF) or each (EACH) as appropriate to the item) have only been provided for materials requiring remedial or corrective action (i.e. materials in Fair or Poor condition). In such circumstances any quantities provided should be considered rough estimates only and should not be solely relied upon for bidding purposes. It is the responsibility of the selected Contractor to obtain actual quantities.

#### **A.2 Lead**

If paint samples were collected, they would be collected by scraping the paint down to the base material substrate to ensure collection of all layers of paint. Care would be taken to avoid collection of the underlying substrate to reduce analytical substrate matrix interference.

If collected, paint samples would be submitted to an independent laboratory for the determination of lead content. The laboratory would participate in and accredited by the EPA (U.S. Environmental Protection Agency) for analysis of lead in paint chips through the American Industrial Hygiene Association (AIHA) Environmental Lead Laboratory Accreditation Program (ELLAP). Analysis would be conducted by the laboratory following the EPA "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW-846), Method 7000B "Flame Atomic Absorption Spectrophotometry". Result of analysis would be reported by the laboratory as the percentage of lead by weight of the total sample (% by wt.).

The presence of lead in other materials, such as lead sheeting, pigmented mortar, lead piping, lead solder, etc. would be noted where observed but not sampled to verify lead content. Lead can be present in these materials to varying degrees, depending on their age of application and should be considered lead-containing until proven otherwise.

### **A.3 Mercury**

The type, quantity and location of mercury-containing equipment and devices in the subject area were determined by visual inspection based on appearance, age and knowledge of historical uses. Sampling for mercury-containing building materials and dismantling of suspect mercury-containing equipment was not performed. Where possible, attempts were made to verify the presence/absence of mercury by gathering additional information such as equipment model number, serial number, etc.

### **A.4 Silica**

The presence of crystalline silica in building materials was determined through visual inspection of building materials only, based on knowledge of the historic use of silica-containing materials in certain building materials. Sampling to verify the presence/absence of silica in building materials was not performed.

### **A.5 Other Designated Substances**

Other designated substances (i.e. acrylonitrile, arsenic, benzene, coke oven emissions, ethylene oxide, isocyanates, and vinyl chloride) are typically not expected to be encountered in building materials as significant constituents or in a form that would represent an exposure concern. These substances were not included in the assessment unless specific information regarding their use (e.g. in a manufacturing process) was provided to us. No sampling for these designated substances was performed.

### **A.6 Other Hazardous Materials**

#### ***A.6.1 Chemical Hazards***

##### ***A.6.1.1 Urea Formaldehyde Foam Insulation (UFFI)***

A visual inspection to evaluate the possible presence of Urea Formaldehyde Foam Insulation (UFFI) was conducted in the subject area. Our visual inspection was limited to identifying evidence of possible UFFI installation (i.e. repaired nozzle holes in walls) and overspray at wall/ceiling joints, etc. No destructive testing or material sampling was conducted as part of the assessment.

### **A.7 Biological Hazards**

#### ***A.7.1.1 Mould Contamination***

A visual inspection to determine the possibility of mould growth was conducted in the subject area. The assessment was limited to identifying evidence of mould growth and water damage (staining, material deterioration, efflorescence, etc.) on the surface of building materials, which may be an indicator of hidden mould growth. No moisture content readings of building materials were taken to determine their current condition. Additionally, destructive testing to confirm the presence/absence of hidden mould growth and material sampling to verify the presence/absence of mould on suspect surfaces was beyond the scope of this assessment.

#### **A.7.1.2 Pest Infestation**

The presence and extent of pest infestation in the subject area was based on visually inspecting for evidence of significant pest activity, including signs of nesting, droppings/fecal accumulation, dead insects/carcass accumulation, etc. Evidence of minor pest presence was not considered to be indicative of pest infestation.

### **A.8 Environmental Hazards**

#### **A.8.1 Polychlorinated Biphenyls (PCBs)**

The presence of PCB-containing electrical equipment in the subject area was identified through visual inspection and knowledge of the timeline of historical use.

For stand-alone transformers and capacitors, information from the manufacturer nameplate (such as the date of manufacture, dielectric fluid trade name or “Type Number”, etc.) was gathered, where possible, to further evaluate if the equipment may contain PCBs. This information was then compared to the information provided in the Environment Canada document entitled “Handbook on PCB’s in Electrical Equipment” (Third Edition, April 1988) to aid in identification. Transformers and capacitors confirmed to be manufactured after 1979 were assumed to not contain PCBs. If appropriate information could not be obtained it was assumed that the transformer or capacitor contained PCBs.

For fluorescent light ballasts, a representative number of fixtures were inspected, if possible, for assessment areas that were constructed prior to 1980 and where there was no history or evidence of a complete lighting retrofit. The light fixtures were examined by removing any lenses and ballast covers to expose the ballast and identify information such as ballast make, model number, serial number, and date code. This information was then compared to the information provided in the Environment Canada document entitled “Identification of Lamp Ballasts Containing PCBs” (Report EPS 2/CC/2 (revised) August 1991) to aid in identification. Ballasts that could not be confirmed Non-PCB-containing were assumed to contain PCBs. The light fixtures were not de-energized and ballasts were not removed to obtain manufacturer information that may be on the back of the ballast. If visual confirmation of ballast type could not be made it was assumed that light fixtures in areas constructed prior to 1980 that have not undergone a complete lighting retrofit have PCB-containing ballasts until proven otherwise.

No sampling of materials or fluids within equipment was conducted to verify the presence/absence of PCBs. Inspection and testing of other materials for PCB content, including (but not limited to) caulking, asphalt, oil-based paint, plastics, switches, electric cables and hydraulic fluids was beyond the scope of the assessment.

#### **A.8.2 Ozone Depleting and Global Warming Substances**

The presence of fixed equipment likely to contain ozone-depleting substances (ODS) and/or global-warming substances (GWS) was identified through visual inspection and

knowledge of the timeline of historical use. This included equipment such as chillers, air-conditioners, walk-in refrigeration and freezer units and fixed dry-chemical fire extinguishers, where chemicals such as hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs) or halons may be present. Where possible, information regarding the type and quantity of refrigerant present was obtained from the manufacturer nameplate. Our visual assessment was limited to fixed equipment in the subject area and did not include portable equipment such as stand-alone refrigerators, freezers, water coolers, air-conditioners and fire extinguishers, etc.



March 9, 2022

IBI Group  
100 - 175 Galaxy Blvd  
Toronto, ON, M9W 0C9

Attn: Faraz Bolourian, Project Manager  
Tel: 416 679 1930  
Email: [faraz.bolourian@ibigroup.com](mailto:faraz.bolourian@ibigroup.com)

**Re: Summary of Bulk Asbestos Sample Analysis, 4330 Dufferin Street, Toronto, ON**

Dear Mr. Bolourian,

As requested, Fisher Environmental Ltd. (Fisher) collected bulk samples of materials suspected to contain asbestos from the building located at 4330 Dufferin Street, Toronto, and submitted for asbestos analysis. The assessment was in response to planned construction activities which discovered the suspected material (vinyl floor tile and mastic) during demolition works. The fieldwork was conducted on March 9, 2022.

Three (3) samples of the vinyl floor tile (12" x 12" light grey with grey and white smears) and three (3) samples of the corresponding black mastic were collected and submitted to Fisher Environmental Laboratories for Polarised Light Microscopy (PLM) analysis, as outlined in NIOSH Method 9002.

**Laboratory analysis determined the materials sampled do not contain asbestos.**

Based on the observations and findings, Fisher recommends that the planned construction activities do not require asbestos abatement procedures. Demolition works may continue as planned. Should you have any questions or concerns please do not hesitate to contact us.

Respectfully submitted,

A handwritten signature in blue ink, appearing to read 'Yvonne Hoogeveen', is written over a faint, light blue circular stamp.

Yvonne Hoogeveen, P. Eng.  
Project Manager

Attachments: Attachment A – Laboratory Analysis Report  
Attachment B – Site Photographs



## **Attachment A – Laboratory Analysis Report**



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**Client:** IBI Group  
**Address:** 100-175 Galaxy Blvd.  
Toronto, ON  
M9W 0C9  
**Tel.:** 416-679-1930  
**E-mail:**  
**Attn:** Faraz Bolourian

**F.E. Job #:** 22-8084  
**Project Name:** New Mail Room  
**Project ID:** FE-P 22-12005  
**Date Sampled:** 9-Mar-2022  
**Date Received:** 9-Mar-2022  
**Date Reported:** 10-Mar-2022  
**Location:** 4330 Dufferin Street

## Certificate of Analysis

<b>Analysis Requested:</b>	Asbestos by PLM
<b>Sample Description:</b>	6 Bulk Sample(s) ( <i>Rush</i> )

Client Sample ID	Lab Sample ID	Sample Matrix	Fibre Type	Asbestos Content
1A - Vinyl Floor Tile	22-8084-1	Vinyl Tile		Not Detected
1B - Vinyl Floor Tile	22-8084-2	Vinyl Tile		Not Detected
1C - Vinyl Floor Tile	22-8084-3	Vinyl Tile		Not Detected
2A - Black Mastic	22-8084-4	Mastic		Not Detected
2B - Black Mastic	22-8084-5	Mastic		Not Detected
2C - Black Mastic	22-8084-6	Mastic		Not Detected

Fisher Environmental Laboratories (Lab ID #: 2745) is accredited by CALA (Canadian Association for Laboratory Accreditation Inc.) for asbestos analysis by PLM.

### ANALYTICAL METHOD:

Asbestos has been done in accordance with normal professional standard using the following Fisher Environmental Lab Method: Asbestos by PLM (Polarized Light Microscope) F-26, Rev.2.2.

**Authorized by:**

*Roger Lin*  
Roger Lin, Ph. D., C. Chem.  
Laboratory Manager













## **Attachment B - Site Photographs**



**Photo 1** – View of the vinyl floor tile and mastic discovered under ceramic tile.

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Bond Securcom 1 – 41 SCARSDALE RD TORONTO ON M3B 2R2	ATTN: Cesar Traverso Email: <a href="mailto:ctraverso@bondsecur.com">ctraverso@bondsecur.com</a> (416) 256-6666
Chubb Security Systems 5201 EXPLORER DR MISSISSAUGA ON L4W 4H1	ATTN: Chris Middleton Email: <a href="mailto:chris.middleton@chubbfs.ca">chris.middleton@chubbfs.ca</a> (905) 629-2600
Convergent Technologies 5716 COOPERS AVE MISSISSAUGA ON L4Z 2E8	ATTN: Eric Heagle Email: <a href="mailto:eric.heagle@convergent.com">eric.heagle@convergent.com</a> (905) 602-8622
Delco Security	ATTN: Mark Peterson Email: <a href="mailto:mpeterson@delcosecurity.com">mpeterson@delcosecurity.com</a> (416) 346-8628

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---

Fitch Security Integration Inc.  
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TORONTO ON M9W 1A4

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Email: [efitchett@fitch.ca](mailto:efitchett@fitch.ca)  
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RICHMOND HILL ON L4B 1H1

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---

Certified Dealer  
Met-Scan Canada Ltd.  
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(416) 391-2200 x111  
(416) 709-3102

---

Paladin Technologies  
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(416) 916-6767

---

Profile Security  
110 – 5525 EGLINTON AVE W  
TORONTO ON M9C 5K5

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---

Quinn Digital Asset Protection  
3 – 7065 TRANMERE DR  
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(416) 441-3770 x223  
(416) 303-6252

---

Siemens Building Technologies, Ltd.  
1577 NORTH SERVICE RD  
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Certified Dealer  
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TORONTO ON M9W 1E7

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(647) 616-3183

---

Certified Dealer  
Stanley Convergent Security Solutions  
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MISSISSAUGA ON L5N 6C3

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Email: [scott.jupp@sbdinc.com](mailto:scott.jupp@sbdinc.com)  
(289) 290-7100

---

Veridin Systems Canada Inc.  
13 – 245 MATHESON BLVD E  
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(905) 568-9100

---

Certified Dealer  
Vipond Inc.  
6380 VIPOND DR  
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ATTN: Mark Gill  
Email: [mark.gill@vipond.ca](mailto:mark.gill@vipond.ca)  
(905) 564-7060 x297  
(647) 527-6339

---



**1 GENERAL**

- 1.1 The requirements of the Articles of Agreement, Conditions of the Contract, Division 1 apply to and form all Sections of the Contract Documents and the Work.
- 1.2 Work in this Specification is divided into descriptive sections which are not intended to identify absolute contractual limits between Subcontractors, nor between the Contractor and their Subcontractors. The Contractor is responsible for organizing division of labour and supply of materials essential to complete the Contract. The Consultant assumes no liability to act as an arbiter to establish subcontract limits between Sections or Divisions of Work.
- 1.3 It is intended that Work supplied under these Contract Documents shall be complete and fully operational in every detail for the purpose required. Provide all items, articles, materials, services and incidentals, whether or not expressly specified or shown on Drawings, to make finished Work complete and fully operational, consistent with the intent of the Contract Documents.
- 1.4 Work designated as "N.I.C." is not included in this Contract.
- 1.5 Specifications, Schedules and Drawings are complementary and items mentioned or indicated on one may not be mentioned or indicated on the others.
- 1.6 Contractors finding discrepancies or ambiguities in, or omissions from the Drawings, Specifications or other Contract Documents, or having doubt as to the meaning and intent of any part thereof shall contact the Consultant for clarification. If the Consultant is not contacted for clarification, execute the Work in accordance with the most stringent requirements.
- 1.7 Mention in the specifications or indication on the drawings of materials, products, operations, or methods, requires that the Contractor provide each item mentioned or indicated of the quality or subject to the qualifications noted; perform according to the conditions stated in each operation prescribed; and provide labour, materials, Products, equipment and services to complete the Work.
- 1.8 Where the singular or masculine is used in the Contract Documents, it shall be read and construed as if the plural, feminine or neuter had been used when the context or the statement so requires and as required to complete the Work, and the rest of the sentence, clause, paragraph, or Article shall be construed as if all changes in grammar, gender or terminology thereby rendered necessary had been made.
- 1.9 The terms "approved", "review", "reviewed", "accepted", "acceptance", "acceptable", "satisfactory", "selected", "directed", "instructed", "required", "submit", "permitted" or similar words or phrases are used in standards or elsewhere in Contract Documents, it shall be understood, that words "by (to) the Consultant" follow, unless context provides otherwise.
- 1.10 Where the words 'submit', 'acceptable' and 'satisfactory' are used in the Contract Documents, they shall be considered to be followed by the words 'to the Consultant' unless the context provides otherwise.
- 1.11 The terms "exposed" or "exposed to view" refers to surfaces that are within the line of vision of persons from any accessible viewpoint, both within and without the building. Where any part of a surface is exposed to view, all other portions of that surface shall also be considered as exposed to view.

- 1.12 Contractor to add The City of Toronto and Cherie Ng Architect Inc. as Additional Insured Names in the Contractor's Commercial General Liability insurance policy.
- 1.13 Contractor to forward a copy of their Commercial General Liability Insurance Certificate of Insurance with the Additional Insured Names to the architect at the Pre-Construction Meeting.

## **2 EXISTING SITE CONDITIONS**

- 2.1 Make a careful examination of the site, and investigate and be satisfied as to all matters relating to the nature of the Work to be undertaken, as to the means of access and egress thereto and therefrom, as to the obstacles to be met with, as to the extent of the Work to be performed, any limitations under which the work has to be executed, and any and all matters which are referred to in the Contract Documents.
- 2.2 Report any inconsistencies, ambiguities, discrepancies, omissions, and errors between Site conditions and Contract Documents to the Consultant prior to the commencement of Work. If inconsistencies, ambiguities, discrepancies, omissions, and errors are not reported and clarified, the most stringent requirement shall govern, as determined by the Consultant. Ensure that each Subcontractor performing work related to the site conditions has examined it so that all are fully informed on all particulars which affect the Work thereon in order that construction proceeds competently and expeditiously.
- 2.3 Before commencing the Work of any Section or trade, carefully examine the Work of other Sections and trades upon which it may depend, examine substrate surfaces, and report in writing to the Consultant, defects which might affect new Work. Commencement of Work shall constitute acceptance of conditions and Work of other sections, trades, and Other Contractors upon which the new Work depends. If repair of surfaces is required after commencement of specific work it shall be included in the work of the trade providing the specific system or finish.

## **3 CONTINUITY OF EXISTING SERVICES**

- 3.1 Shutdowns and planning of operations that may affect Owner's use of services shall be coordinated with and in accordance with the Owner's written directions. Provide notice for all required interruptions to utility, heating, cooling, mechanical, electrical, and life safety systems.
- 3.2 Make written requests for shutdown at least 5 working days in advance, unless specifically stated herein or as otherwise instructed by the Owner.
- 3.3 Shutdowns shall be scheduled in advance with Owner and shutdown period shall be minimized to Owner's convenience. Facilities in existing adjacent areas will be occupied during the Work.
- 3.4 Major shutdowns shall take place on weekends or at night by prior arrangement with and at no additional cost to the Owner.
- 3.5 Minimize disruption, vibration, noise and dust to the function of existing building.

- 3.6 These requirements are for security reasons and for the consideration of the Owner. Requirements shall not be construed as cause for elimination or restriction of Contractor's working schedule, claims for delay or work, nor additional cost.

#### **4 ACCESS / PROPERTY CONSTRAINTS**

- 4.1 Provide and maintain access facilities as may be required for access to the Work.
- 4.2 Minimize disruption, noise and dust to the functions of existing operational areas of existing buildings. Times of entry, routes of access and time required to complete the Work shall be arranged and scheduled in cooperation with the Owner.
- 4.3 Confine Work and operations of employees to limits indicated by the Contract Documents. Do not unreasonably encumber the premises with products.
- 4.4 Organize delivery of materials/equipment to and removal of debris and equipment from place of Work to permit continual progress of work and suitable for restricted site conditions.
- 4.5 Determine and make arrangement as required for loading and unloading of equipment and Products at times that will not affect public traffic flow and that will be permitted by the City of Toronto. Conform to City by-laws with regard to parking restrictions and other conditions.
- 4.6 Make provisions and arrangements and provide allowances if times for loading and unloading allowed by the City of Toronto are other than regular working hours.
- 4.7 All Products, materials and equipment required on Site shall be portable and/or size suitable for access and movement on Site and without causing damage to buildings.
- 4.8 Workers shall not enter existing building beyond construction areas except where required for connection or modification to existing services or other such work. Arrange such requirements with Owner prior to entering existing occupied areas.
- 4.9 Provide locked doors in barriers, permit access by Owner and Consultant to Work areas and to areas Contractor is responsible for.

#### **5 SETTING OUT**

- 5.1 Before commencing work, verify lines, levels and dimensions shown on the drawing and report discrepancies in levels or dimensions to the Consultant. Be responsible for work done prior to the receipt of the Consultant's decision regarding reported discrepancies

#### **6 PARKING**

- 6.1 Parking may be permitted on Site provided it does not disrupt the performance of Work, Site safety or the movement of vehicular or pedestrian traffic and is acceptable to the Consultant and permitted by the City of Toronto.

#### **7 COORDINATION**

- 7.1 Coordination of the Work of all Sections of the specifications as required to complete the Project is the responsibility of the Contractor.
- 7.2 Coordinate with removals/installations specified in other Divisions and Other Contracts.
- 7.3 Ensure that Subcontractors and trades cooperate with other subcontractors and trades whose work attaches to or is affected by their own work. Ensure that minor adjustments are made to make adjustable work fit fixed work.
- 7.4 Allow access of Owner's Other Contractors on site and to areas of Work. Cooperate and coordinate with such Other Contractors. Schedule work to complement work of such Other Contractors.
- 7.5 Entry by the Owner's own forces and by Other Contractors shall not mean acceptance of the Work and shall not relieve the Contractor of their responsibility to complete the Contract.
- 7.6 Existing equipment shall remain in present locations unless designated otherwise. Protect from damage. Remove, store and reinstall existing fixed equipment, fixtures and components which interfere with construction and which are scheduled for relocation.
- 7.7 Placing, installation, application and connection of work by the Owner's own forces or by Other Contractors on and to the Contractor's Work shall not relieve the Contractor of his responsibility to provide and maintain the specified warranties.
- 7.8 Pay particular attention to types of ceiling construction and clearances throughout, especially where recessed fixtures are required. Coordinate work with Other Contractors and Subcontractors wherever ventilation ducts or piping installations occur to ensure that conflicts are avoided.
- 7.9 Install ceiling mounted components in accordance with final ceiling plans. Inform Consultant of conflicting installations. Install as directed.
- 7.10 Install and arrange ducts, piping, tubing, conduit, equipment, fixtures, materials and products to conserve headroom and space with minimum interference and in neat, orderly and tidy arrangement. Run pipes, ducts, tubing and conduit, vertical, horizontal and square with building grid unless otherwise indicated. Install piping, ducts, and conduit as close to underside of structure as possible unless shown otherwise.
- 7.11 Make provision for unrestricted relocation of light fixtures to replace ceiling panels at grid spaces of the same size, without interference or restriction by items located within the ceiling space.
- 7.12 Where supports or openings are to be left for the installation of various parts of the Work furnish the necessary information to those concerned in ample time so that proper provision can be made for such items. Cutting, drilling and the subsequent patching required for failing to comply with this requirement shall be performed at a later date at no additional Cost to Owner.
- 7.13 Ensure that setting drawings, templates, and all other information necessary for the location and installation of materials, fixtures, equipment, holes, sleeves, inserts, anchors, accessories, fastenings, connections, and access panels are provided by each Section whose work requires cooperative location and installation by other

Sections, and that such information is communicated to the applicable installer. Cutting, fixing and 'making good' of the work of other Contractors, Subcontractors and trades and making up of lost time involved in failing to comply with this requirement shall be performed at no additional Cost to Owner.

- 7.14 Be responsible for coordinating products supplied in metric (SI) and imperial units into the overall layout.
- 7.15 Properly coordinate the work of the various Sections and trades, taking into account the existing installations to assure the best arrangement of pipes, conduits, ducts and refrigeration, mechanical, electrical and other equipment, in the available space. Under no circumstances will any extra payment be allowed due to the failure by the Contractor to coordinate the Work. If required, in critical locations, prepare interference and/or installation drawings showing the work of the various Sections as well as the existing installation, and submit these drawings to the Consultant for review before the commencement of Work.
- 7.16 Protect from damage. Remove, store and reinstall existing fixed equipment, fixtures and components which interfere with construction and which are scheduled for relocation.
- 7.17 Coordinate with structural, refrigeration, mechanical and electrical trades to ensure protecting, supporting, disconnecting, cutting off, capping, diverting, relocating or removing of existing services in areas of Work before commencement of alteration work.
- 7.18 In case of damage to active services or utilities, notify Consultant and respective authorities immediately and make all required repairs under direction of Consultant and respective authorities. Carry out repairs to such damaged services and utilities continuously to completion, including working beyond regular working hours.

## **8 METRIC DIMENSIONS**

- 8.1 Measurements in this specification are expressed in metric (SI) units and depending on the progress made in the various sectors of the industry are either hard or soft converted units.
- 8.2 All metric units specified shall be taken to be the minimum acceptable unless otherwise noted.
- 8.3 It is the Contractor's responsibility to check and verify with manufacturers and suppliers on the availability of materials and products in either metric or imperial sizes. Be responsible for coordinating products supplied in metric (SI) and imperial units into the overall layout.
- 8.4 Where both metric and imperial sizes or dimensions are shown, the metric size or dimension shall govern.

## **9 BUILDING DIMENSIONS**

- 9.1 Take necessary job dimensions for the proper execution of the work. Assume complete responsibility for the accuracy and completeness of such dimensions, and for coordination.

- 9.2 Verify that work, as it proceeds, is executed in accordance with dimensions and positions indicated which maintain levels and clearances to adjacent work, as set out by requirements of the Drawings, and ensure that work installed in error is rectified before construction resumes.
- 9.3 Check and verify dimensions referring to the work and the interfacing of services.
- 9.4 Do not scale directly from the Drawings. If there is ambiguity or lack of information, immediately inform the Consultant. Changes required through the disregarding of this clause shall be the responsibility of the Contractor.
- 9.5 All details and measurements of any work which is to fit or to conform with work installed shall be taken at the building.
- 9.6 Advise Consultant of discrepancies and if there are omissions on Drawings, particularly reflected ceiling plans and jointing patterns for surfaces finishes, which affect aesthetics, or which interfere with services, equipment or surfaces. Do not proceed with work affected by such items without direction from the Consultant.
- 9.7 Provide written requirements for site conditions and surfaces necessary for the execution of respective work, and provide setting drawings, templates and all other information necessary for the location and installation of material, holes, sleeves, inserts, anchors, accessories, fastenings, connections and access panels. Inform respective contractors whose work is affected by these requirements and preparatory work.

## **10 INTERFERENCE AND COORDINATION DRAWINGS**

- 10.1 Coordinate placement of equipment to ensure that components will be properly accommodated within the spaces provided prior to commencement of work.
- 10.2 Prepare interference and equipment placing drawings to ensure that all components will be properly accommodated within the spaces provided.
- 10.3 Prepare drawings to indicate coordination and methods of installation of a system with other systems where their relationship is critical. Ensure that all details of equipment apparatus, and connections are coordinated.
- 10.4 Take complete responsibility for any remedial work that results from failure to coordinate any aspect of the Work prior to its fabrication/installation.
- 10.5 Ensure that accesses and clearance required by jurisdictional authorities and/or for easy maintenance of equipment are provided in the layout of equipment and services.

## **11 CUTTING AND PATCHING**

- 11.1 Execute Work to avoid damage to other Work.
- 11.2 Execute cutting, fitting and patching including excavation and fill to complete the Work.
- 11.3 Employ appropriate trades with skilled labour to perform cutting Work.
- 11.4 Fit Work segments together, to integrate with penetrations through surfaces and with other Work.



- 11.5 Remove and replace defective and non-conforming Work.
- 11.6 Do any drilling, cutting, fitting, patching and finishing that may be required to make the various classes and kinds of other Work fit together in a professional and finished manner. Make watertight connections with adjoining structures
- 11.7 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- 11.8 Execute Work by methods to avoid damage to other Work and which will provide proper surfaces to receive patching and finishing.
- 11.9 Cut Products using proper equipment and methods. On rigid materials, use a masonry saw or core drill. Pneumatic or impact tools are not allowed on masonry work without prior approval.
- 11.10 Where new Work connects with existing structures, cut, patch and make good existing work to match original condition.
- 11.11 Be responsible for correct formation and bridging of openings in masonry and structural walls as required.
- 11.12 Ensure compatibility between installed Products and ensure security of installation.
- 11.13 Restore Work with new Products in accordance with requirements of the Contract Documents.
- 11.14 Fit Work airtight to pipes, sleeves, ducts, conduits and other penetrations through surfaces.
- 11.15 Properly prepare surfaces to receive patching and finishing.
- 11.16 Refinish surfaces to match adjacent finishes; for continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.

## **12 FIRE RATINGS**

- 12.1 Where a material, component or assembly is required to be fire rated, the fire rating shall be as determined or listed by one of the following testing authorities acceptable to the authorities having jurisdiction:
- 12.2 Underwriters' Laboratories of Canada.
  - .1 Underwriters' Laboratories Inc.
  - .2 Factory Mutual Laboratories.
  - .3 The National Research Council of Canada.
  - .4 The National Board of Fire Underwriters.
  - .5 Intertek Testing Services.
- 12.3 Where reference is made to only one testing authority an equivalent fire rating as determined or listed by another of the aforementioned testing authorities is acceptable if approved by authorities having jurisdiction. Obtain and submit such approval of authorities, in writing when requesting acceptance of a proposed equivalent rating or test design.

**13 FIRE SEPARATIONS**

- 13.1 Conform to following requirements to maintain continuity of fire separations whether or not shown on the Contract Drawings.
- 13.2 Fire separations may be pierced by openings for electrical and similar service outlets provided such boxes are non-combustible and are tightly fitted and sealed with a ULC approved sealant for the assembly being sealed.
- 13.3 Construction that abuts on or is supported by a non-combustible fire separation shall be constructed so that its collapse under fire conditions will not cause the collapse of the fire separation.
- 13.4 At penetration through fire rated walls, ceilings or floors, completely seal voids with ULC approved firestopping material; full thickness of the construction element. In locations that require a smoke seal, provide appropriate ULC approved system installed in accordance with the manufacturer's recommendations.

**14 CODES**

- 14.1 Reference is made to standards in the specifications to establish minimum acceptable standards of materials, products and workmanship. Ensure that materials, products and workmanship meet or exceed requirements of the reference standards specified.
- 14.2 In the event of conflict between documents specified herein, execute the Work in accordance with the most stringent requirements.

**15 STANDARDS**

- 15.1 Where a material or product is specified in conjunction with a referenced standard, do not supply the material or product if it does not meet the requirements of the standard. Supply another specified material or product, or an acceptable material or product of other approved manufacture which does meet the requirements of the standard, at no additional cost to the Owner.
- 15.2 Where no standard is referred to, provide materials, products and workmanship which meet requirements of the applicable standards of the Canadian Standards Association, and Canadian General Standards Board.
- 15.3 If there is question as to whether a material, product or system is in conformance with applicable standards, the Consultant reserves the right to have such materials, products or systems tested to prove or disprove conformance. The cost for such testing will be paid by the Owner in the event of conformance with contract Documents or by the Contractor in the event of non-conformance.
- 15.4 Where application, installation and workmanship standards are cited, it is intended that referenced standards form the basis for minimum requirements of the specified item and specifications supplement the standards unless specified otherwise.
- 15.5 Matters may be dealt with in part by these specifications which are also dealt with, under the same or similar headings in cited standard. It is not intended that these

specifications take the place of the standards but supplement them, unless specified otherwise.

- 15.6 Where reference is made to manufacturer's directions, instructions or specifications they shall include full information on storing, handling, preparing, mixing, installing, erecting, applying, or other matters concerning the materials pertinent to their use and their relationship to materials with which they are incorporated.

## **16 PRE-CONSTRUCTION MEETING**

- 16.1 Attend a pre-construction meeting, arranged and conducted by the Consultant.
- 16.2 Co-ordinate and organize attendance by representatives of major Subcontractors and parties in contract with the Contractor.
- 16.3 Consultant will arrange attendance of other interested parties not responsible to the Contractor.
- 16.4 Consultant will distribute copies of Agenda prior to meeting.
- 16.5 Be prepared to provide specific information relative to agenda items as they are pertinent to the Contract.
- 16.6 Record minutes of meeting and distribute type written copies to all participants and other interested parties, within one week of meeting date.

## **17 PROGRESS MEETINGS**

- 17.1 Attend regularly scheduled progress meetings to be held on Site at times and dates that are mutually agreed to by the Owner, Consultant, and Contractor.
- 17.2 Co-ordinate and organize attendance of individual Subcontractors and material suppliers when requested. Relationships and discussions between Subcontractor participants are not the responsibility of the Consultant and do not form part of the meetings content.
- 17.3 Ensure that Contractor representatives in attendance at meetings have required authority to commit Contractor to actions agreed upon. Assign same persons to attend such meetings throughout the contract period.
- 17.4 Inform the Consultant in advance of meetings regarding all items to be added to the agenda.
- 17.5 Consultant will distribute copies of Agenda prior to meeting.
- 17.6 Be prepared to provide specific information relative to agenda items at each meeting as they are pertinent to the Contract.
- 17.7 Agenda will include but not be limited to the following topics as are pertinent to the Contract.
- .1 Review and agreement of previous minutes.
  - .2 Construction safety.
  - .3 Status of submittals.
  - .4 Quality control.
  - .5 Co-ordination.

- .6 Contract Schedule.
  - .7 Work plan up to next scheduled meetings.
  - .8 Requests for information/clarification.
  - .9 Contemplated changes.
- 17.8 Record minutes of meeting and distribute type written copies to all participants and other interested parties, within one week of meeting date.
- 18 PRODUCT DATA**
- 18.1 Before delivery of Products to the Site, submit Product data as specified in each section or as requested by the Consultant.
- 18.2 Submit manufacturer's Product data for systems, materials, and methods of installation proposed for use. Such literature shall identify systems, each component, and shall certify compliance of each component with applicable standards
- 19 SAMPLES**
- 19.1 Before delivery of Products to the Site, submit samples of Products as specified or as requested by the Consultant. Label samples as to origin and intended use in the Work and in accordance with the requirements of the Specification Sections. Samples must represent physical examples to illustrate materials, equipment or work quality and to establish standards by which completed Work is judged.
- 19.2 Ensure samples are of sufficient size and quantity, if not already specified, to illustrate:
- .1 The quality and functional characteristics of Products, with integrally related parts and attachment devices.
  - .2 Full range of colours available.
- 19.3 Notify the Consultant in writing, at time of submission, of any deviations in samples from requirements of the Contract Documents, and state the reasons for such deviations.
- 19.4 Identify samples with Project name, Contract number, date, Contractor's name, number and description.
- 19.5 If samples are not acceptable, both samples will be returned. If samples are acceptable, one sample will be so indicated and returned. Be responsible for the cost of samples that are not accepted and for resubmission of samples.
- 19.6 Acceptable samples shall serve as a model against which the products incorporated in the work shall be judged.
- 19.7 Each Product incorporated in the Work shall be precisely the same in all details as the acceptable sample.
- 19.8 Should there be any change from the accepted sample, submit in writing for approval of the revised characteristics and resubmit samples of the Product for approval if requested.
- 19.9 When samples are very large, require assembly, or require evaluation at the Site, they may be delivered to the Site, but only with approval and as directed.

**20 SHOP DRAWINGS**

- 20.1 Arrange for the preparation of shop drawings as called for in the Contract Documents or as may be reasonably requested by the Consultant. The Contractor and each Subcontractor shall operate as experts in their respective fields and all shop drawings and samples shall conform to the requirements of the Contract Documents.
- 20.2 The term "shop drawings" means drawings, diagrams, schematics, illustrations, schedules, performance charts, brochures and other data which are required to illustrate details of the Work.
- 20.3 In addition to shop drawings specified in the specification sections, submit shop drawings required by jurisdictional authorities in accordance with their requirements.
- 20.4 Shop drawings shall indicate the following minimum criteria and any additional criteria indicated in the individual specification sections requiring shop drawings:
- .1 Clear and obvious notes of any proposed changes from the Contract Documents.
  - .2 Fabrication and erection dimension.
  - .3 Provisions for allowable construction tolerances and deflections provided for live loading.
  - .4 Details to indicate construction arrangements of the parts and their connections, and interconnections with other work.
  - .5 Location and type of anchors and exposed fastenings.
  - .6 Materials, physical dimensions including thicknesses, and finishes.
  - .7 Descriptive names of equipment.
  - .8 Information to verify that superimposed loads will not affect function, appearance, and safety of the work detailed as well as of interconnection work.
  - .9 Assumed design loadings, and dimensions and material specifications for loadbearing members.
- 20.5 Include in shop drawing submissions detailed information, templates, and installation instructions required for incorporation and connection of the Work.
- 20.6 Before submitting to the Consultant, review all shop drawings to verify that the Products illustrated therein conform to the Contract Documents. By this review, the Contractor agrees that it has determined and verified all field dimensions, field construction criteria, materials, catalogue numbers and similar data and that it has checked and coordinated each shop drawing with the requirements of the Work and of the Contract Documents. The Contractor's review of each shop drawing shall be indicated by stamp, date and signature of a qualified and responsible person possessing the appropriate authorization.
- 20.7 Be responsible for dimensions to be confirmed and correlated at the Site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for coordination of the Work of all subtrades.
- 20.8 Submit shop drawings for the Consultant's review with reasonable promptness and in orderly sequence so as to cause no delay in the Work nor in the work of Other Contractors. At the time of submission, notify the Consultant in writing of any deviations in the shop drawings from the requirements of the Contract Documents. The Contractor will be held responsible for changes made from the Contract

Documents which are not indicated or otherwise communicated in writing with the submission.

- 20.9 Drawings submitted by the Contractor as required herein are the property of the Owner who may use and duplicate such drawings where required in association with the Work.
- 20.10 Submit shop drawings, as indicated in each section of the Work, signed and sealed by a licensed Professional Engineer registered in the place of the Work.
- 20.11 Shop drawings shall have distinct, uniform letters, numerals and line thicknesses that will ensure the production of clear legible prints and also facilitate reduced reproduction.
- 20.12 Shop drawings shall contain the following identification:
- .1 Project name and Contract number.
  - .2 Applicable 6-digit Contract Specification number describing the item.
  - .3 Location (unit, level, room number, etc.).
  - .4 Name of equipment or Product.
  - .5 Name of Subcontractor or supplier.
  - .6 Signature of Contractor certifying that Shop drawing is in conformance with Contract Documents.
  - .7 On submissions subsequent to the first, the following additional identification:
    - .1 The revision number.
    - .2 Identification of the item(s) revised.
- 20.13 Dimensions and designations of elements shall be shown in the same system of measurement used on the applicable Contract Drawings.
- 20.14 Consultant reserves the right to refuse acceptance of drawing submissions not meeting the above requirements.
- 20.15 Consultant's review will be for conformity to the design concept and for general arrangement only and such review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the Contract Documents unless a deviation on the shop drawings has been approved in writing by the Consultant. Review does not mean that Consultant approves detail inherent in shop drawings, responsibility which shall remain with Contractor submitting same.
- 20.16 Contractor shall make any changes in shop drawings which the Consultant may require consistent with the Contract Documents and re-submit unless otherwise directed by the Consultant. When re-submitting the shop drawings, the Contractor shall notify the Consultant in writing of any revisions other than those requested by the Consultant.
- 20.17 Only drawings noted for revision and resubmission need be resubmitted.
- 20.18 File one copy of each submitted shop drawing at the Site.
- 20.19 Allow two weeks for the Consultant's review of each submission.

**21 CERTIFICATES**



- 21.1 Submit certificates that are required by authorities having jurisdiction or that are requested in the specification sections.
- 21.2 Clearly show on each certification the name and location of the Work, name and address of Contractor, quantity and date of shipment and delivery and name of certifying company.
- 21.3 Certificates shall verify that Products and/or methods meet the specified requirements and shall include test reports of acceptable testing laboratories to validate certificates.
- 21.4 Submit certificates in duplicate and signed by an authorized representative of the certifying company

## **22 CERTIFICATION OF TRADESPERSON**

- 23 Provide certificates, at the request of the Consultant, to establish qualifications of personnel employed on the Work where such certification is required by authorities having jurisdiction, by the Consultant or by the Contract Documents.

## **24 EXTENDED WARRANTIES**

- 24.1 Submit extended warranties as requested in sections of the Specifications showing title and address of Contract, warranty commencement date and duration of warranty.
- 24.2 Extended warranties shall commence on termination of the standard warranty specified in the conditions of the contract and shall be an extension of these provisions. Clearly indicate what is being warranted and what remedial action is to be taken under the warranty. Ensure warranty bears the signature and seal of the Contractor.
- 24.3 Submit each extended warranty on a form that is acceptable to the Owner and Consultant.

## **25 SAFETY**

- 25.1 For the purposes of the Contract, the term "Constructor", as defined in the Occupational Health and Safety Act, shall mean the Contractor who shall be responsible for ensuring that the provisions of the statutes, regulations and by-laws pertaining to the safe performance of the Work are to be observed. The "Constructor" shall submit the Notice of Project.
- 25.2 In the event of conflict between any of the provisions of Statutes, Regulations and Bylaws, and other requirements of authorities, the most stringent provision applies.
- 25.3 The Contractor's representative shall be responsible for ensuring that the provisions of statutes, regulations and by-laws pertaining to safe performance of the Work and the work of Other Contractors and Owner's own forces working on the Site are observed and that the methods of performing the Work do not endanger the personnel employed thereon nor the general public, and are in accordance with the latest edition of the Occupational Health and Safety Act. Include on the Joint Health and Safety Committee representatives of Other Contractors working on Site.

25.4 Prior to the Contractor's representative being absent from the Site for an extended period during execution of the Work, the Contractor's representative will name, in writing to the Consultant, another person who is competent to assume these responsibilities. The Contractor shall advise the Consultant of change of the individual identified as the Contractor's representative.

25.5 At the discretion of the Consultant, the "Constructor" designation may be transferred to/from a Contractor at any time at no additional cost to the Owner.

## **26 PROJECT RESPONSIBILITIES**

26.1 The Contractor's representative shall ensure that:

26.2 All measures and procedures prescribed by the following Acts and Regulations are carried out on Site:

- .1 The Occupational Health and Safety Act;
- .2 The Regulations for Construction Projects;
- .3 WHMIS Regulations;
- .4 The Environmental Protection Act and regulations,
- .5 COVID-19 Construction Practice
- .6 All other legislation, regulations and standards as applicable.

26.3 Every employer and every worker performing Work on the Site must comply with the requirements referred to above.

26.4 Ensure that the health and safety of workers, employees of the Owner and the general public are protected in relation to the Work performed on the Site.

## **27 WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS)**

27.1 Be familiar with and comply with WHMIS regulations.

27.2 Properly label controlled products. Provide proper warning labels and training at the Site.

27.3 Maintain on site for duration of Contract a hazardous materials log containing all required MSDS. Log shall be open for inspection by Owner, Consultant and all personnel on Site.

27.4 Provide copies of material safety data sheets (MSDS) for any controlled products prior to delivery to the Site.

27.5 Be responsible for all applicable requirements of the regulations.

27.6 Before commencing any Work on Site, attend the pre-construction meeting and provide the Consultant with a proposal as to how hazardous materials will be stored and dispensed on Site. In addition, specifically outline the measures which will be undertaken to prevent damage or injury in the event of an accidental spill.

27.7 Provide "Handling Procedure for Hazardous Materials".

## **28 JOINT HEALTH AND SAFETY COMMITTEE**

- 28.1 The Contractor shall be responsible for the establishment and operation of the Joint Health and Safety Committee as required by the Occupational Health and Safety Act.

**29 SAFETY DELIVERABLES**

- 29.1 The Contractor shall deliver to the Consultant:
- .1 The Contractor's Occupational Health and Safety Policy.
  - .2 The Contractor's safety program to implement the Occupational Health and Safety Policy for the Contract, which will effectively prevent and control accidents for the Contract.
  - .3 A copy of all communications with, and including all orders by, the Ministry of Labour or other occupational health and safety enforcement authority.
  - .4 A copy of all accident/injury investigation reports, not just the WSIB Form 7 Employer's Report of Injury Disease. Each report must contain a statement of actions that will be taken to prevent a recurrence.
  - .5 A copy of all inspection reports made by the Contractor in compliance with the employer's responsibility under the Occupational Health and Safety Act.
  - .6 A copy of all safety information pertaining to the Contract made and furnished by the Contractor's own "Safety Personnel" or outside consultants/advisers engaged for the purpose of inspecting the workplace for occupational health and safety.
  - .7 A verification that all workers in the employ of the Contractor on Site, have had a WHMIS training or refresher course within the last twelve months.
  - .8 A verification that all workers in the employ of the Contractor have had "Explosive Activated Tool Training" on the type of tools being used.
  - .9 A verification that the instruction manuals are on Site for all tools and equipment being used.
  - .10 A copy of the most recent workers compensation experience rating account, i.e. CAD-7, NEER, and/or an insurance carrier's experience rating account.
  - .11 Statistical information for the purpose of determining injury frequency and severity rates (hours worked, first-aid injuries, medical aid injuries, lost time injuries, restricted workday injuries, near-miss accident/incident and significant occurrence data), in a timely manner as required by the Consultant.
  - .12 The immediate reporting to the Consultant of all instances that are defined in the Occupational Health and Safety Act as "Notices of Injuries" and "Occurrences" and any occasion that a worker exercises their "Right to Refuse Unsafe Work".
  - .13 The Consultant reserves the right to require additional or amended deliverables pertaining to safety during the duration of the Work at no additional cost to the Owner.
  - .14 Items specified above shall be delivered to the Consultant prior to the Contractor commencing Work on the Site.

**30 DUE DILIGENCE**

- 30.1 The Contractor acknowledges that it has read and understands the measures and procedures relating to occupational health and safety as prescribed above. The Contractor acknowledges and understands its duties as therein set out and hereby

expressly undertakes and agrees to comply with all such requirements and standards in their entirety and at the Contractor's expense.

- 30.2 The Contractor further agrees to fully cooperate with all health and safety requirements, rules, regulations, standards and criteria set out in the Contract Documents, which agreement is in furtherance of the Contractor's duties and responsibilities under occupational health and safety legislation.
- 30.3 The Contractor agrees that if, in the opinion of the Consultant or Owner, the health and safety of a person or persons is endangered or the effective operation of the system put in place to ensure the health and safety of workers on the Site is not being implemented, the Consultant or Owner may take such action as it deems necessary and appropriate in the circumstances, including, without limitation, the following:
  - 30.4 Require the Contractor to remedy the condition forthwith at its own expense;
  - 30.5 Require that the Site be shut down in whole or in part until such time as the condition has been remedied;
  - 30.6 Remedy the problem and the Owner shall back-charge the Contractor for the cost of such remedial work, together with an appropriate overhead factor as determined by the Owner in its sole discretion; and
  - 30.7 Terminate the Contract without further liability in the event the Contractor fails to comply with these provisions.
- 30.8 If a lien is registered, in respect to any monies held back, back-charged or assessed in accordance with these paragraphs, the Contractor shall consent to an order vacating such registration and shall indemnify the Owner for any and all loss, whereby direct or consequential which the Owner may sustain as a consequence of such registration.

### **31 SITE SAFETY PERSONNEL**

- 31.1 In the event the Consultant deems it necessary, because of the Work, the Contractor shall assign a "Competent Safety Person" to assist the Contractor's representative in the discharging of safety responsibility, at no additional cost to the Owner.

### **32 PROGRESS PHOTOGRAPHS**

- 32.1 Concurrently with monthly application for payment submit digital pictures by online cloud storage illustrating the progress of the Work as follows:
  - .1 A minimum of 20 pictures that best illustrate the progress on the site.
  - .2 Pictures shall be in focus and properly illuminated; view shall be unobstructed.
  - .3 Pictures shall be taken with a minimum 5 megapixel camera or better such that quality and details can be discerned from photo.
  - .4 The Pictures shall either have an accurate date-stamp present in the photo, or be numbered and dated in the digital filename.
  - .5 The photo's shall be labeled with the following information: The project name, the period the pictures are taken in, the monthly application number which the pictures are associated with.

**33 SCHEDULES**

33.1 Be responsible for planning and scheduling of the Work. As a minimum, prepare and update the following schedules:

- .1 Contract Schedule.
- .2 Detailed Construction Schedule.

33.2 Be responsible for ensuring that Subcontractors plan and schedule their respective portions of the Work. Subcontractor's schedules shall form part of the above mentioned schedules.

33.3 Contract Schedule:

- .1 Prepare and submit the Contract Schedule within two weeks following award of Contract. This schedule, once it is reviewed by the Consultant and if it meets the Consultant's project requirements, will become contractual.
- .2 The Contract Schedule shall be developed using a logic network technique for planning and scheduling.
- .3 The Contract Schedule shall be submitted for approval in its optimum levelled form. This presentation may be in either a time scaled network or a bar chart form. It shall be subdivided into either work areas or systems as applicable.
- .4 The Contract Schedule shall include the following information:
  - .1 Starting and ending dates of each activity including the float periods;
  - .2 Manpower requirements for each activity;
  - .3 Interdependency with activities of other Contractors;
  - .4 Dates specified in the Contract Documents;
  - .5 Dates on which specific data will be required for submittal, i.e., Vendor data, drawings for review, etc.
- .5 This schedule shall be reviewed and updated monthly by the Contractor so as to reflect any Contract changes as well as major changes to the schedule

33.4 Detailed Construction Schedule:

- .1 Prepare and submit a detailed construction schedule within two weeks of final review and acceptance of the Contract Schedule. This schedule, once it is reviewed and accepted by the Consultant, will be updated and submitted monthly with the Contract Schedule and weekly once the Contractor starts on Site.
- .2 This schedule shall cover the construction period. It will show, in detail, activities on a daily basis indicating durations, manpower and constraints. The activities shown on this schedule shall further clarify or detail the activities shown on the Contract Schedule.
- .3 The detailed construction schedule shall be presented in a bar chart form.

**34 INSPECTION AND TESTING BY THE OWNER**

34.1 The Consultant, on behalf of the Owner may appoint an independent inspection and testing company to carry out inspection and testing of the Work for conformance to the Contract Documents. Such costs for inspection and testing will be paid by the Owner.

However, any additional inspection and testing due to non-conformance to the Contract Documents shall be at the Contractor's expense.

- 34.2 Inspections and testing by the independent inspection and testing company will be promptly made. Uncover for examination any Work covered up prior to inspection or without approval of the Consultant. Make good such Work at no cost to the Owner.
- 34.3 The Owner may inspect and test Products during manufacture, fabrication, shop testing, installation, construction and testing phases of the Contract. The Consultant will ascertain the quantity and quality of testing to be performed. Inspection and testing may be performed at the place of manufacture/fabrication, storage, or at the Site as designated by the Consultant. Where inspection and testing is done either during manufacture, fabrication, or at Site, ensure that proper facilities and assistance are provided.

### **35 INSPECTION AND TESTING**

- 35.1 Source and Field Quality Control specified in Other Sections:
- .1 This Section includes requirements for performance of inspection and testing specified under Source Quality Control and Field Quality Control in other Sections of the specifications.
- .2 Do not include in work of this Section responsibilities and procedures that relate solely to an inspection and testing company's functions that are specified in another Section which is paid for directly by the Owner. Such information is included in this Section for Contractor's information only.

### **36 QUALIFICATIONS OF INSPECTION AND TESTING COMPANIES**

- 36.1 Inspection and testing companies to be certified by the Standards Council of Canada (SCC) or Canadian Council of Independent Laboratories (CCIL).
- 36.2 Companies engaged for inspection and testing shall provide equipment, methods of recoding and evaluation, and knowledgeable personnel to conduct tests precisely as specified in reference standards.
- 36.3 If requested, submit affidavits and copies of certificates of calibration made by an accredited calibrator to verify that testing equipment was calibrated and its accuracy ensured within the previous twelve months.

### **37 RESPONSIBILITIES OF THE CONTRACTOR DURING INSPECTION AND TESTING PROCEDURES**

- 37.1 Be responsible for quality control methods and procedures to ensure performance of the work in accordance with the Contract Documents.

### **38 RESPONSIBILITIES OF INSPECTION AND TESTING COMPANIES**



- 38.1 Determine from specifications and Drawings the extent of inspection and testing required for Work of the Contract. Subcontractors shall notify Consultant of any omissions or discrepancies in the work inspected and/or tested.
- 38.2 Perform applicable inspection and testing described in the Specifications and as may be additionally directed.
- 38.3 Provide competent inspection and testing personnel when notified by the Contractor that applicable work is proceeding. Inspection personnel shall cooperate with the Consultant and Contractor to expedite the Work.
- 38.4 Subcontractors shall notify the Consultant and Contractor of deficiencies and irregularities in the Work immediately when they are observed in the course of inspection and testing.
- 38.5 Inspection and testing companies shall not perform or supervise any of the Contractor's work, and shall not authorize:
- 38.6 Performance of work that is not in strict accordance with the Contract Documents.
- 38.7 Approval or acceptance of any part of the Work.

#### **39 INSPECTION AND TESTING PROCEDURES**

- 39.1 Perform specified inspection and testing only in accordance with specified reference standards, or as otherwise approved.
- 39.2 Observe and report on compliance of the Work to requirements of Contract Documents.
- 39.3 Ensure that inspectors are on site or at fabricator's operations for full duration of critical operations, and as otherwise required to determine that the Work is being performed in accordance with the contract Documents.
- 39.4 Identify samples and sources of materials.
- 39.5 Review and report on progress of the work. Report on count of units fabricated and inspected at fabricator's operations.
- 39.6 Observe and report on conditions of significance to work in progress at time of inspection or at fabricator's operations. Include where applicable and if critical to the work in progress:
  - .1 Time and date of inspection.
  - .2 Temperature of air, materials, and adjacent surfaces.
  - .3 Humidity of air, and moisture content of materials and adjacent materials.
  - .4 Presence of sunlight, wind, rain, snow and other weather conditions.
  - .5 Include in reports all information critical to inspection and testing.
  - .6 Ensure that only materials from the work and intended for use therein are tested.
  - .7 Determine locations for work to be tested.

#### **40 TOLERANCES FOR INSTALLATION OF WORK**

- 40.1 Unless specifically indicated otherwise, Work shall be installed plumb, level, square and straight.

- 40.2 Unless acceptable tolerances are otherwise specified in specification sections or are otherwise required for proper functioning of equipment, site services, and mechanical and electrical systems:
- .1 "Plumb and level" shall mean plumb or level within 1 mm in 1 m.
  - .2 "Square" shall mean not in excess of 10 seconds lesser or greater than 90 degrees.
  - .3 "Straight" shall mean within 1 mm under a 1 m long straightedge.
  - .4 "Flush" shall mean within:
    - .1 6 mm for exterior concrete, masonry, and paving materials.
    - .2 1 mm for interior concrete, masonry, tile and similar surfaces.
    - .3 0.05 mm for other interior surfaces.
- 40.3 Allowable tolerances shall not be cumulative.

#### **41 DEFECTS**

- 41.1 Defective products, materials and workmanship found at any time prior to Contract Completion will be rejected regardless of previous inspections, testing, and reviews of the Work. Inspections, testing, and reviews shall not relieve the Contractor from their responsibility, but are a precaution against oversight or error. Remove and replace defective and rejected products, materials, systems, and workmanship. Be responsible for delays and expenses caused by rejection.

#### **42 DOCUMENTS ON SITE**

- 42.1 Maintain at job site, one copy of each of the following:
- .1 Contract Documents including Drawings, Specifications, Addenda, and other modifications to the Contract.
  - .2 'Reviewed' or 'Reviewed as Modified' Shop Drawing
  - .3 Project Construction and Shop Drawing Schedules. Site Instructions and Change Orders.
  - .4 Field Test Reports.
  - .5 Reports by Authorities having Jurisdiction. Building and other applicable permits.
  - .6 Daily log including:
    - .1 Weather conditions.
    - .2 Excavation conditions
    - .3 Start and finish date of each Trade Contractor.
    - .4 Erection and removal dates of formwork.
    - .5 Date, quantities and particulars of each concrete pour.
    - .6 Dates and quantities and particulars of roofing and waterproofing work. Visits to the Site by Owner, Consultants, Jurisdictional Authorities, Testing and Inspection companies, and material and equipment supplier representatives.
  - .7 Material Safety Data Sheet pursuant to WHMIS (Occupational Health & Safety Act).

- .8 As-built drawings recording as-built conditions, instructions, changes for structure, equipment, wiring, plumbing, etc., prior to being concealed.
- .9 Copies of applicable codes.
- .10 The above material shall be made available to the Consultant at their request.

**43 DRAINAGE**

- 43.1 Layout and construct work to ensure that positive drainage is provided to floor drains, ditches, site drains and catch basins, as set in their final position, preventing undrained areas and ponding.
- 43.2 Ensure that allowable construction tolerances and structural deflection do not cause ponding of water.
- 43.3 Report to Consultant in writing prior to executing work affected, in case adequate drainage cannot be provided.

**44 REGULATORY REQUIREMENTS**

- 44.1 The Building Code - Ontario Regulation 332/12, including all amendments, shall govern the construction of the Work.
- 44.2 The CSA B52 Standard – Mechanical Refrigeration Code
- 44.3 Comply with all By-Laws and regulations of authorities having jurisdiction. These codes and regulations constitute an integral part of the Contract Documents.
- 44.4 Owner shall apply and pay for Municipal Building Permit, and Contractor shall obtain and pay for all other permits, licenses, deposits, and certificates of inspection as part of the Contract Price as per Conditions of the Contract. Ensure that permits, licenses, deposits, and certificates included under specific Sections are provided as specified.
- 44.5 If required, pay for construction damage deposit required by authorities having jurisdiction.
- 44.6 Where permits, licences, and inspection fees are required by authorities having jurisdiction for specific trade functions, they shall be obtained by particular subtrade responsible for that work.
- 44.7 Arrange for inspection, testing of Work and acceptance required by the authorities having jurisdiction. Be responsible for necessary preparations, provisions and pay all associated costs.
- 44.8 Be responsible for ensuring that no work is undertaken which is conditional on permits, approvals, reviews, licences, fees, until all applicable conditions are met. No time extension will be allowed for delay in obtaining necessary permits.
- 44.9 Any additional work or changes to the materials due to Work not complying with the Ontario Building Code and Regulations as indicated by the Building Inspector shall be changed. All costs involved shall be borne by Contractor.
- 44.10 Obtain permit required to work on Municipal rights of way. Provide damage deposits for sidewalks, roads and services work, as applicable.

- 44.11 Give notice of completion of project prior to occupancy, as required by applicable legislation.

**45 EXISTING PUBLIC SERVICE LINES**

- 45.1 Where existing public services are indicated to be removed and/or relocated, perform Work in compliance with authorities having jurisdiction.
- 45.2 Make good public roads, walkways and curbs soiled or damaged due to construction to the requirements of local authorities.

**46 CODES**

- 46.1 Reference is made to standards in the specifications to establish minimum acceptable standards of materials, products and workmanship. Ensure that materials, products and workmanship meet or exceed requirements of the reference standards specified.
- 46.2 In the event of conflict between documents specified herein, execute the Work in accordance with the most stringent requirements.

**47 STANDARDS**

- 47.1 Where a material or product is specified in conjunction with a referenced standard, do not supply the material or product if it does not meet the requirements of the standard. Supply another specified material or product, or an acceptable material or product of other approved manufacture which does meet the requirements of the standard, at no additional cost to the Owner.
- 47.2 Where no standard is referred to, provide materials, products and workmanship which meet requirements of the applicable standards of the Canadian Standards Association, Canadian General Standards Board, Ontario Provincial standard specifications (OPSS), Ontario Provincial Standard Drawings (OPSD) and the applicable building code. References to "Measurement for Payment" and "Basis of Payment" in OPSS standard documents are not applicable to this Contract.
- 47.3 If there is question as to whether a material, product or system is in conformance with applicable standards, the Consultant reserves the right to have such materials, products or systems tested to prove or disprove conformance. The cost for such testing will be paid by the Owner in the event of conformance with contract Documents or by the Contractor in the event of non-conformance.
- 47.4 Where application, installation and workmanship standards are cited, it is intended that referenced standards form the basis for minimum requirements of the specified item and specifications supplement the standards unless specified otherwise.
- 47.5 Matters may be dealt with in part by these specifications which are also dealt with, under the same or similar headings in cited standard. It is not intended that these specifications take the place of the standards but supplement them, unless specified otherwise.
- 47.6 Where reference is made to manufacturer's directions, instructions or specifications they shall include full information on storing, handling, preparing, mixing, installing,

erecting, applying, or other matters concerning the materials pertinent to their use and their relationship to materials with which they are incorporated.

47.7 Where standards, specifications, associations, and regulatory bodies are listed in the Specifications by their abbreviated designations. These are but not limited to the following:

- .1 The Aluminium Association
- .2 Architectural Aluminium Manufacturers Association
- .3 American Association of State Highway and Transportation Officials
- .4 American Concrete Institute
- .5 Anti-Friction Bearing Manufacturer's Association
- .6 American Institute of Electrical Engineers
- .7 American Iron and Steel Institute
- .8 Air Movement and Control Association
- .9 Association of Municipal Electric Utilities
- .10 American National Standards Institute
- .11 Air-Conditioning and Refrigeration Institute
- .12 American Standards Association
- .13 American Society of Heating, Refrigeration and Air Conditioning Engineers
- .14 American Society of Mechanical Engineers
- .15 American Society of Testing and Materials
- .16 Architectural Woodwork Manufacturers Association of Canada American Water Works Association
- .17 Canadian Electrical Manufacturer's Association
- .18 Canadian Gas Association
- .19 Canadian General Standards Board
- .20 Canadian Institute of Steel Construction
- .21 Canadian Mortgage and Housing Corporation
- .22 Canadian Paint Manufacturers Association
- .23 Council of Forest Industries of British Columbia
- .24 Canadian Roofing Contractors Association
- .25 Canadian Standards Association
- .26 Canadian Sheet Steel Building Institute
- .27 Canadian Welding Bureau
- .28 Canadian Wood Council
- .29 Electrical and Electronic Manufacturers Association Canada Factory Mutual
- .30 Institute of Electrical and Electronic Engineers
- .31 Maple Flooring Manufacturers Association
- .32 Military Standards
- .33 Manufacturer's Standardization Society
- .34 Ministry of Transportation Ontario
- .35 National Association of Architectural Metal Manufacturers National Fire Protection Association
- .36 National Electrical Manufacturer's Association (U.S.A.) National Lumber Grades Authority
- .37 National Research Council of Canada
- .38 Ontario Concrete Block Association
- .39 Ontario Hydro Electrical Safety Code
- .40 Ontario Provincial Standard Specification
- .41 Porcelain Enamel Institute

- .42 Plumbing Drainage Institute
- .43 Public Health Act
- .44 Sheet Metal and Air Conditioning Contractors National Association
- .45 Steel Structures Painting Council
- .46 Tubular Exchange Manufacturer's Association
- .47 Terrazzo, Tile and Marble Association of Canada Underwriters Laboratories Inc. (U.S.)
- .48 Underwriters Laboratories of Canada

**48 FIRE RATINGS, ASSEMBLIES AND SEPARATIONS**

- 48.1 Where a material, component, assembly, or separation is required to be fire rated, the fire rating shall be as determined or listed by one of the following testing authorities acceptable to the authorities having jurisdiction:
- .1 Underwriters' Laboratories of Canada.
  - .2 Underwriters' Laboratories Inc.
  - .3 Factory Mutual Laboratories.
  - .4 The National Research Council of Canada.
  - .5 The National Board of Fire Underwriters.
  - .6 Intertek Testing Services.
- 48.2 Where reference is made to only one testing authority an equivalent fire rating as determined or listed by another of the aforementioned testing authorities is acceptable if approved by authorities having jurisdiction. Obtain and submit such approval of authorities, in writing when requesting acceptance of a proposed equivalent rating or test design.
- 48.3 Fire rated door assemblies shall include doors, frame, anchors, and hardware and shall bear label of fire rating authority showing opening classification and rating.
- 48.4 Material having a fire hazard classification shall be applied or installed in accordance with fire rating authorities printed instructions.
- 48.5 Fire rated assemblies shall be constructed in accordance with applicable fire test report information issued by fire rating authority. Deviation from fire test report will not be allowed.
- 48.6 Construct fire separations as continuous, uninterrupted elements except for permitted openings. Extend fire rated walls and partitions from floor to underside of structural deck above.
- 48.7 Fire separations may be pierced by openings for electrical and similar service outlets provided such boxes are non-combustible and are tightly fitted and sealed with a ULC approved sealant for the assembly being sealed.
- 48.8 Construction that abuts on or is supported by a non-combustible fire separation shall be constructed so that its collapse under fire conditions will not cause the collapse of the fire separation.
- 48.9 Do not use combustible members, fastenings, attachments and similar items to anchor electrical, mechanical or other fixtures to fire separations.
- 48.10 At penetration through fire rated walls, ceilings or floors, completely seal voids with ULC approved firestopping material; full thickness of the construction element. In

locations that require a smoke seal, provide appropriate ULC approved system installed in accordance with the manufacturer's recommendations.

**49 TEMPORARY CONTROLS**

- 49.1 Hoarding, fencing and barriers:
- .1 Before commencing operations, supply, erect and maintain hoarding, fencing, and barriers around work area. Paint outside of hoarding in a colour selected by the Consultant and mark with "POST NO BILLS" signs.
  - .2 Provide temporary enclosures as required to protect the building in its entirety or in its parts, against the elements, to maintain environmental conditions required for work within the enclosure, and to prevent damage to materials stored within.
  - .3 Provide lockable gates through hoarding, fencing, and barriers for access to Site by workers and vehicles.
- 49.2 Prevent unauthorized entry to the Site. Barricade, guard or lock access points to the satisfaction of the Consultant and post "NO TRESPASSING" signs.
- 49.3 Install signs for movement of people around Work Site as required and directed by the Consultant.
- 49.4 Provide secure, rigid guide rails and barricades around open shafts, open edges of floors and roofs as required for protection of Work, workers, and the public.
- 49.5 Remove hoarding, fencing, barriers, building enclosures, guide rails and barricades upon Contract Completion unless otherwise noted on the Contract Drawings or as directed by the Consultant.

**50 SERVICE AND UTILITY SYSTEMS**

- 50.1 Consult with utility companies and other authorities having jurisdiction to ascertain the locations of existing services on or adjacent to site.
- 50.2 Information as to the location of existing services, if shown on the Drawings, does not relieve the Contractor of his responsibility to determine the exact number and location of existing services.
- 50.3 Give proper notices for new services as may be required. Make arrangements with authorities and utilities for service connections required.
- 50.4 Pay any charges levied by utilities or authorities for work carried out by them in connection with this Contract, unless specified otherwise.
- 50.5 Operate and maintain all utility systems affected by work of this Contract, until the building or specific portions thereof have been accepted by the Owner.
- 50.6 Report existing unknown services encountered during excavation to Consultant for instructions; cut back and cap or plug unused services. Be responsible for the protection of all active services encountered and for repair of such services if damaged.

**50.7 SCAFFOLDING, HOISTS AND CRANES**



Select, operate, and maintain scaffolding, hoisting equipment and cranes as may be required.

- .1 Do not erect or operate equipment that will endanger existing structures, local municipalities hydro installations, or traffic signals.
- .2 Design and construct scaffolding in accordance with CAN/CSA S269.2-M.

50.8 **TEMPORARY WORKS**

- .1 Installation and Removal: Provide temporary utilities, facilities and controls in order to execute the Work expeditiously. Remove from Site all such Work after use.
- .2 Arrange for connections with Owner and pay all costs for installation, maintenance and removal.
- .3 Be responsible for the careful and reasonable use of Owner supplied water and power.
- .4 Temporary power and lighting systems:
- .5 Supply, install and maintain electrical power and necessary electrical equipment including overhead and underground feeders, transformers, motors, starters, panels, protective devices and equipment. Connections will be made available to any part of the Work within distance of a 30 m extension.
- .6 Provide temporary lighting inside and outside structure of adequate intensity to illuminate construction activities. Provide temporary pedestrian lighting for sidewalk areas affected by the Work.
- .7 Supply and install the type and quantity of minimum lighting equipment in each location to ensure adequate, continual illumination 24 hours per day, 7 days per week for the following:
  - .1 Emergency evacuation, safety and security throughout the Project at intensity levels required by jurisdictional authorities.
  - .2 General lighting for performance of the Work throughout the Project, evenly distributed, and at intensities to ensure that proper installations and applications are achieved.
  - .3 Performance of finishing trades in area as required evenly distributed, and of an intensity of at least 50 Lux.
- .8 In locations approved by the Consultant. install and support the electrical plant, distribution and temporary lighting systems including service equipment and local hydro authority meter energized by the local hydro circuits. Installations shall be approved by the Consultant and shall be carried out in a neat manner to avoid interference with the application of finish material and to facilitate removal when the installed permanent lighting system is in operation.
- .9 Make all necessary arrangements for and pay all costs for a temporary electrical service of sufficient capacity to supply temporary lighting, operation of power tools, cranes and equipment for all construction, implementation, and inspection and testing purposes. Supply and install necessary temporary cables and other electrical equipment and make all temporary connections as required.

- .10 Temporary power distribution wiring shall comply with Ontario Hydro Electrical Safety Code. Obtain inspection certificates for temporary electrical work.
- .11 Maintain the lighting systems in operation during the life of the Contract. Replace burned or missing lamps immediately.
- .12 Upon Contract Completion, remove electrical plant and temporary lighting from the Site.
- .13 Water Supply:
  - .1 Provide and pay for a continuous supply of potable water for construction use. Provide as a minimum one water connection on each floor level.
  - .2 Provide and maintain all temporary lines, extensions and hoses as required. Remove all temporary connections and lines on completion of the Work and make good any damage.
- .14 Temporary Heating:
  - .1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.
  - .2 Construction heaters used inside buildings must be vented to the outside or be flame less type. Solid fuel salamanders are not permitted.
  - .3 Maintain temperatures of minimum 10oC in areas where construction is in progress unless otherwise indicated in the Contract Documents. Protect exposed and adjacent services from freezing. Repair at no cost to the Owner any such services, buildings or other utilities disrupted by freezing.
  - .4 Ventilate heated areas and keep structures free from exhaust combustion gases.
  - .5 The permanent heating system of the building or portions thereof may be used when available only upon written permission by Consultant. If permission to use heating system is obtained:
    - .1 Before using air handling systems, ensure that dust/debris is removed from the premises and install temporary filters to prevent construction dust/debris from entering via return air or intake openings. Keep unused ducts sealed to prevent entry of dust/debris. Replace filters frequently during construction.
    - .2 On completion of work remove temporary filters and install new filters in accordance with Division 23. After temporary use of air handling system is complete and before turning over system to Owner, vacuum internally to ensure all dust/debris is removed.
  - .6 Elevators: Elevators may be used by construction personnel as permitted by the Owner.
  - .7 Temporary Telephone and Data: Provide and pay for separate telephones and Data services, for local call only, as required for own use and use of the Consultant and Owner. Long distance call shall be paid by party making call.

- .8 Sanitary Facilities: Provide sanitary facilities in accordance with occupational health and safety requirements in the place of the Work. Use of Owner's existing sanitary facilities or new sanitary facilities is not allowed.

## **51 SITE SECURITY**

- 51.1 Provide and pay for security personnel to guard the Site and contents of the Site after working hours and during holidays as established by the Owner. Control of access shall be through hoarding and barricades during times work is in progress, and by locking hardware otherwise.
- 51.2 Any security service provided by the Owner is for the protection of the Owner's interest in the Work on the Site and shall not relieve the Contractor of the responsibility to protect the Site and the Work of the Contract.

## **52 PROTECTION**

- 52.1 Protection of Public Area: Protect surrounding private and public property from damage during performance of the Work.
- 52.2 Take all necessary precautions to prevent damage to work affected by temperature, water, weather and other environmental conditions.
- 52.3 Protection of Building Finishes and Equipment:
  - .1 Provide protection for existing structure, finished and partially finished building finishes, waterproofing systems, and equipment during performance of the Work.
  - .2 Cover Owner's equipment and plant within the Site with 6 mil PVC sheet, or equal, taped to make it dust-tight. Equipment and existing work moved or altered to facilitate construction, movement of Products or equipment shall be stored, protected with dust-tight covers and subsequently returned to its original location.
  - .3 Obtain approval from the Consultant prior to the installation of temporary supporting devices into existing roof, ceiling, or wall members for the erecting of equipment or machinery. Repair roof, ceiling, and wall members used for this purpose to the satisfaction of the Consultant.
  - .4 Provide necessary screens, covers and hoarding as required.
  - .5 Any Products or equipment damaged while carrying out the Work shall be restored with new Products or equipment matching the original equipment. Damage shall include harm resulting from all construction work, such as falling objects, wheel and foot traffic, failure to remove debris, operation of machinery and equipment, and scaffolding and hoisting operations.
- 52.4 Fire Protection:
  - .1 Take precautions to prevent fires. Provide and maintain temporary fire protection equipment of a type appropriate to the hazard anticipated in accordance with authorities having jurisdiction, governing codes, regulations, by-laws and to the satisfaction of the Consultant and insurance authorities.

- .2 Excessive storage of flammable liquids and other hazardous materials is not allowed on Site. Flammable liquids must be handled in approved containers. Remove combustible wastes frequently.
  - .3 Inspect temporary wiring, drop cords, extension cables for defective insulation or connections frequently.
  - .4 Open burning of rubbish is not permitted on the Site.
  - .5 Handle, transport, store, use and dispose of gasoline, benzine or other flammable materials with good and safe practice as required by authorities having jurisdiction.
  - .6 Provide fire extinguishers of the non-freezing chemical type in each temporary building, enclosure and trailer. Use only fire-proofed tarpaulins.
  - .7 A fire watch shall be required for each of the following activities regardless of the number, duration or size of the activity in operation:
    - .1 any open flame activities (e.g., soldering and welding);
    - .2 shutdown of fire detection system;
    - .3 shutdown of sprinkler system.
- 52.5 Maintain adequate cover over services as required by Utility Authorities.
- 52.6 Report any discharge of a contaminant to the Authorities having jurisdiction.

### **53 PEST CONTROL**

- 53.1 Be responsible to provide control measures, restraining procedures, and treatments to prevent infestation and spread of insects, rodents and other pests deemed to be present at Site and/or noticed during course of the Work. Carry out fumigation, pest control procedure, and posting of warning signs, notices including contents of such notices in accordance with requirements of Pesticides Act and any other authorities having jurisdictions. Pesticides used shall be in accordance with Canada Pest Control Products Act, and provincial and municipal regulations.

### **54 FIRST-AID FACILITIES**

- 54.1 Provide site equipment and medical facilities necessary to supply first-aid service to injured personnel in accordance with regulations of the Workmen's Compensation Act. Maintain facilities for duration of Contract.

### **55 USE OF NEW PERMANENT SERVICE & EQUIPMENT**

- 55.1 Do not use any new permanent service or equipment without Owner's written approval.
- 55.2 Where permission is granted to use permanent services and equipment provide competent persons to operate services and equipment; inspect frequently and maintain facilities in proper operating condition at all times.
- 55.3 Permanent services and equipment shall be turned over to Owner in "as new" and perfect operating condition.

- 55.4 Use of permanent systems and equipment as temporary facilities shall not affect the warranty conditions and warranty period for such systems and equipment. Make due allowance to ensure that Owner will receive full benefits of equipment manufacturers warranty after project takeover.

**56 PROJECT IDENTIFICATION**

- 56.1 If required, obtain approvals from jurisdictional authorities for temporary signs.
- 56.2 Do not display signs without the Consultant's and Owners written consent.
- 56.3 Maintain signs in good condition for the duration of Contract.

**57 SITE MAINTENANCE**

- 57.1 Maintain the Site and adjacent premises in a clean and orderly condition, free from debris and other objectionable matter. Immediately remove rubbish and surplus Products, equipment and structures from the Site. If the Site is not cleaned (within 48 hours after the Contractor has been instructed to do so), the Consultant may clean the Site and retain the cost from monies due, or to become due, to the Contractor.
- 57.2 When the Work is substantially performed, remove surplus Products, tools, construction machinery and equipment not required for the performance of the remaining Work

**58 SITE STORAGE AND OVER LOADING**

- 58.1 Confine the Work and operations of employees to limits indicated by the Contract Documents. Do not unreasonably encumber the Site with Products.
- 58.2 Products shall be stored only in areas designated or approved by the Consultant, and shall not be left lying on streets, sidewalks, boulevards or elsewhere within public view. Products which the Consultant may permit to be stored elsewhere than in the Contractor's storage areas shall be neatly stacked or otherwise disposed and shall be so maintained.
- 58.3 Fabrication shops shall not be set up within the structure except as directed by or with the permission of the Consultant.
- 58.4 Do not load or permit to be loaded any part of the Work with a weight or force that it is calculated to bear safely. Be solely responsible and liable for damages resulting from violation of this requirement. Provide temporary supports as strong as permanent support.
- 58.5 Do not cut, drill or sleeve load bearing members unless shown on drawings or otherwise approved by the Consultant in writing for each location.
- 58.6 Site storage and loading requirements to be in accordance with the Ontario Occupational Health and Safety Act and Regulations for Construction Projects.

**59 PUBLIC CONVENIENCE AND SAFETY**

- 59.1 Maintain sidewalks at and adjacent to the Site in a safe condition throughout the Contract. Promptly remove ice and snow.
- 59.2 Keep haul routes free at all times from Products spilled on highway or street surfaces and clean highways and streets of deposits due to performance of the Work to the satisfaction of the Consultant and the highway and street authorities. Clean highways and streets within 24 hours of Consultant's instruction.
- 59.3 The Consultant may inspect haul routes, the Site and adjacent premises daily and may halt operations, withhold payment or carry out such additional operations as necessary, deducting the cost from monies due, or to become due, to the Contractor.

**60 ACCESS AND EGRESS TO SITE**

- 60.1 Where construction requirements demand, construct access roads capable of withstanding construction equipment and haul traffic. Maintain access roads in good condition at all times. Remove access roads prior to completion of the Work unless otherwise noted and restore area as shown on the Contract Drawings.

**61 PUBLIC TRAFFIC FLOW**

- 61.1 Provide and maintain flag persons, Police Officers, traffic signals, barricades and illumination as required by Authorities having jurisdiction and/or as necessary to perform the Work and protect the public.
- 61.2 **PUBLIC UTILITIES AND SERVICES**
- 61.3 Verify limitations imposed on project work by presence of utilities and services, and ensure no damage occurs to them.
- 61.4 Notify service authorities concerned so that they protect, remove, relocate, or discontinue them, as they may require.
- 61.5 Make arrangements and pay for connection charges for services required for project work.
- 61.6 Locate poles, pipes, conduit, wires, fill pipes, vents, regulators, meters, and sanitary services work in inconspicuous locations. If not shown on Drawings, verify location of service work with Consultant before commencing installation.

**62 ROADS, CURBS, GUTTERS, AND WALKS**

- 62.1 Include all curb cuts and making good of existing curbs, walks and paving on Municipal property to provide fully paved and finished approaches to requirements of authorities having jurisdiction.

**63 CONSTRUCTION PARKING**

- 63.1 Parking will be permitted on Site provided it does not disrupt the performance of Work, Site safety or the movement of vehicular or pedestrian traffic and is acceptable to the Consultant.

**64 SITE VISITORS**

- 64.1 During the progress of the Work, afford access to visitors duly authorized by the Consultant and facilitate inspections or tests they may desire to make. Record site visitors in log book maintained on site.
- 64.2 Ensure Site visitors wear appropriate safety apparel.

**65 EROSION AND SEDIMENTATION CONTROL**

- 65.1 Control drainage on site to prevent flooding, erosion and run-off onto adjacent properties as a result of construction operations.
- 65.2 Dispose of water containing silt in suspension in accordance with requirements of jurisdictional authorities.
- 65.3 Conform to sedimentation and erosion control requirements of the conservation and/or municipal authority having jurisdiction. Provide and maintain until completion of work or until directed by Consultant to be removed, sediment control devices at catch basins, drainage courses and at other locations on site as directed. Comply with requirements of the local Conservation Authority.
- 65.4 Provide storm drain inlet protection consisting of a sediment control barrier or an excavated ponding area around storm drain inlet or curb inlet; add bracing where necessary to withstand high flow volumes and depth. Inspect inlet protection after each rainfall and repair damage. Sweep up accumulated sediment and dispose of in a controlled area. Remove inlet protection after area has been stabilized with permanent vegetation.
- 65.5 Prevent tracking of mud and dirt from site onto paved roads. Provide stabilized vehicle access/egress points, constructed of coarse granular material. Place additional granular material as required to maintain access/egress points in proper working order. Clean mud and dirt from paved roads at end of each day by shovelling or sweeping and subsequent washing. Dispose of mud dirt in a controlled disposal area.

**66 TEMPORARY DRAINAGE AND DEWATERING**

- 66.1 Drainage lines and gutters shall be kept open at all times. No flow of water shall be directed across or over pavements except through pipes or properly constructed troughs. Keep all portions of Work properly and efficiently drained during construction and until completion. Be responsible for all disturbances, dirt and damage which may be caused by or result from water backing up or flowing over, through, from or along any part of Work, or due to operations which may cause water to flow elsewhere.
- 66.2 Keep trenches and other excavations free of water at all times. Employ adequate means to remove water in a manner that will prevent loss of soil, and maintain the stability of excavation.



- 66.3 Dispose of such water in a manner that will not be dangerous to public health, private property or to any portion of Work completed or under construction, nor which causes an impediment to the use of streets by the public.
- 66.4 Drainage of trenches or other excavation through newly laid storm drainage pipe will be allowed only with the express permission of the authority having jurisdiction.
- 66.5 When drainage is directed to existing catch basins, regularly inspect and clean such catch basins of debris and sediment.

**67 SNOW REMOVAL**

- 67.1 Allow no accumulation of ice and snow on Site, and on roof deck when roofing operations are scheduled to take place.
- 67.2 Remove snow from road, Site circulation paths and elsewhere as required to permit access to Work, parking and uninterrupted construction progress.

**68 POLLUTION (DUST, DEBRIS, AND NOISE) CONTROL**

- 68.1 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
- 68.2 Keep premises free of waste material.
- 68.3 Arrange and pay for removal of all waste generated by the work in manner acceptable to authorities having jurisdiction.
- 68.4 Limit noise levels in accordance with requirements of authorities having jurisdiction.
- 68.5 Maintain temporary erosion and pollution control features installed under this contract.
- 68.6 Control emissions from equipment and plant to local authorities emission requirements.
- 68.7 Prevent abrasive-blasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.

**69 TREE PROTECTIONS**

- 69.1 All trees are to be protected in accordance with the City of Toronto, Urban Forestry, Tree Protection Policy.
- 69.2 Within Contractor's assigned work and storage areas and adjacent to designated access routes, protect existing trees and other plants scheduled to remain. Provide approved barrier consisting of snow fencing or plywood around Tree Protection Zone (TPZ).
- 69.3 Leave protection areas undisturbed; do not use areas for storage, stockpiling or any other purpose. Do not dump or flush any contaminants in areas of tree feeder roots.
- 69.4 Where limbs, roots or portions of plants are required to be removed to accommodate new work, they shall be removed with the approval of Urban Forestry and under the supervision of an experienced arborist.

- 69.5 Where root systems of protected trees adjacent to construction are exposed or damaged, they shall be neatly trimmed and the area backfilled with suitable material to prevent desiccation.
- 69.6 Where necessary give plants an overall pruning to restore the balance between roots and top growth and/or to restore appearance.
- 69.7 Except at locations where specific procedures are included in Contract Documents do not alter grades around existing trees/plants without first obtaining Consultant's consent and directions.

## **70 SUBSTITUTIONS**

- 70.1 Requests for substitutions will not be accepted prior to the Notification of Award. Substitutions will be considered by the Consultant provided that:
- .1 The proposed substitutions have been investigated and complete data are submitted in accordance with the Specifications.
  - .2 Data relating to changes in the Contract Schedule, if any, and relation to other Work have been submitted.
  - .3 Same warranty is given for the substitution as for the original Product specified.
  - .4 All claims are waived for additional costs related to the substitution which may subsequently arise.
  - .5 Installation of the accepted substitution is co-ordinated into the Work and that full responsibility is assumed when substitutions affect other work. Make any necessary changes required to complete the Work. Revisions to the drawings for incorporation of the substitutions shall be made by the Consultant and all costs associated with the revisions shall be borne by the Contractor.
- 70.2 Substitutions to methods or process described in the Specifications or drawings, may be proposed for the consideration of the Consultant. Ensure that such substitutions are in accordance with the following requirements:
- .1 Time spent by the Consultant in evaluating the substitution shall not be the basis for a claim by the Contractor for extensions to the Contract Time.
  - .2 Clearly indicate how the proposed substitutions would be advantageous to the Owner or in the opinion of the Contractor would improve the operation of the installation.
  - .3 Be responsible for substitutions to methods or processes concerning such Work and ensure that the warranty covering all parts of the Work will not be affected.
  - .4 The cost of all changes in the work of Other Contractors, necessitated by the substituted methods or processes, if accepted, is borne by the Contractor.
  - .5 The substituted methods or processes fit into space allotted for the specified methods or processes. Revisions to the drawings for incorporation of the substitutions shall be made by the Consultant and all costs associated with the revisions shall be borne by the Contractor.
- 70.3 Substitutions will not be considered if:

- .1 They are indicated or implied on shop drawings or Product data without formal request.
- .2 Acceptance will require substantial revision of the Specifications and Drawings.
- 70.4 Do not substitute Products or methods or processes into the Work unless such substitutions have been specifically approved for the Work by the Consultant.
- 70.5 Approved substituted Products shall be subject to the Consultant's inspection and testing procedures. Approved substituted Products shall only be installed after receipt of the Consultant's written approval.
- 70.6 The Contract Price will be adjusted accordingly to any and all credits arising from the substitutions mentioned above.

**71 APPROVAL OF PRODUCTS AND INSTALLATION METHODS**

- 71.1 Wherever in the Specifications it is specified that Products and installation methods shall meet approval of Authorities having Jurisdiction, underwriters, the Consultant, or others, such approval shall be in writing.

**72 PRODUCT DELIVERY CONTROL**

- 72.1 It is the responsibility of the Contractor to ensure that the supplier or distributor of materials specified or alternatives accepted, which he intends to use, has materials on the site when required. The Contractor shall obtain confirmed delivery dates from the supplier.
- 72.2 The Contractor shall contact the Consultant immediately upon receipt of information indicating that any material or item, will not be available on time, in accordance with the original schedule, and similarly it shall be the responsibility of all subcontractors and suppliers to so inform the Contractor.
- 72.3 The Consultant reserves the right to receive from the Contractor at any time, upon request, copies of actual purchase or work orders of any material or products to be supplied for the work.
- 72.4 If materials and products have not been placed on order, the Consultant may instruct such items to be placed on order, if direct communication in writing from the manufacturer or prime suppliers is not available indicating that delivery of said material will be made in sufficient time for the orderly completion of the Work.
- 72.5 The Consultant's review of purchase orders or other related documentation shall in no way release the Contractor, or his subcontractors and suppliers from their responsibility for ensuring the timely ordering of all materials and items required, including the necessary expediting, to complete the work as scheduled in accordance with the Contract Documents.
- 72.6 In the event of failure to notify the Consultant at commencement of Work and should it subsequently appear that Work may be delayed for such reason, the Consultant reserves the right to direct the Contractor to take the following measures at no increase in Contract Price:
  - .1 Substitute more readily available Products of similar or better quality and character, or

- .2 Temporarily install another Product until such time as the specified Product becomes available, at which time the temporarily installed product shall be removed and the specified Product installed.

### **73 TRADEMARKS AND LABELS**

- 73.1 Permanent labels, trademarks and nameplates on Products are not acceptable in the finished Work, except where required by authorities having jurisdiction, for operating instructions, or when located in service rooms.
- 73.2 Remove trademarks and labels by grinding, if necessary, painting out where the particular surface is being painted, or if on plated parts, replace with new plain plated or non-ferrous metal parts.

### **74 DELIVERY, STORAGE, HANDLING AND PROTECTION**

- 74.1 Be responsible for handling and delivery of Products. Protect Products from damage during handling, storage and installation. Deliver store and handle items in accordance with manufacturer's instructions and as specified. Be responsible for all costs of delivery, loading and off-loading, and for transportation back to its origin for correction, if required, due to damage or defect. Reject materials and Products delivered to the Site which are damaged.
- 74.2 Manufacture, pack, ship, deliver, and handle Products so that no damage occurs to structural qualities and finish appearance, nor in any other way which is detrimental to their function and appearance.
- 74.3 Ensure that Products, while transported, are not exposed to an environment which would increase their moisture content beyond the maximum specified.
- 74.4 Organize delivery of materials, Products and equipment to, and removal of debris and equipment from, the site and surrounding property.
- 74.5 Schedule early delivery of Products to enable Work to be executed without delay. Before delivery, arrange for receiving at the Place of the Work.
- 74.6 Coordinate mechanical and electrical equipment and apparatus deliveries with the manufacturer's and suppliers such that equipment and apparatus is delivered to the site when it is required, or so that it can be stored within the building and protected from the elements.
- 74.7 Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.
- 74.8 Deliver packaged Products, in original unopened wrapping or containers, with manufacturer's seals and labels intact.
- 74.9 Label packaged products to describe contents, quantity, and other information as specified.
- 74.10 Labels attesting that materials conform to specified reference standards will be acceptable as verification that contents meet specified requirements. In the absence of labels, submit affidavits to validate conformance of Product to reference standards, as requested by the Consultant.

- 74.11 Label fire-rated Products to indicate Underwriters' Laboratories approval.
- 74.12 Handle and store materials and products in such a manner that no damage is caused to the materials and products, the Work, the site and surrounding property.
- 74.13 Do not obstruct or disrupt local traffic flow during construction period.
- 74.14 Allocate an area within the limits of the Work acceptable to the Owner for storage of Products brought to the site by all trades. Keep storage area tidy at all times and do not use other parts of the property for storage. Arrange and pay for off-site storage when required.
- 74.15 Locate products on site in a manner to cause minimal interference with the Work and building activities.
- 74.16 Store Products off the ground, in a manner to prevent damage, adulteration, deterioration and soiling to the Products, other building components, assemblies, other products, the structure, the site and surrounding property, and in accordance with manufacturer's instructions when applicable.
- 74.17 Store packaged or bundled Products in original and undamaged condition complete with written application instructions. Keep manufacturer's seals and labels intact. Do not remove from packaging or bundling until required in the Work.
- 74.18 Do not place or store materials and Products in corridors, public areas, streets, lanes, passageways or similar locations.
- 74.19 Store Products so as not to create any overloading conditions to any part of the building, structure, falsework, form work and scaffolding.
- 74.20 Store Products subject to damage from weather in weatherproof enclosures.
- 74.21 Store cementitious Products clear of earth or concrete floors, and away from walls.
- 74.22 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- 74.23 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- 74.24 Store and handle flammable liquids and other hazardous materials in approved safety containers and as otherwise prescribed by safety authorities. Store no flammable liquids or other hazardous material in bulk within the Work.
- 74.25 Store and mix paints in a heated and ventilated room or area assigned for this purpose. Keep this room or area locked when unattended. Remove oily rags and other combustible debris from the Place of the Work daily. Take every precaution necessary to prevent spontaneous combustion.
- 74.26 Protect prefinished metal surfaces by protective coatings or wrappings until time of final cleanup. Protection shall be easily removable under work of without damage to finishes. Do not permit strippable tape or coatings to become baked on surfaces which they protect.
- 74.27 Touch-up damaged factory finished surfaces to Consultant's satisfaction. Use primer and paint to match original.

- 74.28 Protect glass and other finishes against heat, slag and weld splatter by provision of adequate shielding. Do not apply Visible markings to surfaces exposed to view in finished state or that receive transparent finishes.
- 74.29 Protect surfaces of completed work exposed to view from staining, disfigurement and all other damage by restriction of access or by use of physical means suitable of the material and surface location.
- 74.30 Adequately protect trowelled concrete floors from damage. Take special measure when moving heavy loads or equipment on them.
- 74.31 Keep finished concrete floors free from oils, grease or other material likely to damage or discolour them or affect bond of applied finishes. Once building is enclosed, keep floors as dry as possible after curing.
- 74.32 Protect finished flooring from pedestrian traffic with reinforced kraft paper as a minimum, secured in place and with joints sealed by reinforced pressure sensitive tape. Maintain protection in place until contract completion.
- 74.33 Protect finished flooring from continuing construction work and delivery of products with plywood panels of minimum 6 mm thickness with joints between panels sealed with reinforced pressure sensitive tape. Maintain protection in place until work and deliveries are complete.
- 74.34 Make good or replace damaged materials to the satisfaction of the Consultant.
- 74.35 Hazardous Materials Information:
- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets (MSDS) in accordance with jurisdictional authorities.
  - .2 Deliver copies of Material Safety Data Sheets (MSDS) to the Consultant on all Products intended for use in the Work and designated as a "controlled product."

**75 AVAILABILITY**

- 75.1 If delays in supply of Products are foreseeable, notify the Consultant of such, in order that remedial action may be authorized in ample time to prevent delay in performance of Work.
- 75.2 In the event of failure to notify the Consultant at commencement of Work and should it subsequently appear that Work may be delayed for such reason, the Consultant reserves the right to direct the Contractor to take the following measures at no increase in Contract Price:
- .1 Substitute more readily available Products of similar or better quality and character, or
  - .2 Temporarily install another Product until such time as the specified Product becomes available, at which time the temporarily installed product shall be removed and the specified Product installed.

**76 MANUFACTURER'S INSTRUCTIONS**

- 76.1 Unless otherwise indicated in the Specifications, fabricate, install, apply, connect, install, erect, use, clean, and condition Products in accordance with manufacturer's instructions except where more stringent requirements are specified. Do not rely on labels or enclosures provided with Products. Obtain written instructions directly from manufacturers.
- 76.2 Notify the Consultant in writing, of conflicts between the Specifications and manufacturer's instructions, so that the Consultant may establish the course of action. If requested, make a copy of those instructions available at the Site.
- 76.3 In cases of improper installation or erection of Products, due to failure in complying with these requirements, the Consultant may direct removal and re-installation at no increase in Contract Price.

**77 WORKMANSHIP**

- 77.1 Workmanship shall be the best quality, executed by workers experienced and skilled in the respective duties for which they are employed. Immediately notify the Consultant if required Work is such as to make it impractical to produce required results.
- 77.2 Do not employ any unfit person or anyone unskilled in their required duties. The Consultant reserves the right to require the dismissal from the Place of the Work, workers deemed incompetent, careless, insubordinate or otherwise objectionable.
- 77.3 Decisions as to the quality or fitness of workmanship in cases of dispute rest solely with the Consultant, whose decision is final.
- 77.4 Give particular attention to finished dimensions and elevations of the Work. Make finished Work fit indicated spaces accurately. Make finished Work flush, plumb, true to lines and levels and accurate in all respects.
- 77.5 In finished areas, conceal pipes, ducts, conduit and wiring in floors, walls, ceilings, chases, or behind furring except where indicated otherwise.
- 77.6 Ensure that service poles, fill-pipes, vents, regulators, metres and similar service installations are located in inconspicuous locations. If not indicated on drawings, verify location of service installations with Consultant prior to commencing installation.
- 77.7 Ensure that integrity of fire separations is maintained where they are penetrated.
- 77.8 Finish access panels and doors to match adjacent wall and/or ceiling finish unless otherwise specified or indicated.
- 77.9 Keep surfaces, on which finished materials will be applied, free from grease, oil, and other contamination which would be detrimental in any way to the application of finish materials.
- 77.10 Enforce fire prevention methods at site. Do not permit fires, open flame heating devices or accumulation or debris. Use flammable materials only if all safety precautions are taken. Provide and maintain in working order ULC labelled fire extinguishers of types suitable for fire hazard in each case, and locate them in prominent location and to approval of jurisdictional authorities.



- 77.11 Where flammable materials are being applied, ensure that adequate ventilation is provided, spark-proof equipment is used, and smoking and open flames are prohibited.

**78 DIMENSIONS**

- 78.1 Check all dimensions at the Site before fabrication and installation commences and report discrepancies to the Consultant.
- 78.2 Where dimensions are not available before fabrication commences, ensure that dimensions required are agreed upon between the parties concerned.
- 78.3 Prior to commencing work, ensure that clearances required by jurisdictional authorities can be maintained
- 78.4 Wall thicknesses and openings shown on the drawings may be nominal only; ascertain actual sizes at the Site.
- 78.5 Verify dimensions of shop fabricated portions of the Work at the Site before shop drawings and fabrications are commenced. The Owner will not accept claims for extra expense by reason of non-compliance with this requirement.
- 78.6 Fabricate and erect manufactured items, shop fabricated items, and items fabricated on or off site, to suit site dimensions and site conditions.
- 78.7 In areas where equipment is to be installed, check dimensional data on equipment to ensure that area and equipment dimensions are compatible with necessary access and clearance provided. Ensure that equipment supplied is dimensionally suitable for space provided.
- 78.8 Leave areas clear where space is indicated to be reserved for future equipment, including access to such future equipment.
- 78.9 Whether shown on the Drawings or not, leave adequate space and provision for servicing of equipment and removal and reinstallation of replaceable items such as motors, coils and tubes.

**79 RELOCATION OF MECHANICAL AND ELECTRICAL ITEMS**

- 79.1 The Owner and the Consultant reserve the right to relocate outlets at a later date, but prior to installation, without additional cost to Owner, assuming that the relocation per outlet does not exceed 3000 mm from the original location. No credits will be anticipated where relocation per outlet of up to and including 3000 mm reduces materials, products and labour.
- 79.2 Should relocations per outlet exceed 3000 mm from the original location the Contract Price will be adjusted in accordance with the provisions for changes in the Contract Documents.
- 79.3 Alter the location of pipes and other equipment, without additional cost to the Owner, if approved, provided the change is made before installation.
- 79.4 Make necessary changes, due to lack of coordination, as required and when approved, at no additional cost, to accommodate structural and building conditions.

**80 EXPANSION, CONTRACTION, AND DEFLECTION**

- 80.1 Conform to manufacturer's recommended installation temperatures. If items, components, assemblies, systems, and finishes are installed at temperatures different from operation or service temperatures, make provisions for expansion and contraction in service as acceptable to manufacturer and consultant. Repair all resulting damage should expansion provisions provide inadequate.
- 80.2 Make provisions for expansion and contraction due to temperature changes within components, Products and assemblies, and between adjacent components, Products and assemblies, and due to building movements including but not limited to creep, column shortening, deflection, sway and twist. Ensure provisions for expansion, contraction and building movements prevent damages from occurring to and within components, Products and assemblies.
- 80.3 Make adequate allowance at wall and partition heads for deflection of the structure above. Determine requirements from Consultant where additional information is required. Where partitions butt to underside of floor assembly, or structural framing, the clearance shall be based on the span of the members supporting the floor or structural framing. In making such allowance use methods which maintain the integrity of the wall or partition as a sound, and/or fire barrier.
- 80.4 Make provisions in pipes, plenums, ducts and vessels containing air and fluids as is necessary to prevent damage due to fluid and air induced pressure, surges and vibrations, to pipes, plenums, ducts and vessels and to adjacent components, assemblies and construction to which pipes, ducts, plenums and vessels are attached or pass through.

**81 DIELECTRIC SEPARATION**

- 81.1 Ensure that a dielectric separator is provided in a permanent manner over entire contact surfaces to prevent electrolytic action (galvanic corrosion) between dissimilar materials. Similarly, prevent corrosion to aluminum in contact with alkaline materials such as contained in cementitious materials.

**82 FASTENINGS**

- 82.1 Include in the work of each section necessary fastenings, anchors, inserts, attachment accessories, and adhesives. Where installation of devices is in work or other sections, deliver and locate devices in ample time for installation.
- 82.2 Do not install fibre, plastic or wood plugs or blocking for fastenings in masonry, concrete, or metal construction, unless specified or indicated on drawings.
- 82.3 Install work with fastenings or adhesives in sufficient quantity to ensure permanent secure anchorage of materials, construction, components and equipment under static conditions, and to resist building thermal movement, creep and vibration.
- 82.4 Provide metal fastenings and accessories in same material, texture, colour, sheen and finish as metal on which they occur, unless indicated otherwise.
- 82.5 Prevent electrolytic action between dissimilar metals and materials.

- 82.6 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior Work, and where attached to, or contained within, exterior walls and slabs, unless stainless steel or other material is specified. Leave steel anchors bare where cast in concrete.
- 82.7 Space anchors within their load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- 82.8 Conceal fasteners where indicated. Keep exposed fastenings to a minimum, space evenly and in an organized symmetrical pattern.
- 82.9 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

**83 ADJUSTING**

- 83.1 Ensure that all components of assemblies fit snugly, accurately and in true planes, and that moving parts operate positively and freely, without binding and scraping.
- 83.2 Verify that work functions properly and adjust it accordingly to ensure satisfactory operation. Lubricate Products as recommended by manufacturer.

**84 DEMONSTRATION AND INSPECTION OF PRODUCTS AND SYSTEMS**

- 84.1 Arrange for a demonstration of systems and operating Products upon the 100% completion of their installation and prior to certification for Substantial Performance.
- 84.2 Include in the arrangements for the attendance of the Consultant, Owner, jurisdictional authorities, and personnel assigned by the Owner for the operation of the systems and/or Products.
- 84.3 Demonstrations shall be conducted by the Subcontractor responsible for the installation of the systems and/or Product, assisted by representatives of the manufacturer or supplier. All personnel conducting the demonstration shall be completely knowledgeable of all conditions of the operating, functioning and maintenance of the systems and/or Products.
- 84.4 Owner's representative will acknowledge the successful completion of each demonstration on a form provided by the Contractor. The form shall be agreed to by the Owner, Consultant and Contractor prior to demonstration and testing.
- 84.5 Submit copies of letters from manufacturers of Systems and/or Products before making application for certificate of Substantial Performance to verify that the Products has been installed and connected correctly, and that it is operating in a satisfactory manner. The certification shall be based upon inspection and testing of the Products by competent technical personnel. Include in letter of certification the names of personnel conducting the testing and inspection, the methods of inspection utilized, and the location in the building of the Products certified.
- 84.6 Following submission of letters of certification and their acceptance by the Owner, the owner shall have the right to use the Products on a trial basis and for instructing their personnel in its use.

**85 FINAL INSPECTIONS AND CLOSE OUT**

- 85.1 Submit proposed closeout procedures and schedule of inspection to Consultant for approval before final demonstrations and inspections commence.
- 85.2 Arrange for, conduct and document final demonstrations, inspections, close-out and take-over at completion of the Work in accordance with procedures described in OAA/OGCA TAKE-OVER PROCEDURES, OAA/OGCA Document No. 100. Where "Architect" is referred to in Document No. 100 it shall mean Consultant.

**86 CERTIFICATE OF COMPLIANCE**

- 86.1 Submit Certificate of Compliance, prior to the application for Substantial Performance, for each of the following items.
- .1 An affidavit relative to the use of lead-free solder for all domestic water lines, regardless of location.
  - .2 Products for which Material Safety Data Sheets have been submitted and accepted.
  - .3 Other Work/Products identified in the Contract Documents as requiring a Certificate of Compliance.
- 86.2 Each Certificate of Compliance shall indicated names and addresses of the project, the Owner, the date of issue, product description including name, number, manufacturer, with a statement verifying that the Work/Product installed meets specified requirements and, if applicable, complies with the submitted and accepted Material Safety Data Sheets.
- 86.3 Each Certificate of compliance shall be issued on the subcontractor's letterhead, properly executed, under whose work the prospective Work/Product has been provided.
- 86.4 Each Certificate of Compliance shall be endorsed by the Contractor with his authorized stamp/signature. Ensure that submissions are made to allow sufficient time for review without delaying progress of scheduled completion.

**87 GARBAGE DISPOSAL AND CLEANUP**

- 87.1 Provide waste containers for the disposal of all waste materials resulting from performance of their work.
- 87.2 No hazardous or contaminated waste material shall be placed in Owner's waste containers and Subtrades shall make their own arrangements for the disposal off site of any such material resulting from performance of their work.
- 87.3 Remove all regular waste material and debris from their work areas and deposit in the waste containers at the end of each working day. Any clean up work not performed as requested will be carried out by the Owner with all resultant costs being charged to the Subtrade.

**88 CLEANING**

- 88.1 Progress cleaning:
- .1 Remove from finish work, spatters, droppings, labels, and debris, before they set up.
  - .2 Ensure that only cleaning materials are used which are recommended for the purpose by both the manufacturer of the surface to be cleaned and of the cleaning material.
  - .3 Maintain building work areas "broom clean" at least on a daily basis, but cleaning shall also be done immediately before finishing work.
  - .4 No waste material may be burned or buried at site. Remove waste as often as required to avoid accumulation, no less than, at the end of each working day.
  - .5 Remove packaging materials and debris from the site immediately after product and equipment is unwrapped or uncrated.
  - .6 Ensure that volatile fluid wastes are not disposed of in storm or sanitary sewers, in open drain courses, or anywhere on site.
  - .7 Do not allow waste material and debris to accumulate in an unsightly or hazardous manner. Sprinkle dusty accumulations with water. Provide containers in which to collect waste material and debris. Dispose of hazardous products in accordance with requirements of jurisdictional authorities.
  - .8 Ensure that cleaning operations are scheduled to avoid deposits of dust or other foreign matter on surfaces during finishing work and until wet or tacky surfaces are cured.
  - .9 Provide instructions for final cleaning of finishing work, and for inclusion in Maintenance and Operating Manuals.

- 88.2 Final cleaning:
- .1 Before final inspection, replace glass and mirrors broken, damaged, and etched during construction, or which are otherwise defective.
  - .2 In addition to requirements for progress cleaning, Work shall include final cleaning by skilled cleaning specialists on completion of construction.
  - .3 Remove temporary protections and make good defects before commencement of final cleaning.
  - .4 Final cleaning shall remove dust, stains, paint spots, soil, grease, fingerprints, and accumulations of construction materials, interior and exterior to the building for all new work throughout new and existing Building. Work shall be done in accordance with manufacturer's instructions for each material.
  - .5 Maintain cleaning until Owner has taken possession of building or portions thereof.

**89 PROGRESS RECORDS**

- 89.1 Maintain on site, permanent written records of daily progress of the Work. Records shall be open to review by Consultant and Owner at all times and a copy shall be furnished to Consultant on a weekly basis.
- 89.2 Records shall show dates of commencement, progress and completion of various trades and items of work. Particulars pertaining to number of employees of various

trades and type and quantity of equipment employed daily, temperature, protection methods and other such data shall be noted.

**90 RECORD DRAWINGS**

- 90.1 Complete appended Electronic File Release Agreement and submit complete with required fee. Final record drawings to be submitted in both CAD and PDF format.
- 90.2 Authorized deviations from drawings shall be marked in red accurately on one set of drawing prints in a neat, legibly printed manner and shall be dated. Prior to final inspection, neatly transfer the recorded information to a second set of drawing prints of the most recent revision to the drawings and submit both sets to the Consultant.
- 90.3 Maintain record drawings up to date as Work progresses. Status of maintained record drawings may be considered as a condition for validation of applications for payment.
- 90.4 Identify each record drawing as "Contract Record Copy" and maintain the record drawings in good condition. Make record drawings available to the Consultant at all times.
- 90.5 Record drawings shall include accurate dimensioned record of deviations and changes in Work from drawings.
- 90.6 Record drawings shall be signed and dated by Contractor.
- 90.7 Submit record drawing to Consultant for review and make corrections as directed by Consultant.
- 90.8 Record accurately all deviations in the Work.
- 90.9 Accurately record locations of concealed structure, mechanical and electrical services and similar Work not clearly in view, the location of which is required for maintenance, alteration Work and future additions. Do not conceal such Work until the location has been recorded.
- 90.10 Accurately record locations of equipment bases, anchors, concrete pads and roof curbs, sleeves, piping, conduits, ducts, maintenance holes and valves, etc. located either below, outside or within structure.
- 90.11 Where piping, conduits and ducts are underground, underfloor, embedded in concrete or otherwise in unaccessible locations, accurately record with respect to structure column lines or walls and elevations with respect to finished floor levels or grades referenced to the centre line of components.
- 90.12 Accurately record any components which will be in inaccessible locations for Consultant's review before the component is covered, or buried, or made inaccessible.

**91 OPERATION AND MAINTENANCE MANUALS**

- 91.1 Hand over to the Consultant two (2) copies of a comprehensive operations and maintenance manual and material suitable for the Owner's maintenance employees. Manuals shall cover all Products supplied and installed under the Contract.

- 91.2 Submit draft of the operation and maintenance manuals for the Consultant's review at least 15 days before testing systems and equipment. Incorporate alterations and additions, as found to be necessary during testing, and prepare the final version of the manual from the corrected draft.
- 91.3 Submit final version of operation and maintenance manuals prior to Contract Completion.
- 91.4 Testing of systems and equipment will not be deemed to be complete until the requisite number of copies of the final version of the manuals has been handed over to the Consultant.
- 91.5 If standard literature is incorporated into the operations and maintenance manual, any irrelevant information shall be deleted, or suitably noted.
- 91.6 The manuals shall have sufficient detail in order that the Owner can totally maintain the equipment without outside help.
- 91.7 Submit all material in English.
- 91.8 Operation and maintenance manuals shall contain the following minimum information and data:
- 91.9 Table of contents: Provide title of Contract; names, addresses, and telephone numbers of Consultants and Contractor with name of responsible parties; schedule of Products and systems, indexed to content of the volume.
- 91.10 For each Product or system: List names, addresses and telephone numbers of Subcontractors, suppliers and service representatives, including local source of replacement supplies and parts including telephone numbers.
- 91.11 Warranties: Warranties are between the Contractor and Owner. Warranties shall include, as a minimum:
- .1 Description of warranty coverage.
  - .2 Date warranty starts (being date of Contract Completion).
  - .3 Date warranty expires.
  - .4 Contact name, address and phone number (the Contractor shall also be responsible for advising the Owner of changes in contact information during the warranty period).
  - .5 Equipment and components performance curves.
  - .6 Hydro certificates.
- 91.12 Reports: For each Product or system provide the following:
- .1 Manufacturer's certified reports
  - .2 Factory test reports.
  - .3 Field testing reports.
- 91.13 Details of design, construction and/or fabrication features, component function and maintenance requirements, to permit effective start-up, operation, maintenance, repair, modification, extension and expansion of any portion or feature of the installation.
- 91.14 Technical data, Product data, supplemented by bulletins, component illustrations, detailed views, technical descriptions of items and parts lists.
- 91.15 Schematics, interconnection lists: Manuals shall be complete with schematic and wiring diagrams, wiring interconnection lists and diagrams fully cross referenced and



coordinated, printed circuit board layouts including the component identification, component parts list with electronic substitution equivalent. Provide cross referenced components lists and sequence of operations.

- 91.16 Trouble shooting and fault location guide: Instructions to facilitate quick return of malfunctioning equipment to operation.
- 91.17 Routine servicing and preventative maintenance schedule for Products and/or estimated hours required for routine servicing and preventative maintenance tasks.
- 91.18 List of recommended spare parts and recommended quantity of each item to be stocked based on spare part availability and re-order time.
- 91.19 Complete set of reviewed shop drawings.
- 91.20 Product data: Mark each sheet to clearly identify specific Products and component parts, and data applicable to installation; delete inapplicable information.
- 91.21 Drawings: Supplement Product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams and as required in the Specifications.
- 91.22 Typed text: As required to supplement Product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions and as required in the Specification.

**92 AS-BUILT DRAWINGS**

- 92.1 Prepare all required drawings on CAD (.dwg), using CAD Version 2010 or higher.
- 92.2 Prepare CAD drawings to meet the requirements of the Owners or Consultant's CAD Standards and Procedures.
- 92.3 Supply and hand over to the Consultant one CD of drawings for each final drawing prepared under this Contract, including but not limited to circuit drawings, equipment layout drawings, and shop drawings.
- 92.4 The final size of drawings shall be 560 mm x 860 mm. Half size reproductions (280 mm x 430 mm) shall also be provided.
- 92.5 Prior to Contract Completion, supply and hand over to the Consultant, one complete set of .dwg Drawing Files in CAD format on storage media acceptable to Consultant for each final drawing prepared under this Contract, including but not limited to circuit drawings, equipment layout drawings, and shop drawings.
- 92.6 Text files shall be written in word processing program acceptable to Owner.
- 92.7 Authorized deviations from drawings shall be marked in red accurately on one set of drawing prints in a neat, legibly printed manner and shall be dated. Prior to final inspection, neatly transfer the recorded information to a second set of drawing prints of the most recent revision to the drawings and submit both sets to the Consultant.

- 92.8 Maintain as-built drawings up to date as Work progresses. Status of maintained as-built drawings may be considered as a condition for validation of applications for payment.
- 92.9 Identify each as-built drawing as "As-Built Copy" and maintain the as-built drawings in good condition. Make as-built drawings available to the Consultant at all times.
- 92.10 As-built drawings shall include accurate dimensioned record of deviations and changes in Work from drawings.
- 92.11 As-built drawings shall be signed and dated by Contractor.
- 92.12 Submit as-built drawing to Consultant for review and make corrections as directed by Consultant.
- 92.13 Record accurately all deviations in the Work.
- 92.14 Accurately record locations of concealed structure, mechanical and electrical services and similar Work not clearly in view, the location of which is required for maintenance, alteration Work and future additions. Do not conceal such Work until the location has been recorded.
- 92.15 Accurately record locations of equipment bases, anchors, concrete pads and roof curbs, sleeves, piping, conduits, ducts, maintenance holes and valves, etc. located either below, outside or within structure.
- 92.16 Where piping, conduits and ducts are underground, underfloor, embedded in concrete or otherwise in inaccessible locations, accurately record with respect to structure column lines or walls and elevations with respect to finished floor levels or grades referenced to the centre line of components.
- 92.17 Accurately record any components which will be in inaccessible locations for Consultant's review before the component is covered, or buried, or made inaccessible.
- 92.18 CAD drawings of Contract Drawings can be obtained from Consultant at a cost of \$250.00 plus HST per sheet drawing and with a signed CAD Wavier.
- 92.19 Clearly and prominently mark each drawing "AS-BUILT DRAWING prepared by \_\_\_\_\_ (name of Contractor)"

**93 TRANSMITTAL**

- 93.1 Transmittal shall contain the list of file names contained on the storage media.
- 93.2 Data forwarded to the Owner shall contain the following files in addition to the design information:
- .1 Library parts/cells used in the design

- .2 Level convention used for each design file.
- .3 Plotting instructions used to prepare hard copies including colour tables, pen tables and plot scale.
- .4 Working units of the design files.
- .5 Font library, if the standard is not used.

**94 COVID-19 SITE PROTOCOL**

- 94.1 the Owner and Authorities having jurisdiction over the project site. Including but not limited to screening and PPE requirements.
- 94.2 The Owner and Consultant reserves the right to request disclosure from the General Contractor regarding the wellness of all site personnel with respect to the COVID-19 novel coronavirus. The General Contractor should make it known to the Owner and Consultant if any worker or visitor to the site has been placed in self-isolation and/or is in a medical or travel-imposed quarantine.

**95 PHASING OF WORK**

- 95.1 Detail the phases of work to ensure maintenance of exit and entry routes throughout the project.
- 95.2 All work on this project shall be performed after regular business hours to minimize disruption to daily operations. The specific hours for work shall be from 5 PM to 6 AM, unless otherwise specified or approved by the Owner.
- 95.3 Noise Control Requirements
  - .1 Loud construction activities are strictly prohibited during normal operations to avoid disruptions, particularly to the sensitive operations of the 911 call center.
  - .2 Scheduling and Approval:
    - .1 All activities that may result in loud noise must be pre-scheduled with the Owner.
    - .2 Explicit approval must be obtained from the Owner prior to the commencement of any loud construction activities.
    - .3 A detailed schedule of loud activities should be submitted for approval at least one week in advance, detailing the nature of the work, exact timing, and duration.
  - .3 Communication Protocol
    - .1 Notification: Adequate notice of any approved loud construction activities must be given to all facility occupants to minimize impact and ensure operational continuity.
    - .2 Coordination: Continuous coordination with the facility management is required to adjust the construction schedule based on the operational needs of the 911 call center.
  - .4 Compliance and Monitoring
    - .1 Monitoring of Noise Levels: Noise levels should be monitored using appropriate equipment to ensure compliance with the stipulated noise restrictions.

- .2 Adjustments: Immediate adjustments must be made if noise levels exceed approved limits or if unexpected disturbances are reported by the facility.

**96 AFTER-HOUR WORK AND FIRE WATCH PROTOCOLS**

- 96.1 Hours of Work: Construction Work Hours: 5 PM to 6 AM. The General Contractor is responsible for fire watch duties from 10 PM to 6 AM, Monday to Friday, and throughout the weekend when the fire alarm system is bypassed.
- 96.2 The Owner will manage the fire watch from 6 AM to 10 PM, Monday to Friday.
- 96.3 Requests for bypass must be submitted at least 24 hours in advance.
- 96.4 Ensure all bypass procedures are documented and communicated to all relevant parties.
- 96.5 Fire Alarm Testing: Comprehensive testing of the fire alarm system to ensure functionality and compliance with all applicable safety standards.
- 96.6 Security Systems Testing: Verification of the operational integrity and effectiveness of all security installations, including access control systems and surveillance equipment.
- 96.7 After-Hours Inspections: All inspections with authorities having jurisdiction, including but not limited to the Toronto Building Inspector and Electrical Safety Authority (ESA), must be scheduled after normal business hours to minimize disruption. After-hours are defined as evenings post-business operation and weekends.
- 96.8 The Contractor is responsible for coordinating these inspections, ensuring that all necessary parties are available and that the timing aligns with the project schedule and authority requirements.
- 96.9 All testing and commissioning outlined herein are prerequisites for obtaining the Occupancy Permit, which will enable the use of newly installed systems and infrastructure, such as turnstiles.
- 96.10 To prevent disruption to daily operations, all testing, especially that which may affect normal building functionalities (such as fire alarm and security testing), must be conducted after normal business hours, including weekends.

**97 DAILY CLEANING**

- .1 Daily Deep Cleaning: At the conclusion of each work night period, a thorough cleaning must be conducted. This includes at minimum:
  - .1 Debris Removal: All construction debris must be removed from the site.
  - .2 Dusting and Wiping: Surfaces within and around the work area must be dusted and wiped down to remove dust and particulate matter.
  - .3 Sanitizing: High-touch areas in and around the construction site must be sanitized according to health and safety standards.
  - .4 Floor Cleaning: Floors must be swept and mopped, or vacuumed thoroughly to ensure no traces of work materials or dust remain.
  - .5 Cleaning Checklist: A detailed checklist of cleaning tasks must be completed daily, and submitted to the site supervisor for review.
  - .6 Inspection: Regular inspections will be conducted by the Owner to ensure compliance with cleaning protocols and overall site cleanliness.

**98 PROGRAMMING**

- .1 The Contractor shall include all associated costs required to program the system, ensuring that all configuration and naming conventions are approved by the Owner or the Owner's Representative.
- .2 Pre-Installation Meetings: The Contractor is required to attend pre-installation meetings with the Owner, the Owner's Representative, and key staff to determine specific requirements for system programming.
- .3 Documentation: The Contractor must document all agreed-upon software configuration parameters and submit them for approval.
- .4 Integration in Drawings: The Contractor shall incorporate all approved software configuration parameters into the final revision of shop drawings.
- .5 C-Cure Programming:
- .6 The document detailing C-Cure programming will be shared with the awarded contractor upon the signing of a Non-Disclosure Agreement (NDA).

**99 FIRE ALARM WORK**

- 99.1 The Contractor is responsible for coordinating with the City of Toronto's base building vendors (Bell, Fire Alarm, Security), essential for the integration and operation of project-related services.
- 99.2 Fire Alarm Work - JD Collins:
- .1 Dan Madden: [Dan@jdcollins.ca](mailto:Dan@jdcollins.ca)
  - .2 Justin Liscombe: [justin@jdcollins.ca](mailto:justin@jdcollins.ca)
  - .3 Tyler Patterson: [tyler@jdcollins.ca](mailto:tyler@jdcollins.ca)
  - .4 Main Office Line: (905) 660-4535
- 99.3 Security Certified Dealers: Refer to list under SECTION 00 31 00.

END OF SECTION

**1** General

**1.1 SECTION INCLUDES**

- .1 Labour, Products, equipment and services necessary for demolition and removals Work in accordance with the Contract Documents.
- .2 Work included: Requirements for demolishing, salvaging and removing wholly or in part the various items designated on the drawings or required to be removed or partially removed for the receipt of the Work of this Contract, including not necessarily limited to:
  - .1 Alteration and renovations to existing building.
  - .2 Cutting and removing of walls, floors, ceilings, doors and frames, in the existing buildings as indicated on Drawings.
  - .3 Patching, making good openings and chases in walls, floors, ceilings, including the supply and installation of lintels, channels and finishes.
  - .4 Removal of rubbish, debris, demolished fixtures, fittings and items not scheduled to remain the Owner's property, resulting from the demolition and preparatory work.
  - .5 Remove abandoned services such as conduits, pipes, wiring, ducts, fixtures, equipment, etc. where required for the work or indicated on the drawings.
  - .6 Removal of all mechanical items including plumbing fixtures, services etc. where required for the work or indicated on drawings and or where not required to be relocated.
  - .7 Removal of existing electrical items including fixtures, etc. where required for the work or indicated on the drawings and not required to be relocated.
  - .8 Dust control during the operations of the work of this Section.
  - .9 Removal shall mean removal from site and safe disposal in a legal manner

**1.2 REFERENCES**

- .1 CSA S350-M, Code of Practice for Safety in Demolition of Structures.
- .2 OPSS, Ontario Provincial Standard Specification.

**1.3 SUBMITTALS**

- .1 Where required by Authorities having jurisdiction, submit a Fire Plan to local fire department for review and approval.
- .2 Submit shop drawings, diagrams and details in accordance with Section 01 10 10.
- .3 30 calendar days prior to start of demolition and removals work, submit for review, drawings, diagrams or details showing sequence of disassembly work and shoring of supporting structures in accordance with authorities having jurisdiction.
- .4 Submit for approval, a plan showing impacts, interruptions and delays to Owners operations
- .5 Submit Dust Control Plan conforming to requirements of the City of Toronto's Public Health Services.

- .6 Have submissions signed and sealed by Professional Engineer licensed in Province of Ontario.
- .7 Submit to Consultant, details of where rubble, debris and other materials are to be disposed or reused. Include each disposal/reuse site location, operator's name and business address, type of license under which site operates, and criteria used by site to assess suitability of rubble, debris and other materials for disposal.
- .8 Give notice to Utility Authorities controlling services and appurtenances which will be affected by demolition work.

**1.4 QUALITY ASSURANCE**

- .1 Prepare waste audits, waste reduction workplans, source separation programs and recycling programs as required by jurisdictional authorities and update programs and implement such programs as required.
- .2 Perform the work of this section in accordance with the 'Environmental Protection Act' including Ontario Regulation 102 and the 'Environmental Assessment Act' including Ontario Regulation 103.
- .3 Conform to Fire Code, Regulation under the Fire Marshals Act.
- .4 The demolition contractor must engage a registered professional engineer who holds a certificate of authorization and an appropriate level of liability insurance to prepare demolition procedures.
- .5 As part of the contract requirements, the engineer for the demolition contractor should be required to sign the general review commitment required by city building departments.

**1.5 SITE CONDITIONS**

- .1 Interruptions to Owners operations will not be permitted.
- .2 Perform operations, machine and equipment movements, deliveries and removals at time or times that will permit uninterrupted operations in and around structures, including parking, deliveries, and Site access and egress.
- .3 Take over structures to be demolished based on condition on date that Tenders close.
- .4 Contractor shall photo document all existing conditions prior to demolition and make such material available to Cons

**2 Products**

**2.1 MATERIALS**

- .1 All materials requiring removal shall become the Contractor's property and shall be removed and disposed of from the site, as the work progresses, unless indicated otherwise.
- .2 Salvaged material:
  - .1 Salvage and stockpile Products, materials, and equipment as specified herein, indicated on Site or indicated on drawings.
  - .2 Coordinate items to be salvaged with Owner. Dispose of items Owner deems to be of no further use.



- .3 Salvaged materials shall not be chipped, cracked, split, stained or damaged.
- .4 Store items off of moist surfaces.

### **3 Execution**

#### **3.1 GENERAL**

- .1 Schedule skylight removal work to coincide with commencement of new roofing system installation.
- .2 Clean up rubble and debris, resulting from work promptly and dispose at end of day or place in waste disposal bins. Empty bins on regular basis.
- .3 Stockpiling of rubble, debris, and surplus Products on Site will not be permitted.
- .4 Remove, handle and transport Products indicated to be salvaged and stored for future use. Transport Products to storage area(s) designated by Consultant. Perform work to prevent any damage to Products during removal and in storage. Products damaged during removal, will be inspected by Consultant. Consultant will determine extent of damage and accept or refuse Products.
- .5 List and description of items to be removed and stored or reused:
  - .1 Items as indicated on the drawings or by the Consultant.
- .6 Tag and log all items to be salvaged to the satisfaction of the Consultant. Ensure identification tags do not damage items to be salvaged and are non-permanent, removable and durable.
- .7 Communicate Dust Control Plan procedures to all appropriate personnel on site and their head offices and due diligence measures to be maintained to control all fugitive emissions.
- .8 Take precautions to guard against movement, settlement or collapse of adjacent services, sidewalks, driveways, or trees. Be liable for such movement, settlement or collapse caused by failure to take necessary precautions. Repair promptly such damage when ordered.

#### **3.2 EXAMINATION**

- .1 Verify condition and dimensions of previously installed Work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.
- .2 Examine adjacent structures and other installations prior to commencement of demolition and removals work.

#### **3.3 PRESERVATION OF REFERENCES**

- .1 Record location and designation of survey markers and monuments located within demolition area, prior to removal. Store and restore markers and monuments upon completion of Work or relocate as directed by Consultant.

#### **3.4 PROTECTION**

- .1 Prevent movement or damage of adjacent structures, services, walks, paving, trees, landscaping, adjacent grades, and parts of existing structure to remain. Supply and

install bracing and shoring as required. Make good damage caused by demolition to acceptance of Consultant.

- .2 Protect adjacent structures and property against damage which might occur from falling debris or other causes. Repair or replace damage caused from work of this Section to acceptance of Consultant.
- .3 Do not interfere with use of adjacent structures and Work areas. Maintain free, safe passage to and from adjacent structures and Work areas.
- .4 Take precautions to support affected structures. If safety of structure being demolished, adjacent structures or services are endangered, cease demolition operations and take necessary action to support endangered item. Immediately inform Consultant. Do not resume demolition until reasons for endangering have been determined and corrected and action taken to prevent further endangering.
- .5 If movement or settlement occurs, install additional bracing and shoring as necessary and make good damage to acceptance of Consultant.
- .6 Hang tarpaulins where debris and other materials are lowered. Build in around openings with wood and plywood at locations used for removal of debris and materials.
- .7 Prevent debris from blocking surface drainage system, elevators, mechanical, and electrical systems which are required to remain in operation.
- .8 Pay particular attention to prevention of fire and elimination of fire hazards which would endanger Work or adjacent structures and premises.
- .9 Supply and install adequate protection for materials to be re-used, set on ground and prevent moisture pick-up. Cover stockpiles of materials with tarpaulins.
- .10 Close off access to areas where demolition is proceeding by barricades and post warning signs.
- .11 Supply, install and maintain legal and necessary barricades, guards, railings, lights, warning signs, security personnel and other safety measures, and fully protect persons and property.
- .12 Dust/weather partitions:
  - .1 Prior to demolition work proceeding in existing structures, temporarily enclose Work areas, access and supply and install dustproof and weatherproof partitions. Design partitions to prevent dust and dirt infiltration into adjoining areas, prevent ingress of water, and to resist loads due to wind.
  - .2 Prevent dust, dirt and water from demolition operations entering operational areas.
  - .3 Adjust and relocate partitions as required for various operations of work.
  - .4 Upon completion of work, remove and dispose of partitions from Site.
- .13 Dust protection:
  - .1 Perform dust control procedures in accordance with approved Dust Control Plan and work of this Section.

- .2 Clean water to be applied to hard and soft surfaces and on open excavation faces on Site daily to eliminate dust.
  - .3 Roadways and sidewalks to be cleaned daily or as required.
  - .4 A designated truck loading area on granular material or existing asphalt to be used to mitigate tracking of potentially contaminated soil and demolition debris off Site. Contaminated loading points to be cleaned or re-established.
  - .14 Removed skylights:
    - .1 Provide temporary protective sheeting over removed skylights.
    - .2 Turn sheeting up and over parapets and curbing. Retain sheeting in position with weights or temporary fasteners.
    - .3 Provide for surface drainage from sheeting to roof drains.
    - .4 Do not permit traffic over unprotected or repaired deck surface.
  - .15 Blasting is not permitted
- 3.5 **PREPARATION**
- .1 Disconnect and/or re-route electrical data, communication and telephone service lines entering structures to be demolished. Remove abandoned lines as indicated on Contract Drawings. Post warning signs on electrical lines and equipment which is required to remain energized.
  - .2 Disconnect and cap designated mechanical services:
    - .1 Natural gas supply lines: As indicated on drawings, to be removed by qualified workers in accordance with gas company instructions.
    - .2 Sewer and water lines: Remove and dispose of as indicated on Contract Drawings.
    - .3 Other underground services: Remove and dispose of as indicated on Contract Drawings.
  - .3 Disassemble and remove mechanical equipment, ductwork and piping complete with supports and associated components.
  - .4 Do not disrupt active or energized utilities designated to remain undisturbed
  - .5 Perform rodent and vermin control to comply with health regulations
- 3.6 **DEMOLITION**
- .1 Perform demolition with extreme care. Confine effects of demolition to those parts which are to be demolished.
  - .2 Perform work and prevent inconvenience to persons outside those parts which are to be demolished.
  - .3 Carry out demolition in accordance with the requirements of CSA S350-M.
  - .4 Demolish parts of structure to permit remedial work as indicated
  - .5 Demolition shall proceed safely in systematic manner from roof to grade and as necessary to accommodate remedial work indicated. Work on each floor level shall be

complete before commencing work on supporting structure and safety of its supports are impaired. Parts of building which would otherwise collapse prematurely shall be securely shored. Walls and piers shall not be undermined.

- .6 Do not overload floor or wall with accumulations of material or debris or by other loads.
- .7 Perform work to minimize dusting. Keep work area wetted down with fog sprays to prevent dust and dirt rising. Supply and install temporary water lines and connections that may be required. Upon completion, remove installed temporary water lines. Use covered chutes, water down.
- .8 Do not sell or burn materials on Site.
- .9 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as Work progresses.
- .10 At end of day's work, leave Work in safe condition with no part in danger of toppling or falling. Protect interiors of parts not to be demolished from exterior elements.
- .11 Drainage and sewer system protection:
  - .1 Ensure that no dust, debris or slurry enters drainage and sewer system on Site.
  - .2 Remove and dispose of debris and slurry promptly from Site.
  - .3 Comply with City of Toronto Sewer Use By-Law.
- .12 Concrete:
  - .1 Demolish concrete by methods which avoid impact loads on items which are not to be demolished.
  - .2 Where only part or parts of a concrete floor, wall, or other items are to be demolished, use saw cuts to isolate areas which are to be demolished except where existing reinforcing steel is to be left in place. Prior to such isolating, install suitable support to prevent premature movement of area(s) being isolated and undesirable transfer of loads as cutting progresses. If necessary, remove area(s) to be demolished by successively isolating small sections.
  - .3 Where reinforcing steel is to be left in place, use saw cuts from surface of concrete around perimeter(s) of area(s) to be demolished, chip concrete without damaging reinforcing steel. Retouch damaged epoxy coating of existing reinforcing steel.
- .13 Steel: Where only part or parts of structure is to be demolished, dismantle and maintain structure stable. Do not place excessive loads on components. Install adequate temporary guys and supports to ensure stability and to prevent excessive loading. Support each component being disconnected from structure, and lower, do not drop, component after it is disconnected.
- .14 Cut openings through existing walls, partitions and floors. Establish exact location of steel reinforcing in existing concrete slabs or walls before cutting. Be responsible for damage to existing steel reinforcing and be liable for structural failure. Make good surfaces disturbed with materials to match existing.
- .15 Cladding:

- .1 Remove cladding, girts, channels, and additional components as indicated or necessary for new cladding work, unless otherwise indicated.
- .2 Form openings in cladding such that edges are left straight, clean and not ragged. Where openings abut flashings, ducts or similar items projecting through, or forming integral part of cladding system, preserve and support as required unless otherwise shown.
- .3 Take care to not damage existing cladding material that is to remain.
- .4 Where doors are scheduled to be removed, include removal of door frames and door hardware.
- .5 Remove interior partitions, fittings, fixtures and accessories as indicated on drawings. Partitions and walls shall be removed full height to structure above.
- .6 Remove interior finishes, such as ceiling and floor finishes, where new finishes are indicated on Contract Drawings.
- .7 Removal of existing ceilings shall include complete removal including bulkheads and suspension system.
- .8 Removal of adhesive applied finishes shall include complete removal to substrate including adhesive. Take adequate care to prevent damage to substrate.
- .9 Remove existing floor finishes, include mortar bed, underlayment or other cleavage membranes, underpad, base, floor moulding and transition strips.
- .16 Demolish all other items indicated or required.
- .17 Cut openings through existing walls, partitions, roofs and floors. Establish exact location of steel reinforcing in existing concrete slabs or walls before cutting. Be responsible for damage to existing steel reinforcing and be liable for structural failure. Make good surfaces disturbed with materials to match existing.
- .18 Where doors are scheduled to be removed, include:
  - .1 Removal in re-usable condition of door hardware.
  - .2 Removal of doors and door frames.
- .19 Remove interior partitions, fittings, fixtures and accessories as indicated on drawings. Partitions and walls shall be removed full height to structure above.
- .20 Remove interior finishes, such as ceiling and floor finishes, where new finishes are indicated on Room Finish Schedule.
  - .1 Removal of existing ceilings shall include complete removal including bulkheads and suspension system.
  - .2 Removal of adhesive applied finishes shall include complete removal to substrate including adhesive. Take adequate care to prevent damage to substrate.
- .21 Remove existing floor finishes, include mortar bed, underlayment or other cleavage membranes, base, floor moulding and transition strips.
- .22 Demolish all other items indicated or required.

**3.7 DISPOSAL OF MATERIALS**

- .1 Remove from Site, rubble, debris, and other materials resulting from demolition and removals work in accordance with Authorities having Jurisdiction, except where specified or indicated on Contract Drawings to be reused.
- .2 Conform to requirements of municipality's Works Department regarding disposal of waste materials.
- .3 Materials prohibited from municipality waste management facilities shall be removed from Site and dispose of at recycling companies specializing in recyclable materials.

**3.8 RESTORATION**

- .1 Where demolition removed a structure or installation, rough grade and restore area in accordance with Authorities having Jurisdiction.

END OF SECTION

**1** General

**1.1 SECTION INCLUDES**

- .1 Labour, Products equipment and services necessary for the management of designated substances work in accordance with the Contract Documents.

**1.2 DEFINITIONS**

- .1 Hazardous Materials: Designated Substances as covered by the Ontario Occupational Health and Safety Act as well PCBs, CFCs, HCFCs, and Fuel Oil.
- .2 PCBs: Polychlorinated Biphenyls.
- .3 PCB equipment: Equipment designed or manufactured to operate with PCB liquid or to which PCB liquid was added or drums or other containers used for the storage of PCB liquid.
- .4 PCB liquid: Material containing PCBs at a concentration of more than 50 mg/kg
- .5 PCB material: Material containing PCBs at a concentration of more than 50 mg/kg whether the material is liquid or not
- .6 PCB waste: PCB equipment, PCB liquid, or PCB material, but does not include:
  - .1 PCB material or PCB equipment after it has been decontaminated pursuant to guidelines issued by the Ministry of Environment or instructions issued by the director.
  - .2 PCB equipment that is:
    - .1 An electrical capacitor that has never contained over one kilogram of PCBs.
    - .2 Electrical, heat transfer or hydraulic equipment or a vapour diffuser pump that is being put to the use for which it was originally designed or is being stored for such use by a person who uses such equipment for the purpose for which was originally designed.
    - .3 Machinery or equipment referred to in Clause 1.2.6.3.1.
  - .3 PCB liquid that:
    - .1 Is at the site of fixed machinery or equipment, the operation of which is intended to destroy the chemical structure of PCB's by using the PCB's as a source of fuel or chlorine for purposes other than the destruction of PCB's or other wastes and with respect to which a certificate of approval has been issued under Section 9 of the Act after the 1st day of January 1981 specifying the manner in which PCB liquid be processed in the machinery or equipment.
    - .2 Is in PCB equipment referred to in subclause (b) (2) Ontario Regulation 11/82.
    - .3 HCFC: Hydrochlorofluorocarbons.
    - .4 CFC: Chlorofluorocarbons.

**1.3 REGULATORY AGENCIES**

- .1 Comply with Federal, Provincial, and local requirements pertaining to the handling, management, haulage, and/or disposal of Hazardous Materials including but not limited to the following:
  - .1 Ontario Regulation 356, Highway Traffic Act.
  - .2 R. R. O. 1990, Regulation 347, General - Waste Management.

**1.4 SUBMITTALS**

- .1 Submit proof satisfactory to the Consultant that suitable arrangements have been made to dispose of Hazardous Materials in accordance with requirements of authorities having jurisdiction.
- .2 Submit notifications to applicable authorities having jurisdiction regarding the handling, storage, haulage, and/or disposal of Hazardous Materials as required by Regulations.
- .3 Submit proof satisfactory to the Consultant that the Hazardous Waste materials were appropriately disposed of.

**1.5 EXISTING CONDITIONS**

- .1 Information pertaining to the presence of Hazardous Materials to be handled; removed, or otherwise disturbed during this project is identified in the report: Section A1000 Removal and Disposal of Designated Substance dated 2020-07-10 prepared by Fisher Environmental
- .2 Assessment:
  - .1 Employ an Asbestos Abatement Consultant to confirm the presence of asbestos in the materials being demolished and to remove hazardous materials in accordance with authorities having jurisdiction.
  - .2 Submit Asbestos Abatement Consultant's certificate that hazardous materials have been removed in accordance with Authorities having Jurisdiction

**1.6 INSTRUCTION AND TRAINING**

- .1 Before commencing work, provide to the Consultant satisfactory proof that every worker has had instruction and training in the hazards of handling and storage of Hazardous Materials, in personal hygiene and work practices, and in the use, cleaning, and disposal, of respirators and protective clothing as required.
- .2 Instruction and training related to respirators shall include instruction and training related to:
  - .1 The limitations of the equipment.
  - .2 The inspection and maintenance of the equipment.
  - .3 The fitting of the equipment.
  - .4 The disinfecting of the equipment.



**1.7 WORKER PROTECTION**

- .1 Respirators: Provide workers with personally issued and marked as to efficiency and purpose non-powered reusable or replaceable filter type air purifying respirators suitable for the materials being handled and acceptable to the Provincial Authority having jurisdiction (as required).
- .2 Protective Clothing: Provide workers with full body disposable type coveralls (as required).
- .3 Eating, drinking, chewing, and smoking are not permitted in the work area.
- .4 Store protective clothing in clean plastic bag for reuse or if protective clothing is not to be reused, dispose of as contaminated waste.
- .5 Workers shall wash hands and face when leaving the work area and before eating or drinking.

**2 Products**

**2.1 MATERIALS**

NOT USED

**3 Execution**

**3.1 EXAMINATION**

- .1 Verify condition and dimensions of previously installed Work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.

**3.2 ASBESTOS CONTAINING MATERIALS**

- .1 Conform to and Manage and dispose of asbestos containing materials in accordance with Regulation Designated Substance - Asbestos on Construction Projects And In Buildings And Repair Operations R.R.O. 1990, Reg. 838, made under Occupational Health and Safety Act as amended by O.Reg. 278/05 and O.Reg 837 as amended by O.Reg. 279/05.

END OF SECTION

**1** General

**1.1 SECTION INCLUDES**

- .1 Labour, Products equipment and services necessary for the finish carpentry Work in accordance with the Contract Documents.

**1.2 REFERENCES**

- .1 ANSI A208.1, Particleboard.
- .2 ANSI/HPVA HP-1, Hardwood and Decorative Plywood.
- .3 ANSI A208.2, Medium Density Fibreboard for Interior Use.
- .4 ANSI/NEMA LD 3, High-Pressure Decorative Laminates.
- .5 APA - The Engineered Wood Association.
- .6 ASTM F1667, Driven Fasteners: Nails, Spikes and Staples.
- .7 Architectural Woodwork Manufacturers Association of Canada (AWMAC).
- .8 Architectural Woodwork Standards (AWS) - Quality Standards for Architectural Woodwork.
- .9 CAN/CSA O141, Softwood Lumber.
- .10 CSA O151-M, Canadian Softwood Plywood.
- .11 National Hardwood Lumber Association (NHLA) Rules for the Measurement and Inspection of Hardwood and Cypress.
- .12 National Lumber Grades Authority (NLGA) Standard Grading Rules for Canadian Lumber.

**1.3 SUBMITTALS**

- .1 Shop drawings: Submit shop drawings of finish carpentry Work in accordance with Section 01 10 10 indicating materials, thicknesses, sizes, finishes, wood species, grades, profiles, connection attachments, shop jointing, field jointing, reinforcing, anchorage, fastener types and sizes, location of exposed fastenings, mechanical and electrical service routes, service outlets, cutout locations, and sizes. Include erection drawings, plans, elevations, sections, and details as applicable.
- .2 Samples: Submit samples of the following in accordance with the requirements of Section 01 10 10:
  - .1 Two representative pieces of each type of wood to receive a stained or natural finish.
  - .2 Two representative pieces of each type of wood finished as specified.
  - .3 Two of each colour, pattern, gloss, and texture of plastic laminate, in manufacturer's standard tag size.
  - .4 Two of each solid surface, in 100 x 75 x 12 mm samples.

- .5 One of each item of finish carpentry hardware.

#### 1.4 **QUALITY ASSURANCE**

- .1 Execute Work of this Section by member of AWMAC, with 5 years experience in finish carpentry Work of comparable complexity and scope. Submit proof of experience upon Consultant's request.
- .2 Fabricate finish carpentry Work in accordance with AWS Quality Standards, Premium Quality materials and installation unless otherwise indicated. Perform Work in accordance with the definition of Good Workmanship as defined in the AWS Quality Standards.
- .3 Remove and replace finish carpentry Work which does not conform to the AWS Quality standards or as amended by these Specifications.

#### 1.5 **DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store, and handle finish carpentry in accordance with the AWS Quality Standards. Control the temperature and humidity in accordance with the AWS recommendations, before, during, and after finish carpentry delivery, and also during storage and installation.
- .2 Cover finished plastic laminated work with heavy kraft paper or put in cartons during shipment. Protect installed surfaces by approved means. Do not remove until immediately before final inspection.

#### 1.6 **EXTENDED WARRANTY**

- .1 Submit an extended warranty for plastic laminate work of this Section in accordance with General Conditions, except that warranty period is extended to 2 years from date of Substantial Performance of the Work.
  - .1 Warrant against defects in material and workmanship including but not limited to opening of joints, cracking, shrinkage, warpage, and delamination of plastic laminate.
  - .2 Coverage: Complete replacement including affected adjacent Work.

#### 1.7 **COORDINATION**

- .1 Coordinate with other work to ensure satisfactory and expeditious completion of the work of this section.
- .2 Take dimensions at the *Place of the Work* relative to the work of this section. Perform work of this section to suit dimensions and conditions at the *Place of the Work*.
- .3 *Provide* forms, templates, anchors, sleeves, inserts and accessories required to be fixed to or inserted in the work of this section and set in place. Instruct applicable *Subcontractors* as to their locations.
- .4 Coordinate with partition accessories, electrical, communications, and finish components to ensure that proper provisions are made for the installation of the work of this section and for work by others.

- .5 *Provide* cut-outs for raceways, sleeves, grommets and other manufactured accessories which are required for the work of this section and for work by others.
- .6 Architectural woodwork specified under this section includes woodwork items which are closely integrated with built-in electrical components, and consequently requires close coordination with such allied trades. This section is responsible for ensuring correct installation procedures and results.
- .7 Field measurements: Where woodwork is to be fitted to other construction, check actual dimension of other construction by accurate field measurements before manufacturing woodwork; show recorded measurements on final shop drawings. Coordinate manufacturing schedule with construction progress to avoid delays in the *Work*.

## 2 Products

### 2.1 MATERIALS

- .1 General: All materials under Work of this Section, including but not limited to, adhesives and mastics, are to have low VOC content limits.
- .2 Hardwood lumber: Ash, unless otherwise indicated, to NHLA and AWS Premium Grade, S4S, average moisture content 7% +/- 2% at installation.
- .3 Plywood, core substrate (19mm): APA plywood, Grade A-D, in sizes, thickness and shapes
- .4 Laminating adhesive: CSA O112 Series, water resistant type, low VOC content, selected by laminate manufacturer for intended end use.
- .5 Nails and staples: Conforming to ASTM F1667; Size and type to suit application, galvanized for exterior work, interior humid areas and for treated lumber; plain finish elsewhere.
- .6 Bolts, nuts, washers, blind fasteners, lags and screws: Size and type to suit application. Stapling is not acceptable.
- .7 Adhesive and bituminous mastic: Selected by the millwork fabricator with low VOC content.
- .8 Finishing: In accordance with Section 09 91 00.
- .9 Solid Surfacing (**SOL-1**): 12 mm (1/2") thick sheet stock, provide with eased edge and all cutouts as required. Colour: "Deep Black Quartz" by Corian or to be selected from standards colour chart. Installation and seam adhesives to be as recommended by solid surfacing manufacturer colour matched to solid surfacing.
  - .1 Acceptable manufactures:
    - .1 Wilsonart
    - .2 Corian
    - .3 Formica

- .10 Solid surfacing installation and seam adhesives: As recommended by solid surfacing manufacturer, colour matched to solid surfacing.

## **2.2 FABRICATION**

- .1 Be responsible for methods of construction and for ensuring that materials are rigidly and securely attached and will not be loosened by the work of other sections.
- .2 Coordinate locations of concealed supports and blocking with other parts of Work. Provide cutouts for outlet boxes and other fixtures.
- .3 Fabricate work in a manner which will permit expansion and contraction of the materials without visible open joints. Conceal joints and connections in wherever possible.
- .4 Set nails and countersink screws, apply wood filler to indentations, sand smooth and leave ready to receive finish.
- .5 Mitre exposed corners, no end grain shall be visible in completed installation.
- .6 Finish millwork in accordance with Section 09 91 00. Finished millwork shall be free from bruises, blemishes, mineral marks, knots, shakes and other defects and shall be selected for uniformity of colour, grain and texture.
- .7 Do not exceed maximum 760 mm unsupported span for 19 mm thick shelving. House fixed shelving into gables and divisions.
- .8 Shop assemble finish carpentry to accommodate delivery and handling and to ensure passage through building openings.
- .9 Shop install cabinet hardware for doors, shelves and drawers. Recess shelf standards unless noted otherwise.
- .10 Fabricate sills, screens, frames, benches and moldings to profiles shown.
- .11 Fire retardant coating: Apply fire retardant fire coating to floor plywood panels at the underside of new furnace installations in accordance with manufacturer's written instructions.
- .12 MW-1 : Continuous Wire Mold Cover:
  - .1 Construct continuous wire mold cover of sizes and details as noted.
  - .2 SOL-1 top to be 19mm plywood with blocking.
  - .3 Anchor wood to supports in a concealed manner.
  - .4 Mitre joints at corners. Keep joints to a minimum.
  - .5 Round all corners, edges and ends.

## **2.3 SOLID SURFACING WORK**

- .1 Fabricate units by solid surfacing manufacturer's certified or approved fabricator/installer. Fabricate built-up profiles as indicated. Back paint solid surfacing with paint recommended by solid surfacing manufacturer prior to installation.

- .2 Solid surfacing installation and seam adhesives: As recommended by solid surfacing manufacturer, colour matched to solid surfacing.
- .3 Seal edges of countertop plumbing cut-outs with two coats of varnish.
- .4 Seal all SOL-1 countertop edges with two coats of varnish.
- 3 Execution**
- 3.1 EXAMINATION**
  - .1 Verify condition and dimensions of previously installed Work upon which this Section depends. Report defects to Consultant. Commencement of Work means acceptance of existing conditions.
- 3.2 INSTALLATION**
  - .1 Install Work in accordance with AWS Quality Standards and tolerances for Architectural Woodwork. Set and secure finish carpentry in place, rigid, plumb, square, and level.
  - .2 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate columns, fixtures, outlets, or other projecting, intersecting or penetrating objects leaving a 0.8 mm gap maximum.
  - .3 Coordinate cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and other fixtures, in finish carpentry. Round internal corners of cut-outs and seal exposed cores.
  - .4 Form joints to conceal shrinkage.
  - .5 Install draw bolts and splines in laminated plastic counter top joints at maximum spacing 450 mm o.c., and 75 mm from edge. Make joints flush, hairline butt joints.
  - .6 Install finishing hardware accurately and securely in accordance with manufacturer's directions, adjust and clean.
  - .7 Install prefinished millwork at locations shown on drawings. Position accurately, level, plumb straight.
  - .8 Install solid surfacing in accordance with manufacturer's instructions.
  - .9 Continuous wire mold cover:
    - .1 Construct continuous wire mold cover of sizes and details as noted.
    - .2 SOL-1 top to be 19mm plywood with blocking.
    - .3 Anchor wood to supports in a concealed manner.
    - .4 Mitre joints at corners. Keep joints to a minimum.
    - .5 Round all corners, edges and ends.
  - .10 Fastening:

- .1 Coordinate wall securement, anchorage, and blocking for finish carpentry items.
- .2 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.
- .3 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.
- .4 Provide heavy duty fixture attachments for wall mounted cabinets.
- .5 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round cleanly cut hole and plug with wood plug to match material being secured.
- .11 Remove and replace damaged, marked, or stained finish carpentry.
- .12 No face nailing of exposed members.
- .13 Work in close cooperation with turnstile and electrical trades installing floors, carefully applying finished millwork junctions. Ensure entire assembly is level or plumb as applicable, and face variations between panels do not exceed 2mm.
- .14 Cover all finished surfaces with heavy kraft paper or put in cartons during shipment. Protect installed laminated surfaces by approved means. Do not remove unit immediately before final inspection.

**END OF SECTION**

- 1 General
- 1.1 **SECTION INCLUDES**
  - .1 Labour, Products, equipment and services necessary for firestopping and smoke seals work in accordance with the Contract Documents.
- 1.2 **REFERENCES**
  - .1 ASTM C303, Standard Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation.
  - .2 ASTM C920, Standard Specification for Elastomeric Joint Sealants.
  - .3 ASTM C1104, Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation.
  - .4 ASTM E814, Test Method for Fire Tests of Through-Penetration Fire Stops.
  - .5 ASTM E2174, Standard Practice for On-Site Inspection of Installed Fire Stops.
  - .6 ASTM G21, Standard Test for Determining Resistance of Synthetic Polymeric Materials to Fungi.
  - .7 CAN/CGSB 19.13, Sealing Compound, One Component, Elastomeric, Chemical Curing.
  - .8 CAN/ULC S102, Surface Burning Characteristics of Building Materials and Assemblies.
  - .9 CAN/ULC S114, Standard Method of Test for Determination of Non-Combustibility in Building Materials.
  - .10 CAN/ULC S115, Standard Method of Fire Tests of Firestop Systems.
  - .11 CAN/ULC S129, Standard Method Of Test For Smoulder Resistance Of Insulation (Basket Method).
  - .12 CAN/ULC S702, Thermal Insulation, Mineral Fibre for Buildings.
- 1.3 **DEFINITIONS**
  - .1 Fire Separation: A construction assembly, plane or device, either vertical or horizontal, which is required to prevent the passage of fire and smoke for a prescribed period of time. Proof of compliance to required time rating shall be by ULC, Warnock Hersey (or similar approved) certification or shall be as listed in the Ontario Building Code Supplementary Standard SB-2.
  - .2 Smoke Separation: A construction assembly, plane or device, either vertical or horizontal, which is not required to prevent the passage of fire for a prescribed period of time but is required to prevent the passage of smoke. A "Smoke Separation" is also known as a "Fire Separation with No Rating" or a "Zero Hour Rated Separation".
  - .3 Non-Rated Separation: A construction assembly, plane or device, either vertical or horizontal, which is not required to prevent the passage of fire for a prescribed period of time and is not required to prevent the passage of smoke.
- 1.4 **SYSTEM DESCRIPTION**



- .1 Firestopping and smoke seals: ULC or Intertek Testing Services listed Products and systems in accordance with CAN/ULC S115 suitable to actual application and installation conditions.
- .2 Firestop applications that exist for which no ULC or cUL tested system is available through a manufacturer, a manufacturer's engineering judgment derived from similar ULC or cUL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineer judgment drawings must follow requirements set forth by the International Firestop Council.
- .3 Firestop and smoke seal system shall achieve a fire resistance rating and smoke seal rating equal to that of assemblies into which they are installed.
- .4 Provide smoke sealants over firestopping materials or combination smoke seal/firestop seal material to form air tight barriers to retard the passage of gas and smoke.
- .5 Firestopping and smoke seals located at movement joints shall be designed with movement capability.
- .6 Provide penetration firestopping with mould and mildew resistance rating of 0 in accordance with ASTM G21.
- .7 Firestopping and smoke seals within mechanical and electrical assemblies shall be provided as part of the work of Divisions of mechanical, electrical and refrigeration respectively.

**1.5 SUBMITTALS**

- .1 Product data:
  - .1 Submit copies of manufacturer's Product data in accordance with 01 10 10 indicating:
    - .1 Performance criteria, compliance with appropriate cUL or ULC reference standard, characteristics, limitations.
    - .2 Product transportation, storage, handling and installation requirements.
    - .3 Submit firestop and smoke seal manufacturer's Product data for materials and prefabricated devices, including manufacturer's printed installation instructions.
- .2 Shop drawings:
  - .1 Submit shop drawings in accordance with Section 01 10 10 indicating:
    - .1 Fire rated and smoke sealed systems for each typical application.
    - .2 Construction details, accurately reflecting actual job conditions.
    - .3 ULC or Intertek Testing assembly listing.
    - .4 Each floor and wall assembly requiring firestop system with each corresponding ULC firestop system.
- .3 Certification:
  - .1 Submit certified documentation from manufacturer for each worker performing work of this Section.

- .2 Submit installer's and Product manufacturer's certification verifying compliance with the Contract Documents and conformance with ASTM E814 and CAN/ULC S115.

**1.6 QUALITY ASSURANCE**

- .1 Installers qualifications: Perform work of this Section by a company that has a minimum of five years proven experience in the installation of firestopping and smoke seal work of a similar size and nature and that is approved by manufacturer. Submit to Consultant, applicator's current certificate of approval by the material manufacturer as proof of compliance.
- .2 Manufacturer's direct representative and/or fire protection specialist shall be on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures conforming to manufacturer's written recommendations published in their literature and drawing details.
- .3 Pre-construction meetings: Arrange with manufacturer's representative, Contractor, Consultant and Field Engineer to determine responsibility for handling such issues as FT rated partitions, firestop custom details, compatibility, mixed penetrations, and to review installation procedures 48 hours in advance of installation.

**1.7 DELIVERY STORAGE AND HANDLING**

- .1 Deliver materials to Place of Work in manufacturer's unopened containers, containing classification label with labels intact and legible at time of use.
- .2 Do not use damaged or adulterated materials exceeding their expiry date.

**1.8 SITE CONDITIONS**

- .1 Conform to manufacturer's requirements and maintain a minimum temperature of 5°C for a minimum period of 24 hour before application, during, and until application is fully cured.
- .2 Maintain sealant at a minimum 18°C for best workability.

**2 Products**

**2.1 ACCEPTABLE MANUFACTURERS**

- .1 Acceptable manufacturers of rated systems include:
  - .1 AD Fire Protection Systems Inc.
  - .2 Hilti Canada Corporation.
  - .3 3M Canada Inc.
  - .4 Tremco Ltd.

**2.2 GENERAL SYSTEM REQUIREMENTS**

- .1 All materials under work of this Section, including but not limited to, primers and sealants are to have low VOC content limits.
- .2 Do not use Products containing asbestos.
- .3 Firestopping components shall not contain volatile solvents or require special application to protect plastic pipe from firestopping compound.
- .4 Provide smoke seal sealant in following colours:

- .1 Grey or white in finished areas.
- .2 Red in unfinished areas.
- .5 Smoke sealant for overhead and vertical joints for floor to be self-levelling and non-sagging sealant.
- .6 Smoke sealant at vertical through penetrations in areas with floor drains shall be waterproof type.

**2.3 MATERIALS**

- .1 Following materials have been provided for convenience. Contractor shall provide complete system with all components and accessories as required for fire resistant and smoke seal installation.
- .2 Firestop sealant: single component, low modulus, silicone rubber, moisture curing sealant to ASTM C920, ULC labelled to CAN/ULC S115.
- .3 Pre-Installed firestop devices for use with non-combustible and combustible pipes, conduit and/or cable bundles penetrating concrete floors and walls.
  - .1 Cast-in place firestop device complete with aerator adaptor when used in conjunction with aerator system. Model CP 680-P by Hilti or approved alternative.
  - .2 Cast-in place firestop device for use with non-combustible penetrants. Model CP 680-M by Hilti or approved alternative.
  - .3 Speed sleeve for use with cable penetrations. Model CP 653 by Hilti or approved alternative.
  - .4 Firestop block. Model CFS-BL by Hilti or approved alternative.
- .4 Re-penetrable, round cable management devices for use with new or existing cable bundles penetrating walls:
  - .1 Speed sleeve with integrated smoke seal fabric membrane. Model CP 653 by Hilti or approved alternative.
  - .2 Firestop Sleeve. Model CFS-SL SK by Hilti or approved alternative.
  - .3 Retrofit sleeve for use with existing cable bundles. Model CFS-SL RK by Hilti or approved alternative.
  - .4 Gangplate for use with multiple cable management devices. Model CFS-SL GP by Hilti or approved alternative.
  - .5 Gangplate Cap for use at blank openings in gangplate for future penetrations. Model CFS-SL GP CAP by Hilti or approved alternative.
- .5 Firestop insulation: to CAN/ULC S702, Type 2; mineral fibre manufactured from rock or slag, suitable for manual application.
  - .1 Density: Minimum 64 kg/m<sup>3</sup> when tested to ASTM C303.
  - .2 Combustibility: Noncombustible to CAN/ULC S114.
  - .3 Melt temperature: >1175 degrees C.
  - .4 Surface burning characteristics: to CAN/ULC S102, maximum flame spread of 0, smoke developed of 0.

- .5 Moisture Absorption: 0.04 percent when tested to ASTM C1104.
- .6 Smoulder Resistance: 0.01 percent when tested to CAN/ULC S129.
- .6 Damming, back-up, supports, and anchorage: In accordance with manufacturer's fire rated systems and to acceptance of authorities having jurisdiction.
- .7 Primer: As recommended by firestopping sealant manufacturer.
- 3 Execution
- 3.1 **EXAMINATION**
  - .1 Verify condition and dimensions of previously installed Work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.
  - .2 Verify that substrates and surfaces to receive firestopping and smoke seals are clean, dry, and frost free.
- 3.2 **PREPARATION**
  - .1 Prepare, modify, and adjust void sizes, proportions, and conditions to conform to fire rated and smoke sealed assembly requirements such as assembly opening size and dimensional restrictions.
  - .2 Clean surfaces to remove material detrimental to bond including dust, paint, rust, oil, grease, moisture, frost and other foreign matter to manufacturers recommendations.
  - .3 Mask adjacent surfaces to avoid spillage and over-coating of adjacent surfaces. Remove stains from adjacent surfaces.
- 3.3 **INSTALLATION**
  - .1 Install firestopping and smoke seal systems in accordance with reviewed Shop Drawings, manufacturer's instructions and fire rated assembly to establish continuity and integrity of fire separations.
  - .2 Install firestop insulation in compacted thicknesses required by ULC design. Compress insulation approximately 50 percent.
  - .3 Install primers as recommended by firestop and smoke seal Product manufacturers.
  - .4 Install temporary forming, damming, back-up as required, remove after materials have achieved initial cure and will resist displacement.
  - .5 Install firestop and smoke seal filler in horizontal joints providing 25% compression fit.
  - .6 Use resilient, elastomeric firestopping and smoke seal systems in following locations:
    - .1 Openings and sleeves for future use.
    - .2 Penetration systems subject to vibration or thermal movement.
    - .3 Penetration systems in acoustical containment enclosures.
  - .7 Trowel and tool exposed firestop and smoke seal. Product surfaces to uniform, smooth finish.
  - .8 Seal joints to ensure an air and water resistant seal capable of withstanding compressions and extensions due to thermal wind or seismic joint movement.
  - .9 Taped joints will not be acceptable.

- .10 Repair damaged firestopped and smoke sealed surfaces to acceptance of Consultant.
  - .11 Identify each firestop and smoke seal penetration assembly with permanent label listing following:
    - .1 Assembly and rating in hours.
    - .2 Date of installation.
    - .3 Installing company's name and telephone number.
  - .12 Do not cover materials until full cure has taken place.
- 3.4 **INSPECTION AND TESTING**
- .1 Inspection of through-penetration firestopping shall be performed in accordance with ASTM E2174 to ensure that firestopping and smoke seals have been installed in accordance with Contract documents and to tested and listed firestop system.
- 3.5 **CLEAN-UP**
- .1 Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.
  - .2 Remove excess materials and debris immediately after application.
- 3.6 **SCHEDULE OF FIRESTOP AND SMOKE SEAL LOCATIONS**
- .1 Following firestop and smoke seal location schedule is included for convenience and may not be complete. Examine Contract Drawings and other specification sections and determine entire extent of work of this Section. Generally provide systems with required fire and smoke ratings at following locations:
    - .1 Gaps at intersections of fire-resistance rated walls and partitions.
    - .2 Control and sway joints in fire-resistance rated walls and partitions.
    - .3 Gaps at top of fire-resistance rated partitions and walls.
    - .4 Penetrations through fire-resistance rated walls and partitions including mechanical and electrical services and openings and sleeves for future use.
    - .5 Penetrations through fire-resistance rated floor slabs, ceilings, and roofs.
    - .6 Gaps at edge of floor slabs at exterior walls.
    - .7 Perimeter of retaining angles on rigid ducts greater than 0.012 m<sup>2</sup>, firestopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.
    - .8 Where indicated on drawings.
    - .9 At non-rated assemblies that require a smoke seal.
    - .10 Where required by Ontario Building Code.

END OF SECTION

**1** General

**1.1 DESCRIPTION**

- .1 This section provide the elastomeric sealants and their implementation that are used to seal building joint assemblies.
- .2 Labour, Products, equipment and services necessary for sealant Work in accordance with the Contract Documents.
- .3 Work of this Section does not include sealants in firestopping and smoke sealed assemblies.
- .4 Work of this Section does not include sealant work identified in individual specification sections.

**1.2 REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM C 919-[08], Standard Practice for Use of Sealants in Acoustical Applications.
  - .2 ASTM C834, Specification for Latex Sealants.
  - .3 ASTM C920, Specification for Elastomeric Joint Sealants.
  - .4 ASTM C1330, Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
- .2 Canadian General Standards Board (CGSB)
  - .1 CGSB 19-GP-5M-[1984], Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).
  - .2 CAN/CGSB-19.13-[M87], Sealing Compound, One-component, Elastomeric, Chemical Curing.
  - .3 CGSB 19-GP-14M-[1984], Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).
  - .4 CAN/CGSB-19.17-[M90], One-Component Acrylic Emulsion Base Sealing Compound.
  - .5 CAN/CGSB-19.24-[M90], Multi-component, Chemical Curing Sealing Compound.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for joint sealants and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Product data: Submit copies of Product data in accordance with Section 01 10 10 describing type, composition and recommendations or directions for surface preparation, material preparation and material installation.
  - .3 Manufacturer's product to describe:

- .1 Caulking compound.
  - .2 Primers.
  - .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.
- .2 Samples:
  - .1 Submit samples of each type of material and colour.
  - .2 Cured samples of exposed sealants for each colour where required to match adjacent material.
  - .3 Two samples of sealant/caulking, for colour selection. Two samples of back-up material and primer for physical characteristics.
- .3 Manufacturers' Instructions
  - .1 Submit instructions to include installation instructions for each product used.
- 1.4 **DELIVERY, STORAGE AND HANDLING**
  - .1 Arrange delivery of materials in original, unopened packages with labels intact, including batch number, and ensure that on-site storage is kept to a minimum. Do not store materials on site where there exists any danger of damage from moisture, direct sunlight, freezing and other contaminants.
  - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
  - .3 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
  - .4 Storage and Handling Requirements:
    - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
    - .2 Store and protect joint sealants from nicks, scratches, and blemishes.
    - .3 Replace defective or damaged materials with new.
- 1.5 **QUALITY ASSURANCE**
  - .1 Qualifications: Work of this Section shall be executed by trained applicators approved by sealant manufacturer and having a minimum of 5 years proven experience.
- 1.6 **EXTENDED WARRANTY**
  - .1 Submit an extended warranty for Sealant Work in accordance with General Conditions, except that warranty period is extended to 2 years from date of Substantial Performance of the Work.
    - .1 Warrant against leakage, cracking, crumbling, melting, shrinkage, running, loss of adhesion and staining adjacent surfaces.
    - .2 Coverage: Complete replacement including affected adjacent Work.
- 1.7 **SITE CONDITIONS**

- .1 Do not install materials when ambient air temperature is less than 5 degrees Celsius, when recesses are wet or damp, or to manufacturer's recommendations.
- .2 Ambient Conditions:
  - .1 Proceed with installation of joint sealants only when:
    - .1 Ambient and substrate temperature conditions are within limits permitted by joint sealant manufacturer or are above 4.4 degrees C.
    - .2 Joint substrates are dry.
    - .3 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.
  - .3 Joint-Width Conditions
    - .1 Proceed with installation of joint sealants only where joint widths are as allowed by joint sealant manufacturer for applications indicated.
  - .4 Joint-Substrate Conditions:
    - .1 Proceed with installation of joint sealants only after contaminants capable of interfering with adhesion are removed from joint substrates.
- 2 Products**
- 2.1 SEALANT MATERIALS**
  - .1 All materials under Work of this Section, including but not limited to, primers and sealants are to have low VOC content limits.
  - .2 Use materials as received from manufacturers, without additives or adulterations. Use one manufacturer's Product for each kind of Product specified.
  - .3 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.
  - .4 When low toxicity caulks are not possible, confine usage to areas which off gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off gas time.
  - .5 Where sealants are qualified with primers use only these primers.
  - .6 Where exposed the colours shall match the substrate, as approved by the Owner.
- 2.2 Sealant Type A: ASTM C920, Type S, Grade NS, Class 25; One-part, non-sag type, silicone sealant, in standard colours selected.**
  - .1 'DC CWS' by Dow Corning Inc.
  - .2 'Sikasil 305CN' by Sika.
  - .3 'Tremsil 400' by Tremco.
- 2.3 Sealant Type B: ASTM C920, Type S, Grade NS; One-part mildew-resistant silicone, in standard colours selected.**
  - .1 '786 Mildew Resistant Silicone Sealant' by Dow Corning Inc.
  - .2 'Sikasil GP Mildew Resistant' by Sika.



- .3 'Tremsil 200 Silicone Sealant' by Tremco Ltd.
- 2.4 Sealant Type C: ASTM C834; Pure acrylic siliconized sealant; in standard white colour (paintable).
  - .1 '950A Siliconized Acrylic Latex Caulk' by Sherwin Williams.
  - .2 'Tremflex 834 Siliconized Sealant' by Tremco Ltd.
  - .3 Sealant Type D: Urethanes one part: Non-sag: to CAN/CGSB-19.13, Type 2, approved products include:
    - .1 Dymonic by Tremco;
    - .2 SikaFlex 15LM by Sika;
    - .3 or approved alternate.
  - .4 Preformed compressible and non-compressible back-up materials:
    - .1 Polyethylene, urethane, neoprene or vinyl foam:
      - .1 Extruded closed cell foam backer rod.
      - .2 Size: oversize 30 %.
    - .2 Neoprene or butyl rubber:
      - .1 Round solid rod, Shore A hardness 70.
    - .3 High density foam:
      - .1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m<sup>3</sup> density, or neoprene foam backer, size as recommended by manufacturer.
    - .4 Bond breaker tape:
      - .1 Polyethylene bond breaker tape which will not bond to sealant.
- 2.5 **ACCESSORIES**
  - .1 Primers: Type recommended by material manufacturers for various substrates, primers to prevent staining of adjacent surfaces encountered on project.
  - .2 Joint backing: ASTM C1330; Round, solid section, closed cell, skinned surface, soft polyethylene foam gasket stock, compatible with primer and sealant materials, 30 to 50% oversized, Shore A hardness of 20, tensile strength 140 to 200 kPa. Bond breaker type surface.
  - .3 Bond breaker: Type recommended by material manufacturers.
  - .4 Void filler around the window frames to be one part expanding polyurethane foam.
  - .5 Cleaning agents: As recommended by material manufacturer, non-staining, harmless to substrates and adjacent finished surfaces.
- 2.6 **MIXING**
  - .1 Follow manufacturers instructions on mixing, shelf and pot life.
- 2.7 **JOINT CLEANER**

- .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant in accordance with sealant manufacturer's written recommendations.
- .2 Primer: in accordance with sealant manufacturer's written recommendations.
- 3 Execution**
- 3.1 EXAMINATION**
  - .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for joint sealants installation in accordance with manufacturer's written instructions.
    - .1 Visually inspect substrate in presence prior to sealant installation.
    - .2 Inform the Consultant of unacceptable conditions immediately upon discovery.
    - .3 Proceed with installation only after unacceptable conditions have been remedied. Proceeding with the installation will be the acceptance of the substrate by the Contractor.
- 3.2 SURFACE PREPARATION**
  - .1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
  - .2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other
  - .3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
  - .4 Ensure joint surfaces are dry and frost free.
  - .5 Prepare surfaces in accordance with manufacturer's directions.
  - .6 Prepare joints to receive sealants to manufacturer's instructions. Ensure that joints are clean and dry and ferrous surfaces are free from rust and oil.
  - .7 Clean recesses to receive sealant, to be free of dirt, dust, loose material, oil, grease, form release agents and other substances detrimental to sealant's performance.
    - .1 Remove lacquer or other protective coatings from metal surfaces, without damaging metal finish, using oil-free solvents. Remove rust, mill scale and coatings from ferrous metals by wire brush, grinding or sand blasting. Ensure recess is dry.
    - .2 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings. Remove incompatible coatings as required.
  - .8 Ensure that all materials in contact with sealant are compatible. Test substrate for adhesion.
  - .9 Depth of recess: Maintain depth to  $\frac{1}{2}$  joint width up to a maximum of 13 mm and not less than 6 mm at centre of joint. For greater depth, use joint backing under. Where recess is less than specified depth, cut back surface of recess to specified recess depth.

- .10 Install polyethylene backing rod in joints 6 mm or more in width. Roll backing rod into joint. Do not stretch or bend backing rod. Install bond breaker to back of recess.
- .11 Prime sides of recess, in accordance with sealant manufacturer's instructions.
- .12 Condition products for use in accordance with manufacturer's recommendations.

### 3.3 **INSTALLATION**

- .1 Apply sealant immediately after adjoining Work is in condition to receive such Work. Apply sealant in continuous bead using gun with correctly sized nozzle. Use sufficient pressure to evenly fill joint.
- .2 Ensure sealant has full uniform contact with, and adhesion to, side surfaces of recess. Superficial painting with skin bead is not acceptable. Tool sealant to smooth surface, free from ridges, wrinkles, sags, air pockets, embedded impurities, dirt, stains or other defects.
  - .1 At recesses in angular surfaces, finish sealant with flat profile, flush with face of material at each side.
  - .2 At recesses in flush surfaces, finish compound with concave face, flush with face of material at each side.
- .3 Make sealant bead uniform in colour.
- .4 Cure sealants in accordance with sealant manufacturer's instructions. Do not cover up sealants until proper curing has taken place.
- .5 Immediately remove excess compound or droppings which would set up or become difficult to remove from adjacent finished surfaces, using recommended cleaners, as work progresses. Do not use scrapers, chemicals or other tools which could damage finished surfaces. Remove defective sealant.
- .6 Clean recesses and re-apply sealant.
- .7 Remove masking tape immediately after joints have been sealed and tooled.

### 3.4 **PRIMING**

- .1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

### 3.5 **BACKUP MATERIALS**

- .1 Apply bond breaker tape where required to manufacturer's instructions.
- .2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

### 3.6 **APPLICATION**

- .1 Sealant:
  - .1 Apply sealant in accordance with manufacturer's written instructions to achieve the required minimum and maximum sealant depths.

- .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
- .3 Apply sealant in continuous beads.
- .4 Apply sealant using gun with proper size nozzle to achieve a minimum 6mm depth over the joint profile and adhesive to substrate a minimum of 9mm, and 10mm minimum joint width, while maintaining a consistent depth-to-width ratio.
- .5 Use sufficient pressure to fill voids and joints solid.
- .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
- .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
- .8 Remove excess compound promptly as work progresses and upon completion.
- .9 Apply multiple application of sealant to build up the required joint-to-width ratio for joints in excess of 19mm wide, and within the manufacturer's recommendations.
- .2 Curing:
  - .1 Cure sealants in accordance with sealant manufacturer's instructions.
  - .2 Do not cover up sealants until proper curing has taken place.

**3.7 CLEANING**

- .1 Clean surfaces adjacent to joints, remove sealant smears or other soiling resulting from application of sealants. At metal surfaces, remove residue. Do not mar or damage finishes on materials adjacent to joints. Repair or replace marred or damaged materials.
- .2 Leave Work area clean at end of each day.
- .3 Clean adjacent surfaces immediately.
- .4 Remove excess and droppings, using recommended cleaners as work progresses.
- .5 Remove masking tape after initial set of sealant.
- .6 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

**3.8 PROTECTION**

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

**3.9 SCHEDULE OF LOCATIONS**

- .1 Following sealant location schedule is included for convenience and may not be complete. Examine Contract Drawings and other specification sections and determine entire extent of Work of this Section. Generally seal following locations:

- .1 Concrete, masonry, wood and stone to metal. Wood to masonry, concrete and stone.
- .2 Metal to metal.
- .3 All dissimilar materials.
- .4 Where 'sealant' or 'caulking' is indicated on drawings.
- .2 Sealant Type A:
  - .1 Exterior joints between masonry and steel or aluminum.
  - .2 Exterior joints between masonry and shelf angle.
  - .3 Exterior joints between steel or aluminum and concrete or masonry. Interior and exterior control joints, except in floors.
  - .4 Door frames, louvre frames, interior and exterior side.
  - .5 Protrusions through interior and exterior walls and floors, interior and exterior side, except where fire rated seals are required.
  - .6 Seal thresholds.
- .3 Sealant Type B:
  - .1 Between mechanical fixtures/fittings. Between access panels.
- .4 Sealant Type C:
  - .1 Perimeter of interior windows.
  - .2 Junction between drywall and masonry.
- .5 Sealant Type D:
  - .1 Exterior joints between roof and mechanical fixtures/fittings
  - .2 Perimeter of roof.

**END OF SECTION**

**1** General

**1.1 SECTION INCLUDES**

- .1 Design, labour, Products, equipment and services necessary for gypsum board work.

**1.2 REFERENCES**

- .1 ASTM A653/A653M, Specification for Steel Sheet, Zinc-coated (Galvanized) or Zincron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 ASTM C475, Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
- .3 ASTM C645, Specification for Nonstructural Steel Framing Members.
- .4 ASTM C665, Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- .5 ASTM C754, Specification for Steel Framing Members to Receive Screw-Attached Gypsum Board.
- .6 ASTM C834, Standard Specification for Latex Sealants.
- .7 ASTM C840, Specification for Application and Finishing of Gypsum Board.
- .8 ASTM C1002, Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
- .9 ASTM C1178, Specification for Glass Mat Water-Resistant Gypsum Backing Board.
- .10 ASTM C1278, Specification for Fiber-Reinforced Gypsum Panel.
- .11 ASTM C1396, Specification for Gypsum Board.
- .12 ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials.

**1.3 DESIGN REQUIREMENTS**

- .1 Design ceiling suspension system in accordance with manufacturer's printed directions and ASTM C754.
- .2 Design ceiling system for adequate support of electrical fixtures as required by the current bulletin of the Electrical Safety Authority.
- .3 Design hanger anchor and entire suspension system static loading not to exceed 25% of their ultimate capacity including lighting fixture dead loads.
- .4 Design suspension system to support weight of mechanical and electrical items such as air handling boots and lighting fixtures, and with adequate support to allow rotation/relocation of light fixtures.
- .5 Design subframing as necessary to accommodate, and to circumvent, conflicts and interferences where ducts or other equipment prevent the regular spacing of hangers.
- .6 Design wall framing system and reinforce as necessary to accommodate and support items attached to and supported by wall framing system.
- .7 Design wall framing system for wall assemblies with a height greater than 3000 mm and those assemblies incorporating non-standard gypsum board assemblies

including, but not limited to, abuse resistant gypsum board, large format tile applications, etc.

**1.4 REGULATORY REQUIREMENTS**

- .1 Provide fire separations and fire protection exactly as specified in test design specification that validates the specified rating. Verify that work specified in other Sections, as a part of the entire assembly, meets applicable validating test design specification.

**1.5 SUBMITTALS**

- .1 Product data:
  - .1 Submit copies of manufacturer's Product data in accordance with Section 01 10 10 indicating:
    - .1 Performance criteria, compliance with appropriate reference standard, characteristics, and limitations.
    - .2 Product transportation, storage, handling and installation requirements.
- .2 Shop Drawings:
  - .1 Submit Shop Drawings in accordance with Section 01 10 10 indicating:
    - .1 Wall assemblies, suspension systems, adjacent construction, elevations, sections and details, dimensions, thickness, finishes and relationship to adjacent construction.
    - .2 Framing and blocking for items being supported of wall systems.
- .3 Certifications: Submit written certification stating that suspended ceiling system is designed for adequate support of electrical fixtures as required by the current bulletin of the Electrical Safety Authority.

**1.6 QUALITY ASSURANCE**

- .1 Qualifications: Execute the work of this Section by skilled, qualified, and experienced workers trained in the installation of the work of this Section.
- .2 Retain a Professional Engineer, licensed in Province of Ontario, with experience in work of comparable complexity and scope, to perform following services as part of work of this Section:
  - .1 Design of wall systems with height greater than 3000 mm and at nonstandard gypsum board assemblies including, but not limited to, assemblies incorporating abuse resistant gypsum board, large format tile applications, etc.
  - .2 Design of suspended gypsum board assemblies.
  - .3 Review, stamp, and sign Shop Drawings and design calculations.
  - .4 Conduct shop and on-site inspections, prepare and submit written inspection reports verifying that this part of Work is in accordance with Contract Documents and reviewed Shop Drawings.

**1.7 SITE CONDITIONS**

- .1 Do not begin work of this Section until:

- .1 Mechanical and electrical work above the ceiling is complete.
- .2 Substrate and ambient temperature is above 15 degrees Celsius.
- .3 Relative humidity is below 80%.
- .4 Ventilation is adequate to remove excess moisture.
- .2 Install temporary protection and facilities to maintain Product manufacturer's, and above specification, environmental requirements 24 h before, during, and 24 h after installation.

**2** Products

**2.1 MATERIALS**

- .1 General:
  - .1 All materials under work of this Section, including but not limited to, sealants, adhesives, and primers are to have low VOC content limits.
- .2 Steel framing: ASTM C754; ASTM A653/A653-M, Z275; cold rolled, galvanized steel sheet.
  - .1 Bailey Metal Products Limited
  - .2 Corus Metal Profiles
- .3 Steel studs and track runners: ASTM C645; Galvanized steel studs and runners, 32 mm wide x depth as indicated on Contract Drawings. Formed from galvanized steel sheet, thicknesses as follows:
  - .1 Studs less than 3000 mm: Minimum 0.53 mm (25 ga.).
  - .2 Studs greater than 3000 mm and non-standard assemblies: Minimum 0.91 mm (20 ga.), unless stud thickness of greater thickness is required to accommodate intended loading, spans, or conditions.
  - .3 Track runners and ancillary components to match stud thickness.
- .4 Main carrying channels: ASTM C645; Formed from galvanized steel sheet, 38 x 19 mm cold rolled, channels.
- .5 Resilient channel: ASTM C645; 0.5 mm thick galvanized metal, 57 mm wide x 12 mm deep for walls and ceiling to reduce sound transmission.
- .6 Furring channels: ASTM C645; Formed from galvanized steel sheet, 22 mm winged flange type, cold rolled.
- .7 Furring channels (hat type): ASTM C645; 0.5 mm base steel thickness, galvanized. 70 mm wide x 22 mm deep hat shaped channel.
- .8 Heavy duty furring channels: ASTM C645; 0.9 mm steel thickness, galvanized hat shaped channel with a wider and deeper size as required by manufacturers.
- .9 Hanger wires: 4.1 mm minimum diameter galvanized pencil rod.
- .10 Tie wire: 1.6 mm thick minimum diameter, soft annealed, galvanized steel wire.



- .11 Corner bead, casing bead, and special shapes: Formed from 0.6 mm thick minimum, galvanized steel sheet, designed to be concealed by joint compound.
- .12 Deflection track: ASTM C 645 top runner with 50.8-mm- deep flanges, in thickness indicated for studs and in width to accommodate depth of studs.
- .13 Deflection track (fire rated): Provide 25 mm deep leg deflection track where indicated on rated walls. 'Fire Trak Shadowline' by Fire Trak Corporation or approved alternative.
- .14 Ceiling clips: Hot dip galvanized partition attachment clips, in square and reveal edge; 'PAC 15 Series' to match grid system by CGC Inc. or approved alternative.
- .15 Gaskets (acoustic partitions): Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 3.2 mm thick, in width to suit steel stud size.
- .16 Control joint strip: Roll formed from galvanized steel sheet, with a tape protected recess, 6 mm wide x 11 mm deep.
- .17 Screw fasteners: ASTM C1002 Type S; Corrosion resistant.
- .18 Concrete anchors: tie wire sleeve anchors, 'Redi-Drive Anchors' by ITW Red Head or approved alternative.
- .19 Acoustic/Fire insulation: ASTM C665, Paperless, semi-rigid, spun mineral fibre mats, of thickness as indicated on Contract Drawings, 'Sustainable Insulation, NoiseReducer' by CertainTeed, 'EcoTouch Quiet Zone Pink Fiberglass Acoustic Insulation' by Owens Corning Inc. or 'Roxul AFB' by Roxul Inc.
- .20 Sealants:
  - .1 Acoustic sealant (non-rated): Non-hardening acoustic sealant for use at nonrated assemblies, ASTM C834; Acrylic, mould resistant sealant, paintable. 'Smoke and Acoustic Sealant CP506' by Hilti or approved alternative.
  - .2 Sealant (fire-rated): Non-hardening sealant for use at fire-rated assemblies: ASTM E84; Acrylic based firestop sealant, colour: red or white as selected by Consultant. 'Flexible Firestop Sealant CP606' by Hilti or approved alternative.
  - .3 Standard sealants: In accordance with Section 07 91 00.
- .21 Moisture / Abuse resistant board (GB-1): 15.9MM thick of maximum practical lengths to minimize end joists, unless indicated otherwise; moisture and abuse resistant board "Fiberock Aquatough Interior Panel" by CGC Inc. or 'DensArmor Plus" by Georgia-Pacific Canada LP.
- .22 Tile Backer (GB-2): Water resistant tile backer board meeting ASTM C1178 or ASTM C1278, 15.9MM thick. "Diamondback Tile Backer" by CertainTeed Gypsum Canada, Fiberock Aqua-Tough Underlayment' by CGC Inc. or "Dens Shield" By Georgia-Pacific Canada LP.
- .23 Primer: Where indicated by board manufacturer, provide primer as required to achieve finishes as defined in ASTM C840.
- .24 Joint reinforcing tape:
  - .1 Standard gypsum board: ASTM C475; 50 mm wide x 0.25 mm thick, perforated paper, with chamfered edges.

- .2 Moisture resistant and tile backer boards: ASTM C475; fibreglass mat joint tape as recommended by board manufacturer to suit location.
- .25 Bonding adhesive: Type for purpose intended and as recommended and approved by manufacturer.
- .26 Joint and patching compound: ASTM C475; Asbestos-free, supplied by manufacturer of gypsum board used.
- .27 Fast setting patching compound: ASTM C475; Asbestos-free, Sheetrock or Durabond by CGC Inc., 'Moisture and Mold Resistant Setting Compound with M2Tech' by Certaineed Gypsum Canada or approved alternative.
- .28 Access doors: Supplied by other Sections for installation as part of the work of this Section

**3 Execution**

**3.1 EXAMINATION**

- .1 Verify condition and dimensions of previously installed Work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.

**3.2 SUSPENSION FRAMING**

- .1 Install ceiling systems in accordance with reviewed Shop Drawings and manufacturer's written instructions.
- .2 Install hanger wires plumb and securely anchored to the building structural framing, independent of walls, pipes, ducts, and metal deck; install additional framing and hangers to bridge interference items.
- .3 Install hanger wires at 1200 mm maximum centres along carrying channels, not less than 25 mm, and not more than 150 mm from channel ends.
- .4 Install additional hangers at lighting fixture and ductwork locations. Do not attach hanger wires to mechanical or electrical equipment. Do not support mechanical and electrical fixtures and fitting on ceiling without the ceiling manufacturer's written acceptance.
- .5 Install main carrying channels transverse to structural framing members. Lap main carrying channels 200 mm minimum at splices and wire each end with two loops and prevent clustering or lining-up of splices.
- .6 Install furring channels at 400 mm o.c., not less than 25 mm, and not more than 150 mm from perimeter walls, at openings, at interruptions in ceiling continuity, and at change in plane. Install furring channels to a tolerance of 3 mm maximum in 3600 mm.
- .7 Install additional main carrying and furring channels to frame and to reinforce openings such as recessed lighting fixtures, access hatches, ceiling grilles, outlet boxes, ventilating outlets and similar items.

**3.3 STEEL STUDS AND FURRING**

- .1 Install steel studs and furring in accordance with reviewed Shop Drawings and manufacturer's written instructions.
- .2 Install steel stud partitions to underside of structure unless indicated otherwise.
- .3 Install track runners at floors, ceilings, and underside of structure; align track runners accurately and secure to structure at 600 mm centres maximum.
- .4 Install double top track runner assembly to prevent the transmission of structural loads to steel studs.
- .5 Install steel studs vertically at 400 mm o.c., unless otherwise indicated, and not more than 50 mm from abutting walls, at openings, and at each side of corners. Install studs securely to track runners.
- .6 Schedule and coordinate steel framing installation with mechanical and electrical services installation.
- .7 Install full height, double studs at door and service openings, fastened together and stiffened back to the structure to prevent vibration when doors close.
- .8 Provide double studs boxed together at all openings, sill, head and jambs and at door jambs, fastened together and stiffened back to the structure to prevent vibration. At each opening exceeding 900 mm in width, double studs shall be 20 ga. extending to structure above, and adequately anchored at each end. Provide steel studs above and below openings spaced at 400 mm oc maximum. All metal stud partitions above doors and screens over 1220 mm wide shall be secured to structure over and reinforced with sway bracing to stabilize walls to prevent lateral movement.
- .9 Erect three studs at corner and intermediate intersections of partitions. Space 50 mm apart and brace together with wired 19 mm channels.
- .10 Stiffen partitions over 2440 mm high or 3000 mm long, or both, with horizontal bracing extended for full length of partitions. Provide one line of bracing in partitions. Space lines to provide equal unbraced panels. Provide bracing for portions of partitions over door openings in partitions over 3000 mm high, and bracing both above and below openings in partitions located no greater than 150 mm from top and bottom of opening, and extending two stud spaces beyond each edge of opening for both doors and windows. Wire tie or weld bracing to studs.
- .11 Frame control joints using back to back double studs at abutting structural elements, at dissimilar backup interface, at dissimilar walls and ceilings, at structural expansion and control joints, at door and other openings, and at 9000 mm maximum spacing in continuous runs. Install control joint strips and secure in place.
- .12 Install additional support framing at openings and cutouts for built-in equipment, upper cabinet support, access panels and similar items.
- .13 Attach to framing adequate steel reinforcing members or a 1.2 mm (18 ga.) steel stud mounted horizontally and notched around furring members to support the load of, and to withstand the withdrawal and shear forces imposed by, items installed upon the work of this Section. Such items include, but are not restricted to, miscellaneous metals, coat hooks, washroom accessories, handrail anchors, rub rails, grab bars, guards, wall-hung cabinets and fitments, shelving, curtain and drape tracks, miscellaneous specialties; Owner supplied equipment; and minor mechanical and

electrical work. Heavy mechanical and electrical equipment shall be selfsupporting in Divisions 21, 22, 23 and 26.

- .14 Provide for support and incorporation of flush-mounted and recessed mechanical and electrical equipment and fixtures only after consultation and verification of methods with those performing the work of Divisions 21, 22, 23 and 26.
- .15 Install cross bracing in accordance with the steel stud manufacturer's recommendations.

### 3.4 **FIRE RATED ASSEMBLIES**

- .1 Install Products in fire rated assemblies in strict accordance with applicable ULC tested and approved designs.
- .2 Stiffen fire rated walls over 3.66 m high, where linear length of wall is greater than 2.44 m between perpendicular wall supports, with diagonal bracing above the ceiling extending perpendicular to wall at a 45E angle to structure above. Locate diagonal bracing at maximum 2.44 m o.c.
- .3 Where double layers of gypsum board are shown, and required for fire rating, screw first layer to studs and furring and laminate the second layer to the first using joint filler as an adhesive. Stagger joints between first and second layers.

### 3.5 **ACOUSTICAL INSULATION**

- .1 Install acoustic insulation in partitions, between steel studs, and as indicated on Contract Drawings and in accordance with the manufacturer's instructions. Fill stud cavities to full height of partitions and carefully cut and fit acoustic insulation around services and protrusions.

### 3.6 **ACOUSTICAL SEALANT**

- .1 Install acoustical sealant to acoustically insulated partitions in accordance with the manufacturer's instructions and Contract Drawings.
- .2 Install acoustical sealant under floor runner track, at partition perimeter both sides and at openings, cut-outs, and penetrations, concealed from view in the final installation.
- .3 Install firestop fill material behind fire rated acoustical sealant and provide firestop identification tag.
- .4 Smooth acoustical sealant with trowel prior to skin forming.

### 3.7 **BUILT-IN CORNER GUARDS**

- .1 Install built-in corner guards in accordance with manufacturer's written instructions level, secure and rigid.

### 3.8 **GYPSUM BOARD**

- .1 Comply with ASTM C840. Install gypsum board in accordance with reviewed Shop Drawings and manufacturer's written instructions.
- .2 Install gypsum board vertically or horizontally, whichever results in fewer end joints. Locate end joints over supporting members.
- .3 Install gypsum board in lightly butted contact at edges and ends and with 1.6 mm maximum open space between boards; do not force gypsum board into place. Do not install imperfect, damaged or damp boards.

- .4 Install gypsum board butting paired tapered edge joints, and mill-cut or field-cut end joints; do not place tapered edges against cut edges or ends.
- .5 Install vertical joints minimum 300 mm from the jamb lines of openings and stagger vertical joints over different studs on opposite sides of partitions.
- .6 Do not locate joints within 200 mm of corners or openings, except where control joints occur at jamb lines or where openings occur adjacent to corners. Where necessary, place a single vertical joint over the centre of wide openings.
- .7 Cut, drill and patch gypsum board as may be necessary to accommodate the work of other trades.
- .8 Fire Separations:
  - .1 Construct gypsum board assemblies, where located, in accordance with tested assemblies to obtain required or indicated fire rated assemblies. As a minimum fire separations shall consist of metal framing covered on both sides by fire-rated gypsum board.
  - .2 Install assemblies tightly to enclosing constructions to maintain integrity of the separations. Install casing beads at all perimeter edges.

**3.9 CORNER, CASING BEADS AND TRIM**

- .1 Corner reinforcing bead: Install along all external angles, erect plumb, level and with a minimum of joints. Secure with screws at 225 mm o.c. apply filler over flanges flush with nose of the bead and extending at least 75 mm onto surface of board each side of corner. When filler dries, apply a thin coat of topping cement and blend onto adjoining surfaces.
- .2 Casing bead: Install where wallboard butts against a surface having no trim concealing the juncture and where shown on drawings. Erect casing beads plumb or level, with minimum joints, and secure with screws at 300 mm o.c. apply filler over flange flush with bead and extending at least 75 mm onto surface of board. When dry, apply a thin coat of topping cement and blend onto adjoining surfaces.
- .3 Recess channels and trim: Install recess channels and special metal trim where shown. Secure to substrate. Provide casing beads full height on wallboard edges at recess channels and metal trim.

**3.10 JOINT TAPING AND FINISHING**

- .1 Install reinforcing tape and a minimum of 3 coats of joint compound over gypsum board joints, metal trim and accessories, and screw fasteners in accordance with the gypsum board manufacturer's instructions.
- .2 Fill gaps between, and any imperfections in, gypsum boards with joint compound, allow to dry, and sand smooth ready for painting.
- .3 Install finished gypsum board work smooth, seamless, plumb, true, flush, and with square, plumb, and neat corners.
- .4 Finish gypsum board in accordance with ASTM C840 to the following grades:
  - .1 Level 0: No taping, finishing, or accessories required. Use above suspended ceilings and within other concealed spaces, unless the assembly is fire rated,

sound rated, sound or smoke controlled, or unless the space serves as an air plenum.

- .2 Level 1: At joints and interior angles embed tape in joint compound. Leave surface free of excess joint compound. Tool marks and ridges are acceptable. Use above suspended ceilings and within other concealed spaces if the gypsum board assembly is fire rated, sound rated, sound or smoke controlled, or the space serves as an air plenum.
- .3 Level 2: At joints and interior angles embed tape in joint compound with one separate coat of joint compound applied over joints, angles, fastener heads, and accessories. Use for water resistant gypsum board indicated for use as a substrate for ceramic tile.
- .4 Level 3: At joints and interior angles embed tape in joint compound with two separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. Apply joint compound smooth and free of tool marks and ridges. Use where heavy grade wall coverings are the final decoration.
- .5 Level 4: At joints and interior angles embed tape in joint compound with three separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. Apply joint compound smooth and free of tool marks and ridges. Use for all locations except those indicated for other finish levels.
- .6 Level 5: At joints and interior angles embed tape in joint compound with three separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. Apply a thin skim coat of joint compound, or a material manufactured especially for this purpose, to the entire surface. Leave surface smooth and free of tool marks and ridges. Use where semi-gloss or gloss finish coatings are the final decoration.

**3.11 ACCESS DOORS**

- .1 Install access doors, supplied as part of other parts of the work, in accordance with manufacturer's written instructions. Access Doors by SECTION 10 95 00.

**3.12 SITE TOLERANCES**

- .1 Install metal support systems to ensure that, within a tolerance of +3 mm and -1.5 mm for plaster thickness, finish surfaces will be flat within 3 mm under a 3 m straightedge, and with no variation greater than 1.5 mm in any running 300 mm, and that surface planes shall be within 3 mm of dimensioned location.

**3.13 WORK IN EXISTING AREAS**

- .1 In existing areas, where existing gypsum board work has been demolished and/or damaged and repair work is required, provide new gypsum board finish.
- .2 Thoroughly prepare areas to be repaired. Provide neat, clean and straight cuts.
- .3 Finish all repair work as specified for new work.
- .4 In existing areas where existing openings are to be filled in with gypsum board, provide new gypsum board wall and ceiling construction. Ensure new board faces are flush with faces of abutting existing walls and ceilings.

**3.14 REPAIR**

- .1 Make good cut-outs for services and other work, fill in defective joints, holes and other depressions with joint compound.
- .2 Make good defective work, and ensure that surfaces are smooth, evenly textured and within specified tolerances to receive finish treatments.

END OF SECTION

- 1 General**
- 1.1 SECTION INCLUDES**
  - .1 Design, labour, Products, equipment and services necessary for acoustical ceilings work in accordance with the Contract Documents.
- 1.2 REFERENCES**
  - .1 ASTM A653/A653M, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .2 ASTM C423, Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
  - .3 ASTM C635, Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
  - .4 ASTM C636, Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
  - .5 ASTM C645, Specification for Non-Load Bearing (Axial) Steel Studs, Runners (Tracks), and Rigid Furring Channels for Screw Application of Gypsum Board.
  - .6 ASTM C665, Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
  - .7 ASTM E1264, Classification for Acoustical Ceiling Products.
- 1.3 DESIGN REQUIREMENTS**
  - .1 Design acoustical ceiling suspension system and anchors in accordance with specified Seismic Design requirements.
  - .2 Design ceiling suspension systems in accordance with ASTM C636 and manufacturer's printed directions.
  - .3 Design tile ceiling system for adequate support of electrical fixtures as required by the current bulletin of the Electrical Safety Authority. Acoustic panel system is not designed to carry the weight of electrical equipment.
  - .4 Design hanger anchor and entire suspension system static loading not to exceed 25% of their ultimate capacity including lighting fixture dead loads.
  - .5 Design tile suspension system to support weight of mechanical and electrical items such as air handling boots and lighting fixtures, and with adequate support to allow rotation/relocation of light fixtures. Acoustic panel system is not designed to carry the weight of mechanical and electrical equipment.
  - .6 Design subframing as necessary to accommodate, to avoid conflicts and interferences where ducts or equipment prevent regular spacing of hangers.
- 1.4 SUBMITTALS**
  - .1 Shop drawings:
    - .1 Submit shop drawings in accordance with Section 01 10 10 indicating:
      - .1 Suspension system layout including hangers and supports for acoustic tile system.



- .2 Acoustic panel system including suspension system, hangers, supports and panel sizes and locations.
  - .3 Conditions at abutting, intersecting, and penetrating construction.
  - .4 Dimensioned locations of lighting fixtures, diffusers, sprinkler heads and other items that pierce the ceiling plane.
- .2 Samples:
  - .1 Submit following samples in accordance with Section 01 10 10:
    - .1 One full-size sample of each type of tile panels to be used.
- 1.5 **SITE CONDITIONS**
  - .1 Do not install the work of this Section until:
    - .1 Mechanical and electrical work above the ceiling is complete.
    - .2 Relative humidity is below 80 %.
    - .3 Ventilation is adequate to remove excess moisture.
    - .4 Areas are closed and protected against weather, and maintained at no less than 10°C.
  - .2 Install temporary protection and facilities to maintain Product manufacturer's, and above specification, environmental requirements 24 h before, during, and after installation.
- 1.6 **MAINTENANCE**
  - .1 Submit extra acoustic ceilings amounting to 2% of gross ceiling area, allowing proportionately for each pattern and type specified to nearest full carton. Submit Products which are part of same production run as installed Products. Store maintenance Products as directed by Consultant.
- 1.7 **DELIVERY, STORAGE AND HANDLING**
  - .1 Transport, handle and store material in manner to prevent warp, twist, damage to panel edges and surfaces in accordance with Manufacturer's recommendations.
  - .2 Any warped and/or damaged panels and trim shall be rejected and be replaced by new, straight, undamaged and acceptable material at no cost to Owner.
  - .3 Bent, twisted or otherwise damaged Tee grid suspension components shall not be used under any circumstances. Replace such damaged items with new undamaged material at no additional cost to Owner.
  - .4 Store material in warm, dry place away from water and the elements. Protect against undue loading stresses and shock.
  - .5 All packaged material shall be delivered in original manufacturers wrappers and containers with labels and seals intact. All cartons shall bear U.L. label.
- 2 Products
- 2.1 **MATERIALS**

- .1 Wherever possible, acoustical ceiling tiles used in work of this Section are to contain recycled content.
  - .2 Acoustic tile (ACT-1): ASTM E1264, type 3, Form 2, Pattern CE. Wet-formed mineral fiber with factory applied vinyl latex paint. 610 (2'-0") x 1220 (4'-0") x 15 mm (5/8") thick square edge 'Dune (Fine Texture) 1773' as manufactured by Armstrong Ceiling Tiles, or approved alternative by Certainteed Ceilings Canada or CGC Inc.
  - .3 Wall mouldings: To match acoustical ceiling suspension system.
- 3 Execution**
- 3.1 EXAMINATION**
- .1 Verify condition and dimensions of previously installed Work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.
- 3.2 ACOUSTIC LAY-IN TILES**
- .1 Install acoustic tile in grid system openings supported by bottom flanges of members. Provide special shapes and sizes to provide a complete installation by cutting tile to fit into openings. Fit tile moderately tight between upright legs of members.
  - .2 Carefully cut and trim acoustic tiles to accommodate items piercing the finished ceiling plane.
  - .3 Remove and replace acoustic tiles with broken edges, or damaged, marked, discoloured, soiled, or stained faces.
- 3.3 ADJUSTMENTS AND CLEANING**
- .1 Clean soiled or discoloured surfaces of exposed work on completion of work.
  - .2 Replace components which are visibly damaged, marred or uncleanable.

END OF SECTION

**1** General

**1.1 SECTION INCLUDES**

- .1 Labour, Products, equipment and services necessary for tactile warning surfacing Work in accordance with the Contract Documents.

**1.2 REFERENCES**

- .1 ASTM E2180 Standard Test Method for Determining the Activity of Incorporated Antimicrobial Agent(s) In Polymeric or Hydrophobic Materials
- .2 ASTM G21 Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi
- .3 ASTM D412 Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
- .4 ASTM D2240 Standard Test Method for Rubber Property—Durometer Hardness
- .5 ASTM D955 Standard Test Method of Measuring Shrinkage from Mold Dimensions of Thermoplastics
- .6 ISO 23599 Assistive Products for Blind and Vision-Impaired Persons – Tactile Walking Surface Indicators

**1.3 SUBMITTALS**

- .1 Product data: Submit copies of manufacturer's Product data in accordance with Section 01 10 10 indicating:
  - .1 Submit manufacturer's Product data sheets for Products proposed for use in the work of this section.
  - .2 Product data sheets shall include material test reports from qualified independent testing laboratories, current within a 24 month period preceding date of installation, indicating that materials proposed for use in the Work are in compliance with the requirements of the Contract Documents, and meet the properties specified or indicated.
- .2 Shop drawings: Submit shop drawings indicating seam layout and welding procedures in accordance with Section 01 10 10.
- .3 Samples:
  - .1 Submit full size sample of each type and colour of tactile warning surfacing specified or required for the Work.
- .4 Closeout submittals: Submit maintenance and cleaning data for incorporating into Operations and Maintenance Manuals in accordance with Section 01 10 10.

**1.4 QUALITY ASSURANCE**

- .1 Installers / applicators / erectors: Provide work of this section, executed by competent installers with minimum 3 years experience in application of Products,

systems and assemblies specified, and with approval and training of Product manufacturers.

**1.5 SITE CONDITIONS**

- .1 Ambient conditions: Maintain minimum temperature of 5°C in spaces to receive tactile warning surfaces for at least 24 hours prior to installation, during installation, and for not less than 24 hours after installation.
- .2 Comply with manufacturer's

**2 Products**

**2.1 MATERIALS**

- .1 Acceptable Product: Kinesik 'EON Tiles' 3mm Thickness or approved alternative.
- .2 Tactile warning surfacing plates, interior:
  - .1 Fabricated from cast iron to ASTM A48 Class 35B.
  - .2 Truncated domes shall have a base diameter of 23 mm (0.9") minimum and 36 mm (1.4") maximum, a top diameter of 50% of the base diameter minimum, to 65% of the base diameter maximum, and a height of 5.0 mm (0.2").
  - .3 Truncated domes shall have a centre-to-centre spacing of 41 mm (1.6") minimum and 61 mm (2.4") maximum, and a base-to-base spacing of 17 mm (0.65") minimum, measured between the most adjacent domes on a square grid.
  - .4 Coefficient of friction: 0.9.
  - .5 Colour: To be selected by the Consultant from the full range of standard colours.
- .3 Anchors: Colour matched to tiles with which they are being used, flat head, drive anchors, 1/4" diameter x 1-1/2" long, as recommended and supplied by tactile warning surfacing tile manufacturer for use with tiles being installed.
- .4 Adhesive: as recommended and supplied by tactile warning surfacing tile manufacturer for use with tiles being installed.
- .5 Perimeter sealant: as recommended and supplied by tactile warning surfacing tile manufacturer for use with tiles being installed.

**3 Execution**

**3.1 EXAMINATION**

- .1 Verify condition and dimensions of previously installed Work upon which this Section depends. Report defects to Consultant. Commencement of Work means acceptance of existing conditions.

**3.2 INSTALLATION**

- .1 Install tactile warning surfacing in accordance with tactile warning surfacing manufacturer's instructions and recommendations, to locations indicated, scheduled, or required by authorities having jurisdiction.
  - .2 Do not install tactile surfacing over expansion joints and control joints.
  - .3 Prepare surface as per manufacturer's instructions. Prep or grind substrate, remove dust and debris on tile substrate, apply adhesive to back of tiles, drill into concrete substrate, installed fasteners, clean and protect tile surface and apply continuous perimeter sealants.
- 3.3 **ADJUSTING AND CLEANING**
- .1 Clean tiles by method recommended by tile manufacturer not less than 4 days prior to inspection for Substantial Performance of the Work.
- 3.4 **PROTECTION**
- .1 Protect tiles and installation against damage during construction period in accordance with the tile manufacturer's instructions and recommendations.
  - .2 Protect tiles against damage from rolling loads following installation by covering with plywood or hardwood in accordance with tile manufacturer's instructions and recommendations.

END OF SECTION

**1** General

**1.1 SECTION INCLUDES**

- .1 Labour, Products, equipment and services necessary for tactile warning surfacing Work in accordance with the Contract Documents.

**1.2 REFERENCES**

- .1 ASTM E2180 Standard Test Method for Determining the Activity of Incorporated Antimicrobial Agent(s) In Polymeric or Hydrophobic Materials
- .2 ASTM G21 Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi
- .3 ASTM D412 Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
- .4 ASTM D2240 Standard Test Method for Rubber Property—Durometer Hardness
- .5 ASTM D955 Standard Test Method of Measuring Shrinkage from Mold Dimensions of Thermoplastics
- .6 ISO 23599 Assistive Products for Blind and Vision-Impaired Persons – Tactile Walking Surface Indicators

**1.3 SUBMITTALS**

- .1 Product data: Submit copies of manufacturer's Product data in accordance with Section 01 10 10 indicating:
  - .1 Submit manufacturer's Product data sheets for Products proposed for use in the work of this section.
  - .2 Product data sheets shall include material test reports from qualified independent testing laboratories, current within a 24 month period preceding date of installation, indicating that materials proposed for use in the Work are in compliance with the requirements of the Contract Documents, and meet the properties specified or indicated.
- .2 Shop drawings: Submit shop drawings indicating seam layout and welding procedures in accordance with Section 01 10 10.
- .3 Samples:
  - .1 Submit full size sample of each type and colour of tactile warning surfacing specified or required for the Work.
- .4 Closeout submittals: Submit maintenance and cleaning data for incorporating into Operations and Maintenance Manuals in accordance with Section 01 10 10.

**1.4 QUALITY ASSURANCE**

- .1 Installers / applicators / erectors: Provide work of this section, executed by competent installers with minimum 3 years experience in application of Products,

systems and assemblies specified, and with approval and training of Product manufacturers.

**1.5 SITE CONDITIONS**

- .1 Ambient conditions: Maintain minimum temperature of 5°C in spaces to receive tactile warning surfaces for at least 24 hours prior to installation, during installation, and for not less than 24 hours after installation.

- .2 Comply with manufacturer's

**2 Products**

**2.1 MATERIALS**

- .1 Acceptable Product: Kinesik 'EON Tiles' 3mm Thickness or approved alternative.
  - .1 Colour: Smoke Grey Code: SG
- .2 Tactile warning surfacing plates, interior:
  - .1 Fabricated from cast iron to ASTM A48 Class 35B.
  - .2 Truncated domes shall have a base diameter of 23 mm (0.9") minimum and 36 mm (1.4") maximum, a top diameter of 50% of the base diameter minimum, to 65% of the base diameter maximum, and a height of 5.0 mm (0.2").
  - .3 Truncated domes shall have a centre-to-centre spacing of 41 mm (1.6") minimum and 61 mm (2.4") maximum, and a base-to-base spacing of 17 mm (0.65") minimum, measured between the most adjacent domes on a square grid.
  - .4 Coefficient of friction: 0.9.
  - .5 Colour: To be selected by the Consultant from the full range of standard colours.
- .3 Anchors: Colour matched to tiles with which they are being used, flat head, drive anchors, 1/4" diameter x 1-1/2" long, as recommended and supplied by tactile warning surfacing tile manufacturer for use with tiles being installed.
- .4 Adhesive: as recommended and supplied by tactile warning surfacing tile manufacturer for use with tiles being installed.
- .5 Perimeter sealant: as recommended and supplied by tactile warning surfacing tile manufacturer for use with tiles being installed.

**3 Execution**

**3.1 EXAMINATION**

- .1 Verify condition and dimensions of previously installed Work upon which this Section depends. Report defects to Consultant. Commencement of Work means acceptance of existing conditions.

**3.2 INSTALLATION**

- .1 Install tactile warning surfacing in accordance with tactile warning surfacing manufacturer's instructions and recommendations, to locations indicated, scheduled, or required by authorities having jurisdiction.
- .2 Do not install tactile surfacing over expansion joints and control joints.
- .3 Prepare surface as per manufacturer's instructions. Prep or grind substrate, remove dust and debris on tile substrate, apply adhesive to back of tiles, drill into concrete substrate, install fasteners, clean and protect tile surface and apply continuous perimeter sealants.

**3.3 ADJUSTING AND CLEANING**

- .1 Clean tiles by method recommended by tile manufacturer not less than 4 days prior to inspection for Substantial Performance of the Work.

**3.4 PROTECTION**

- .1 Protect tiles and installation against damage during construction period in accordance with the tile manufacturer's instructions and recommendations.
- .2 Protect tiles against damage from rolling loads following installation by covering with plywood or hardwood in accordance with tile manufacturer's instructions and recommendations.

END OF SECTION



- 1 General**
- 1.1 SECTION INCLUDES**
  - .1 Labour, Products, equipment and services necessary for painting work in accordance with the Contract Documents.
- 1.2 REFERENCES**
  - .1 CAN/CGSB 85.10, Protective Coatings for Metals.
  - .2 CAN/CGSB-85.100, Painting.
  - .3 Master Painters Institute (MPI), Painting Specification Manual.
  - .4 SSPC Steel Structures Painting Council, Standards.
- 1.3 SUBMITTALS**
  - .1 Product data:
    - .1 Submit copies of manufacturer's Product data in accordance with Section 01 10 10 indicating:
      - .1 Performance criteria, compliance with appropriate reference standard, characteristics, limitations.
      - .2 Product transportation, storage, handling and installation requirements.
    - .2 Submit listing of manufacturer's Product types, Product codes, and Product names, number of coats, and dry film thicknesses, corresponding to each Painting Schedule code; submit listing minimum of 8 weeks before materials are required.
  - .2 Samples:
    - .1 Submit following samples in accordance with Section 01 10 10.
      - .1 Four 300 x 150 mm draw downs of each colour minimum 4 weeks before paints are required.
      - .2 Identify each sample with Contract number and title, colour reference, sheen, date, and name of applicator.
  - .3 Certificates:
    - .1 Submit certification from paint manufacturer, on company letterhead, indicating each product proposed for use is Manufacture's premium grade, first line Product.
    - .2 Submit certified documentation to confirm each airless spray painter has minimum of 5 years experience on applications of similar complexity and scope.
    - .3 Submit certified documentation to confirm each worker has Provincial Tradesman Qualification certificate of proficiency.
  - .4 Reports:
    - .1 Submit written field inspection and test report results after each inspection.

- .2 Submit Field Quality Control test result reports for alkali content, substrate moisture, and dry film thickness.
- .3 Submit electronic moisture meter manufacturer's specifications including tolerances. Submit record of latest meter calibration to meet manufacturer's recommendations.

**1.4 QUALITY ASSURANCE**

- .1 Finishing work: Perform work to MPI requirements for premium grade.
- .2 Supervision: Have work supervised by a full-time qualified foreperson who has 10 years minimum experience on Contracts of similar complexity and scope
- .3 Mock-up:
  - .1 Construct three 2m2 mock-ups of different Paint Schedule code systems, selected by Consultant, in locations acceptable to Consultant to demonstrate installation workmanship, colour, and hiding power of Products.
  - .2 Obtain Consultant's acceptance in writing before proceeding with the work of this Section.
  - .3 Mock-ups may remain as part of the Work if acceptable to Consultant and will serve as a standard for similar code systems.
  - .4 Repaint over mock-ups which do not form part of the Work.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- .1 Install correct, safe temporary storage for paint, thinner, solvents, and other volatile, corrosive, hazardous, and explosive materials in accordance with requirements of authorities having jurisdiction.
- .2 Post hazard warning signage in areas of storage and mixing. Install and maintain sufficient CO2 fire extinguishers of minimum 9 kg capacity, accessible in each storage mixing and storage areas.
- .3 Maintain storage enclosures at minimum 10 degrees Celsius ambient temperature and to manufacturer's instructions.

**1.6 SITE CONDITIONS**

- .1 Apply coatings under the following conditions:
  - .1 Exterior coatings (except Latex): 5 degrees Celsius minimum.
  - .2 Exterior latex coatings: 10 degrees Celsius minimum.
  - .3 24 hours minimum after rain, frost, condensation, or dew.
  - .4 When no condensation is possible (unless specifically formulated against condensation).
  - .5 Interior coatings: 7 degrees Celsius minimum.
  - .6 Relative humidity: 85% maximum.
  - .7 Not in direct exposure to sun light.
- .2 Maintain temperature conditions indicated above for 24 hours before, during and 24 hours after painting.

- .3 Install clean plywood sheets to protect floors and walls in storage and mixing areas, from paint drips, spatters, and spills.
- .4 Apply sufficient masking, clean drop cloths, and protective coverings for full protection of work not being painted including, but not limited to, the following:
  - .1 Light fixtures, fire and smoke detectors.
  - .2 Sprinkler heads.
  - .3 Prepainted diffusers and registers.
  - .4 Prepainted equipment.
  - .5 Fire rating labels and equipment specification plates.
  - .6 Finished surfaces.
- 1.7 **ENVIRONMENTAL PERFORMANCE REQUIREMENTS**
- .1 Provide paint products meeting MPI "Green Performance Standard GPS-1-05".
- 1.8 **MAINTENANCE**
- .1 Deliver to Owner's place of storage on completion of work, sealed containers of each finish painting material applied, and in each colour. Label each container as for original, including mixing formula. Provide the following:
  - .1 1 L of extra materials when less than 50 L are used for Project;
  - .2 3.78 L of extra stock when 50 to 200 L are used;
  - .3 7.57 L of extra stock when over 200 L are used.
- 2 Products
- 2.1 **MATERIALS**
- .1 Paint:
  - .1 All materials under work of this Section, including but not limited to, primers, stains, and paints are to have low VOC content limits.
  - .2 Products in accordance with the MPI Painting Specification Manual, Exterior and Interior Systems;
    - .1 For each MPI paint code, manufacture's premium grade, first line Products is to be use.
    - .2 Uniform dispersion of pigment in a homogeneous mixture.
    - .3 Ready-mixed and tinted whenever possible.
- .2 Products within each MPI paint system code: From single manufacturer.
- .3 Acceptable manufacturers:
  - .1 Benjamin Moore.
  - .2 Dulux Paints/PPG.
  - .3 Para Painting & Coatings.

.4 Sherwin Williams.

## 2.2 COLOUR SCHEDULE

- .1 Consultant will select choice of colours and gloss when compiling a Colour Schedule after award of Contract; allow for colour selection beyond paint manufacturer's standard colour range.
- .2 Refer to Colour Schedule for selected colour references. Allow for 6 different colours.
- .3 Conform to gloss reflectance definitions listed in MPI Specification Manual.

## 2.3 PAINTING AND FINISHING SCHEDULE

- .1 Refer to Table 1, MPI Painting and Finishing Schedule coded systems, comply with MPI Painting Specification Manual.

Table 1: Painting and Finish Schedule				
INTERIOR SUBSTRATES	Typical substrates (Including but not limited to)	MPI Manual Ref.	MPI Finish System Code	Topcoat
Concrete walls and ceilings		INT 3.1	INT 3.1A	Latex
Structural steel (Factory primed)	Columns, beams, joists	INT 5.1	INT 5.1R	High performance latex
Galvanized metal	HM doors & door frames, handrails, stairs	INT 5.3	INT 5.3B	WB light industrial coating
Gypsum Board	Drywall, walls, ceiling and all previously painted surfaces	INT 9.2	INT 9.2F	Epoxy-modified latex

## 3 Execution

### 3.1 EXAMINATION

- .1 Verify condition of previously installed Work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.

### 3.2 PREPARATION

- .1 General:
  - .1 Clean substrate surfaces free from, dust, grease, soiling, or extraneous matter, which are detrimental to finish.

- .2 Patch, repair, and smoothen minor substrate defects and deficiencies e.g. machine, tool and sand paper marks, shallow gouges, marks, and nibs.
- .3 Clean, sweep, and vacuum floors and surfaces to be painted, debris and dustfree prior to painting.
- .4 Refer to MPI Painting Specification Manual for surface preparation requirements of substrates not listed here.
- .2 Where finish hardware has been installed remove, store, re-install finish hardware, to accommodate painting. Do not clean hardware with solvent that will remove permanent lacquer finishes.
- .3 Alkali Content tests and neutralization:
  - .1 Test for ph level using litmus paper on dampened substrate.
  - .2 Neutralize surfaces over 8.5 ph with 4% solution of Zinc Sulphate for solvent based systems and tetrapotassium pyrophosphate for latex based systems, to below 8.0 ph, and allow to dry.
  - .3 Brush-off any residual Zinc Sulphate crystals.
  - .4 Coordinate paint system primer / sealer to be alkali-resistant.
- .4 Substrate moisture tests:
  - .1 Test for moisture content over entire surface to be painted, minimum one test/2 m2 in field areas and one test/600 mm along inside corners including at ceiling to wall juncture.
  - .2 If any test registers above 10% allow entire substrate surfaces, within the plane, to dry further before paint system application. Install temporary drying fans if necessary.
  - .3 Re-test employing same criteria.
- .5 Mildew removal: Scrub with solution of trisodium phosphate and sodium hypochlorite (Javex) bleach, rinse with water, and allow to dry completely.
- .6 Cementitious and masonry (existing): Clean existing surfaces by pressure washing where indicated on drawings with a TSP solution and pressure range of 1500 - 4000 PSI at 150 mm - 300 mm. Rinse areas with clean water and allow to thoroughly dry. Provide for collection and disposal of water.
- .7 Cementitious and masonry (Concrete, block):
  - .1 Allow 28 days cure before painting.
  - .2 Coordinate repair of protrusion-chipping and grinding, and honeycomb filling with responsible trades.
  - .3 Remove dirt, loose mortar, scale, powder, efflorescence, and other foreign matter.
  - .4 Remove form oil and grease with trisodium phosphate, rinse, and allow to dry thoroughly.
  - .5 Prepare surfaces in accordance with CAN/CGSB-85.100.

- .6 Remove rust stains with solution of sodium metasilicate after thorough wetting;
  - .1 allow to dry thoroughly.
- .8 Metal Fabrications (existing): Scrape and either hand or power wire brush surfaces to remove mill and scale.
- .9 Galvanized steel sheet:
  - .1 Z275 (Satin & Spangled Sheet): SSPC SP7 brush blast.
  - .2 ZF075 (Wiped Coat): Remove contamination, wash with Xylene solvent.
  - .3 Touch-up damaged galvanized areas with organic zinc rich primer.
- .10 Galvanized iron and steel: Prepare galvanized and ungalvanized metal surfaces as
  - .1 Z275 (Satin & Spangled Sheet): SSPC SP7 brush blast.
  - .2 ZF075 (Wiped Coat): Remove contamination, wash with Xylene solvent.
  - .3 Touch-up damaged galvanized areas with organic zinc rich primer.
- .11 Galvanized iron and steel: Prepare galvanized and ungalvanized metal surfaces as follows:
  - .1 Unpassivated, unweathered and weathered: Remove contamination, wash with Xylene or Toluol solvent, allow to dry thoroughly. Make paint system primer/sealer an etching type primer.
  - .2 Manufacturer pre-treated (including passivated): SSPC SP7.
  - .3 Touch-up damaged galvanized areas with organic zinc rich primer.
- .12 Structural steel and miscellaneous metal fabrications:
  - .1 Coordinate the following with the responsible trades:
    - .1 Rust, mars, mill scale, and weld-burn touch-ups.
    - .2 Oil, grease, weld flux and other residue removal.
  - .2 Prime paint items, not otherwise indicated to be primed as part of another Section.
  - .3 Touch-up damaged galvanized areas with organic zinc rich primer
- .13 Factory primed surfaces:
  - .1 Touch up damaged areas.
  - .2 Clean as required for top coat.
- .14 Gypsum board (existing):
  - .1 Remove dust, dirt, oil, grease, glue and all foreign material. Clean with stiff fibre brush prior to applying primer coat.
  - .2 Coordinate repairs and touch-ups with the responsible trade.
  - .3 Lightly sand surface to smooth out ridges and provide neat smooth surface.
- .15 Gypsum board:

- .1 Apply primer/sealer paint to reveal defects and deficiencies and to equalize absorption areas.
- .2 Coordinate repairs and touch-ups with the responsible trade.
- .3 Re-prime repairs.
- .16 Coordinate with other trades to prevent:
  - .1 Damage, and inadvertent activation of fire and smoke detectors.
  - .2 Odour and dust distribution by permanent HVAC systems including fouling of ducts and filters.
- .17 Field-mix Products in accordance with manufacturer's written instructions.

### 3.3 **APPLICATION**

- .1 Apply painting systems in accordance with the MPI Painting Specification Manual. Apply each Product to manufacturer's recommended dry film thickness.
- .2 Painting systems listed are required minima, apply additional coats if necessary to obtain substrate hiding acceptable to the Consultant.
- .3 Tint intermediate coats lighter than final top coats for identification of each succeeding coat and to facilitate inspections. Include only manufacturer's recommended reducing and tinting accessories. Do not add adulterants.
- .4 Primer to be specialized primer coating system as required by manufacturer for selected colour. Standard primer being tinted shall be tinted to a maximum of 1.5% by volume.
- .5 Sand lightly between coats to achieve a tooth or anchor for subsequent coats.
- .6 Apply paint uniformly in thickness, colour, texture, and gloss, as determined by the Consultant under adequate illumination and viewed at a distance of 1500 mm. Apply finishes free of defects in materials and application which, in the opinion of the Consultant, affect appearance and performance. Defects include, but are not limited to:
  - .1 Improper cleaning and preparation of surfaces.
  - .2 Entrapped dust, dirt, rust.
  - .3 Alligatoring, blisters, peeling.
  - .4 Scratches, blemishes.
  - .5 Uneven coverage, misses, drips, runs, and poor cutting in.
- .7 Do not apply coatings on substrates which are not sufficiently dry. Unless indicated otherwise, allow each painting system coat to cure dry and hard before following coats are applied.
- .8 Repaint entire areas of damaged or incompletely covered surfaces, to the nearest inside or outside corner; patching will not be permitted.
- .9 Miscellaneous painting requirements:
  - .1 Paint projecting ledges, and tops, bottoms and sides of doors both above and below sight lines to match adjacent surfaces.

- .2 Paint door frames, access doors and frames, door grilles, prime coated butts, and prime coated door closers to match surface in which they occur.
- .3 Finish closets and alcoves as specified for adjoining rooms.
- .4 Paint light coves white whether a light lense is installed or not, unless otherwise indicated.
- .5 Paint interior columns to match walls of room.
- .6 Allow for:
  - .1 2 wall colours per room, one ceiling colour per room.
  - .2 Different door colours in each functionally different area.
  - .3 Different colours on both sides of same door.
- .10 Mechanical, electrical, refrigeration and other painting coordination:
  - .1 Paint mechanical services in accordance with Mechanical Identification Division 21, 22, 23 and 24.
  - .2 Coordinate painting of pipes, ducts, and coverings with the work of Division 21, 22, 23 and 24 to precede pipe colour banding, flow arrows, and other pipe identification labeling installation.
  - .3 Paint exposed conduit, pipes, hangers, ductwork, grilles, gratings, louvres, access panels, fire hose cabinets, registers, convector and radiator covers, enclosures, and other mechanical and electrical equipment including services concealed inside cupboard and cabinet work; apply colour and sheen to match adjacent surfaces, except as noted otherwise.
  - .4 Paint portions of surfaces such as duct interiors, piping, ductwork, hangers, insulation, walls, and similar items, visible through grilles, louvres, convector covers etc., matte black in colour.
  - .5 Remove the following to accommodate painting, carefully store, clean, then reinstall on completion of each area and when dry:
    - .1 Switch and receptacle plates, fittings and fastenings, grilles, gratings, louvres, access panels, convector covers, and enclosures.

### 3.4 **FIELD QUALITY CONTROL**

- .1 Dry film thickness tests:
  - .1 Test for film thickness over entire surface to be painted, minimum one test/2 m2 in field areas and one test/600 mm along inside corners including at ceiling to wall juncture.
  - .2 If any test registers below specified thickness, re-apply paint to entire surface to nearest inside and outside corners.
  - .3 If test registers more than 50% above specified thickness, consult with paint manufacturer, determine if problem exists, offer solutions to Consultant, and repair as directed.
  - .4 Re-test employing same criteria after repair.



**3.5 CLEANING**

- .1 Remove spilled, splashed, and spattered paint promptly as work proceeds and on completion of work. Clean surfaces soiled by paint spillage and paint spatters. Repair or replace damaged work, as directed by Consultant.

**3.6 PROTECTION**

- .1 Post Wet Paint signs during drying and restrict or prevent traffic where necessary.
- .2 Post sign, after Consultant's inspection and acceptance of each room, reading:  
PAINTING COMPLETE - NO ADMITTANCE WITHOUT CONTRACTOR'S PERMISSION.

END OF SECTION

- 1** General
  - 1.1 SECTION INCLUDES**
    - .1 Labour, Products equipment and services necessary for the miscellaneous specialties Work in accordance with the Contract Documents.
  - 1.2 SUBMITTALS**
    - .1 Product data:
      - .1 Submit manufacturer's Product data for each Product specified in accordance with Section 01 10 10 indicating:
        - .1 Performance criteria, compliance with appropriate reference standard(s),
        - .2 Product transportation, storage, handling and installation requirements.
      - .2 Shop drawings:
        - .1 Submit shop drawings in accordance with Section 01 10 10 indicating elevations, sections, details, dimensions, materials, gauges, and finishes.
      - .3 Closeout submittals: Submit cleaning and maintenance instructions for miscellaneous specialties for incorporation into Operations and Maintenance Manuals in accordance with Section 01 10 10.
  - 1.3 DELIVERY, STORAGE, AND HANDLING**
    - .1 Package or crate, and brace products to prevent distortion in shipment and handling. Label packages and crates, and protect finish surfaces by sturdy wrappings.
- 2** Products
  - 2.1 MATERIALS**
    - .1 Access doors (non-fire rated walls and ceilings):
      - .1 Access door, "Bauco Plus II TX" by Access Panel Solutions or approved alternative.
      - .2 Seamless access panel for gypsum board with concealed aluminum frame with continuous factory installed perimeter EPDM gasket, galvanized steel hardware, pivoting hinge and steel safety cable with clip for ceiling operation.
      - .3 Provide concealed mechanical touch-latch for ceiling access doors and tamper-resistant torx head can latch lock for wall and ceiling applications.
      - .4 Door size as approved by the Consultant for intended applications.
      - .5 Finishing: In accordance with Section 09 91 00.
- 3** Execution
  - 3.1 EXAMINATION**

- .1 Verify condition and dimensions of previously installed Work upon which this Section depends. Report defects to Consultant. Commencement of Work means acceptance of existing conditions.

**3.2 PREPARATION**

- .1 Verify substrate surfaces are solid, free from surface water, dust, oil, grease, projections and other foreign matter detrimental to performance.
- .2 Items to be built-in: Provide information and templates required for installation of work of this Section, and assist or supervise, or both, the setting of anchorage devices, and construction of other work incorporated with products specified in this Section in order that they function as intended.
- .3 Verify there is adequate supports and / or blocking in gypsum wall assemblies prior to installation of miscellaneous speciality items as required.

**3.3 INSTALLATION**

- .1 Install miscellaneous specialties level and securely and rigidly anchored to substrate in accordance with authorities having jurisdiction, reviewed shop drawings, and manufacturer's written instructions.
- .2 After installation, adjust miscellaneous specialties in accordance with manufacturer's written instructions.

**3.4 CLEANING**

- .1 Clean and polish exposed surfaces prior to acceptance by Consultant.

END OF SECTION

- 1 General**
- 1.1 SECTION INCLUDES**
  - .1 Labour, Products, equipment and services necessary for Building Entrance Control work in accordance with the Contract Documents.
- 1.2 REFERENCES**
  - .1 The Power supply unit (PSU) shall be certified under UL 60950-1, second edition and CSA C22.2 No. 60950-1-07, second edition, to provide 24Vdc “class 2” supplies as part of a Fastlane Turnstile system. (Supplied by manufacturer of turnstiles).
  - .2 ETL listed as per UL325 and UL2593
  - .3 CE marked in accordance with appropriate European Directives
    - .1 Electromagnetic Compatibility EU Directive 2004/108/EC
    - .2 Low Voltage EU Directive 2006/95/EC
    - .3 Machinery Directives EU Directive 2006/42/EC
- 1.3 SUBMITTALS**
  - .1 Product data:
    - .1 Submit duplicate copies of manufacturer's Product data in accordance with Section 01 10 10 indicating:
      - .1 Performance criteria, compliance with appropriate reference standard, characteristics, limitations.
      - .2 Product transportation, storage, handling and installation requirements.
  - .2 Shop drawings:
    - .1 Submit shop drawings in accordance with Section 01 10 10 indicating:
      - .1 Elevations, sections, details, materials, operating components, dimensions, gauges, finishes, arrangement of hardware, required clearances, and relationship to adjacent construction.
      - .2 Complete electrical wiring diagrams including electrical schematics and sequence of operation.
      - .3 Complete engineering design data confirming that Products meet design criteria specified.
  - .3 Samples:
    - .1 Submit samples of the full range of standard 3M FASARA Glass Finishes.
  - .4 Closeout submittals:
    - .1 Submit following for incorporation into Operations and Maintenance Manuals in accordance with Section 01 10 10:
      - .1 Identification: Manufacturing name, type, year, and serial number. Performance criteria and maintenance data.
      - .2 Operating instructions and precautions.
      - .3 Safety precautions.

- .4 Component parts availability including names and addresses of spare part suppliers.
- .5 Lubrication schedule indicating lubrication points and type of lubricant recommended.

1.4 **QUALITY ASSURANCE**

- .1 Manufacturers: Company specializing in manufacturing Products specified in this section, with minimum 10 years experience.
- .2 Installers / applicators / erectors: Execute work of this section using an installer who has adequate equipment and skilled workers to perform it expeditiously, and is known to have been responsible for satisfactory installations similar to that specified during a period of at least the immediate past 20 years.
- .3 Manufacturer must operate a Quality Management System that meets the ISO 9001:2008. International Standard for design, development, and manufacturing activities, including associated software products.

1.5 **DELIVERY, STORAGE, AND HANDLING**

- .1 Package or crate, and brace Products to prevent distortion in shipment and handling. Label packages and crates, and protect finish surfaces by sturdy wrappings.
- .2 Deliver materials to job site in manufacturer's packaging undamaged, complete with installation instructions.
- .3 Store indoors in a controlled environment, protected from weather, construction activities and debris.
- .4 Use forklift, pallet jack or equivalent equipment for moving.

1.6 **SITE CONDITIONS**

- .1 Coordinate the work in this section with other appropriate sections of the specifications to ensure proper scheduling for fabrication and installation of the work in this section.
- .2 Install on a level floor.

**2** Products

2.1 **MATERIALS**

- .1 **Motorized Pedestrian Swing Gates with Glass Panels for Delivery:**
  - .1 Features of the gate shall include:
    - .1 Motorized bi-directional movement; bi-directional access control; 36" passage width; user adjustable barrier cycle and dwell times; emergency override/fire alarm input
  - .2 System shall be designed for single person access for each authorization granted. Glass barriers shall swing away from authorized users. Barrier then either:
    - .1 Closes quickly behind the authorized person to deter tailgaters;
    - .2 Stays open for immediate additional authorized users passing in either direction

- .3 System shall be configured to open in the exit direction upon fire alarm or power outage.
- .4 Opening/closing time: 0.9 to 1.2 seconds.
- .5 Safety features:
  - .1 Slows when safety beams sense object in the way.
- .2 Materials:
  - .1 Exterior:
    - .1 End Panels: stainless steel 304 grade 240 grit (Satin No. 4) horizontal grain (standard).
    - .2 Side Panels: stainless steel 304 grade 240 grit (Satin No. 4) horizontal grain (standard) with polycarbonate filter windows for the infrared beams.
    - .3 Lower Panels: stainless steel 304 grade 240 grit (Satin No. 4) horizontal grain with Black Quartz Corian®. Wire Mold Cover to match corian finish.
  - .2 Interior Chassis:
    - .1 Chassis framework must be black satin, powder-coated mild steel
    - .2 3/8" (10mm) mounting studs (qty. 4) are required to secure the baseplate to the floor substrate.
  - .3 Decorative Tops:
    - .1 Stainless steel 304 grade 240 grit (satin #4) horizontal grain with Black Quartz Corian® for reader mounting locations.
  - .4 Custom Moving Glass Panel Barriers:
    - .1 12mm Toughened Safety Glass (Heat Soaked) to EN 14179 / ANSI 97.1 with an abrasion resistant coating
    - .2 Glass Panel height of 70" (1800mm).
    - .3 The barriers provide a 70" (1800mm) delivery passageway when open.
  - .5 Enclosure:
    - .1 Dimensions
      - .1 Round Ø240mm, Height 38" (965mm)
    - .2 Pedestal weight
      - .1 Receive Pedestal 24kg
      - .2 1800mm Glass Panel 18Kg.
  - .6 Unit enclosure shall provide an Ingress Protection rating of IP20.
- .3 Equipment
  - .1 The gate shall have the ability to provide (2) controlled passage in one direction and free passage in the opposite direction through use of an optional motion sensor provided by manufacturer.
- .4 Security Equipment: Card readers are to be installed in the field by installer.
  - .1 The card-reader shall not be mounted higher than 1000mm AFF.
- .5 Finishes:
  - .1 Stainless Steel: The post is fabricated from #304 stainless steel material, polished to a satin (#4) finish.

- .2 Powder Coat over Stainless Steel: The post is fabricated from #304 stainless steel and then painted in a powder coat color specified by the Consultant.
- .6 Additional Feature Requirement to be included:
  - .1 Tandem Glass Gate Set: A tandem glass gate set consisting of two gates that operate in tandem. Posts are on either end with panels facing inward. The Tandem Glass Gate Set provides approximately double the passage opening as a single gate.
  - .2 Barrier Film: City of Toronto logo/artwork film by 3M Fasara Glass Finishes or approved equivalent on all moving barriers and/or side panels. Install as per manufacturer specifications.
  - .3 Motion Sensor: A motion sensor is added to one side of the gate. As a user moves toward the gate, the motion sensor detects the user and the gate opens in the direction of travel.
  - .4 Floor Saver Baseplates: Baseplate for delivery turnstile configurations. Powder coated black with a sprayed non-slip coating in walkway area. Baseplate houses interconnection cable.
- .7 Factory Testing
  - .1 Product shall be fully tested at the factory prior to shipment.
  - .2 Check all mechanical connections.
  - .3 Check all electrical connections.
  - .4 Inspect product finish. Touch up prior to shipment.
- .8 Capabilities
  - .1 Detect and deter unauthorised persons from entering into the protected area.
  - .2 Detect unauthorised persons more than 10 mm at waist height, behind an authorised person, that is "tailgating" or "piggybacking."
  - .3 Detect direction of movement, that is, entry and exit.
  - .4 Verify entry into the protected area following authorisation.
  - .5 Provide alarm outputs on detection of a violation by means of local sounders and indicators
  - .6 Operate in bi-directional, single direction, no entry or free access modes.
  - .7 Minimize false alarms through the use of infrared beams connected to intelligent detection algorithms.
  - .8 Ensure a fast throughput, up to one person per second, subject to the access control system.
  - .9 Buffering multiple inputs from an access control system to maximize throughput.
  - .10 Easy to use.
  - .11 Allow safe emergency egress through a fire alarm input to open the glass panels.
  - .12 Entry and exit with an authorised card, or other credential.
  - .13 Entry and exit that is unauthorised causing an alarm.
  - .14 Authorised card being read by the system but no entry or exit taking place using an optional alarm configuration.
  - .15 Card presented for entry but exit occurring causing an alarm.
  - .16 Card presented for exit but entry occurring causing an alarm.

- .17 Obstruction of an infrared beam path causing an alarm.
- .18 Create an alarm for a person pushing/forcing the glass panels, that is, forced entry.

2.2 **Turnstile with Motorized Swinging Glass Panel Barriers for Pedestrian:**

- .1 Turnstile with Motorized Swinging Glass Panel Barriers including control and monitoring Software. Turnstile with clear 12MM thick glass panels that allow a capacity of 150 persons per turnstile.
  - .1 Exterior:
    - .1 Side Panels: stainless steel 304 grade 240 grit (satin #4) horizontal grain (standard) with polycarbonate filter windows for the infrared beams and central 10mm glass panel.
    - .2 Encasement: stainless steel 304 grade 240 grit (satin #4) horizontal grain (standard)
  - .2 Interior Chassis:
    - .1 Chassis framework must be black satin, powder-coated mild steel
    - .2 3/8" (10mm) mounting studs (qty. 4) are required to secure the baseplate to the floor substrate.
  - .3 Decorative Tops:
    - .1 Stainless steel 304 grade 240 grit (satin #4) horizontal grain with Black Quartz Corian® for reader mounting locations.
    - .2 Turnstiles to house a cover plate for card readers to be installed within. HID Card reader to be installed and housed within the turnstile.
  - .4 Turnstile Status Display:
    - .1 Located on the Right Hand center post of each lane viewed from the entrance/exit
    - .2 The Indicator is provided by LEDs diffused through frosted clear acrylic inset into the right hand center post, approximate dimensions 1.8" x 0.4" (45 x 10mm)
  - .5 12mm Toughened Safety Glass (Heat Soaked) to EN 14179 / ANSI 97.1
  - .6 Barrier height of 70" (1800mm).
  - .7 Enclosure: Square end panel model Length 44.4" (1129mm), Width 9.4" (240mm), Height 38" (965mm)
  - .8 Pedestal weight
    - .1 RX/TX Pedestal 123lbs / 56kg
    - .2 Interlane Pedestal 130lbs / 59kg
    - .3 DDA Glass 16.5lbs / 7.5kg each
    - .4 Unit enclosure shall provide an Ingress Protection rating of IP20.
- .2 Dimensions
  - .1 Passage Opening:
    - .1 Standard opening: 914mm minimum
    - .2 Accessibility Barrier-Free opening: 950mm minimum
  - .2 Moving Barrier Heights:
    - .1 High: 70" (1800mm)



- .3 Equipment
  - .1 The installation shall consist of end and center lanes, as required by the installation. Center cabinets shall have the same height, length and nominal width dimensions as end cabinets. Units shall be bi-directional in operation.
  - .2 Controlled Passage: Each patron must present a valid electronic credential to the integrated reader before passage is allowed. Upon receipt of an authorization signal from the access control system, the barriers open and allow a single passage in the authorized direction. The barriers return to the closed position after the user has passed through the turnstile or the time frame allowed for entry expires. The turnstile will buffer multiple inputs to maximize throughput.
  - .3 Free Passage: All patrons are allowed to pass. The barriers open when the first sensor in the cabinet array is activated and close when the patron passes through the turnstile.
  - .4 No Passage (Direction Closed): No passage is allowed. Valid electronic credentials are ignored.
  - .5 Visitor: Allows visitors and groups without credentials access through the turnstile. When placed in Visitor Mode, the barriers open and remain open. Passages in either direction are monitored and an output is provided for each passage.
- .4 Operating Modes:
  - .1 Normally Closed: The barriers are closed, securing the turnstile.
  - .2 Barrier Disabled: The barriers remain open, allowing the unit to function as a barrier free optical turnstile.
  - .3 Emergency: Activation to open the barriers in conjunction with a fire alarm or similar system. When activated, the barriers open in the exit direction and remain open until deactivated.
  - .4 Power Failure: In the event of loss of power, the barriers can be freely moved in either direction. When pushed or pulled to the open position the barriers remain open.
- .5 Optical Detection:
  - .1 Strategically placed optical sensors and a sophisticated detection algorithm detects patrons, determines the direction of patron movement, and (in conjunction with the facility access control system) detects unauthorized users.
  - .2 Each sensor to consist of a separate transmitter and receiver operating on a high-speed communication bus.
  - .3 The sensors and system:
    - .1 Must have the capability of tracking a user's passage from entry to exit point
    - .2 Must consistently detect closely following tailgaters on allowed entries while avoiding generating false alarms for commonly carried objects
    - .3 Must detect patrons travelling in the opposite direction when passage has been allowed

- .4 Sensitivity settings to be adjustable via an included configuration utility.
- .5 Sensor operation shall not be affected by natural or indoor lighting.
- .6 Sensors to be deployed at various heights to detect persons crawling through the passage area.
- .7 Safety sensors shall be present to prevent the barriers from closing or opening when persons or objects are the barrier field of travel.
- .8 The optical system to provide superior processing speed and throughput of up to one person per second, subject to the access control system limitations.
- .6 Motor and Motor Control:
  - .1 Smooth and controlled for all sized barriers; no shimmying or wobbling during opening or closing.
  - .2 Self-aligning so that barriers always align in the home or closed position.
  - .2 Barriers to detect impact with an object or obstruction during the opening or closing cycle so as to minimize impact with a person, object or obstruction.
  - .3 Unit to have an integrated electromechanical lock which secures the barriers against forced entry in the home or closed position.
- .7 System Integration:
  - .1 Units shall integrate with third-party access control systems through the use of dry contact inputs and outputs.
  - .2 Custom methods of integration (through TCP commands) shall be available.
  - .3 Available Inputs: Available inputs shall include:
    - .1 Passage allowed, access granted x 2
    - .2 Passage denied, access denied x 2
    - .3 Direction closed, no passage x 2
    - .4 Direction open, free passage x 2
    - .5 Visitor allowed, access granted x 2
    - .6 Single override entry x 2
    - .7 Disable barrier x 1
    - .8 Emergency override x 1
    - .9 TCP port
  - .4 Available Outputs: Available outputs shall include:
    - .1 Authorized passage x 2
    - .2 Unauthorized passage x 2
    - .3 Unauthorized presence x 2
    - .4 Free passage x 2
    - .5 Sensor blocked x 1
    - .6 Barrier held open x 1
    - .7 Barrier breakaway x 1
  - .5 Configuration Capabilities: Units shall come with a web-based utility that allows the installer to conveniently configure settings for installed turnstiles. The utility must allow dissemination of operational settings for a single unit, or all installed units, over an Ethernet network. Configurable unit features available from the web-based utility to include:

- .1 User definable operational and alarm sounds
- .2 Access timeout configuration
- .3 Object size and tailgating sensitivity
- .4 Unauthorized entry sensor control
- .5 Barrier impact force
- .6 Blocked sensor time
- .7 Alarm duration
- .8 Emergency override barrier movement direction
- .6 Diagnostic Capabilities: The web-based utility shall also provide the following diagnostic capabilities:
  - .1 Operational debug
  - .2 Optic debug
  - .3 Motor I/O debug
- .7 Power requirements are as follows:
  - .1 24 VDC for operation.
  - .2 Power / digital signals run between cabinets via a conduit run interconnect cable.
- .8 User Interface:
  - .1 Enter / Exit User Status Display: The unit to have LED illuminated user status icons visible looking down on the lid, on each side of the unit. User status icons to be as follows:
    - .1 An illuminated yellow means the turnstile is ready for card presentation.
    - .2 An illuminated green means valid credentials have been presented and / or passage is allowed in the direction of the arrow.
    - .3 An illuminated red symbol means that passage is prohibited in the direction of the arrow.
    - .4 A flashing red stop symbol means invalid credentials have been presented or the turnstile has an alarm condition.
  - .2 Open / Closed Status Lights: The unit to have an opaque end piece mounted to the upper end "leg" of each side of the turnstile diffusing green and red signal LED's. The lights to function as follows:
    - .1 Green consistently illuminated means the turnstile is open for use.
    - .2 Red consistently illuminated shall signify the turnstile is closed for use.
    - .3 A flashing red shall signify an alarm condition.
    - .4 The timing and length of illumination shall be user definable for select alarms.
  - .3 User Definable Sounds: Each unit shall allow user to define the duration and type of audible sounds (in the form of .wav files) that play for the following alarms and operations.
    - .1 Access accepted
    - .2 Access denied

- .3 Unauthorized presence
- .4 Unauthorized passage
- .5 Blocked sensor
- .6 Unsafe to open / close barrier
- .7 Barrier impact
- .8 Barrier lingering
- .9 Appropriate startup
- .4 Operator Interface for Control:
  - .1 Control Software: Web-based control and monitoring software shall be provided. Communication between the control software and the units shall be TCP/IP.
  - .2 Features of Control Software: The software shall include or provide:
    - .3 Three different levels of access, with the level of access dependent on the level of the operator. Access levels shall be password protected.
    - .4 Real time status of installed units.
    - .5 Change of operational status modes in real time.
    - .6 Monitoring of alarm conditions and screen alerts showing alarm conditions.
    - .7 Ability to place individual or all units in emergency override condition.
    - .8 Ability to allow a single passage through an individual lane in either direction.
    - .9 Apply settings/changes to one or all units.
  - .5 Event Scheduler: An integrated event scheduler allowing modes and access direction settings to be changed automatically at scheduled times.
  - .6 Reporting: A detailed log of all activity for defined periods.
- .8 Security Equipment
  - .1 Reader Integration:
    - .2 Mullion sized proximity readers can be installed under the turnstile lid.
    - .3 Readers can be installed on the turnstile lid subject to space limitations.
    - .4 Other options are available (see Options section below).
    - .5 Readers can be factory installed, or installed in field by installer.
    - .6 Readers and installation are not part of the product and must be purchased separately.
    - .7 Emergency Input: FP200 or similar from the Fire Panel Normally Closed relay contacts (or 24V signal) to each Interlane and Receive Pedestal.
- .9 Additional Feature Requirement to be included:
  - .1 Barrier Film: City of Toronto logo/artwork film by 3M Fasara Glass Finishes or approved equivalent on all moving barriers and/or side panels. Install as per manufacturer specifications.

- .2 Floor Saver Baseplates: Baseplate for multi-turnstile configurations. Powder coated black with a sprayed non-slip coating in walkway area. Baseplate houses interconnection cable.
  - .3 External Power Supply: Portable enclosure provided for remote installation of unit primary power supply. One enclosure houses up to three power supplies (one power supply required per turnstile).
  - .4 Side Panel Illumination (Dynamic): Select panels dynamically change color based on presented card status and alarm conditions.
  - .5 Monitoring and Operational Mode Scheduling Software: Web-based communication and control software.
  - .6 Turnstile Key Controls: 3-position key switches installed in turnstile cabinet provide quick method of placing the turnstile direction in Controlled Passage, Free Passage or No Passage mode.
  - .7 Automatic Barrier Opening on Loss of Power: An enclosure houses the turnstile UL listed power supply and power buffer. On loss of power, the power buffer retains power to automatically open the barriers in the exit direction.
  - .8 Climb Over Detection: Load cells are installed underneath the lid to detect an unauthorized user attempting to climb on the lid to gain entry.
- .10 Factory Testing
- .1 Product shall be fully assembled at the factory.
  - .2 Check all mechanical connections.
  - .3 Check all electrical connections.
  - .4 Provide 24-hr factory burn in testing.
  - .5 Inspect product finish. Touch up prior to packaging.

### **3 Execution**

#### **3.1 EXAMINATION**

- .1 Verify condition of previously installed Work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.

#### **3.2 SITE EXAMINATION**

- .1 Finished floor substrate shall be level in accordance with equipment manufacturer's written requirements.
- .2 Notify Consultant in writing of conditions, which would be detrimental to installation. Commencement of work implies acceptance of previously completed work.
- .3 Inspection: Installer must examine the installation location and advise the Contractor of any site conditions inconsistent with proper installation of the product. Installation shall not begin until unacceptable conditions are rectified. These conditions include but are not limited to the following:
  - .4 Gate must be installed on a level floor.

- .5 Power and control wiring to come from ground through appropriate conduit, per manufacturer direction, or via alternate methods if manufacturer is contacted and approves.
  - .6 Installation: Install in accordance with manufacturer's instructions and secure to adjacent solidly anchored structure or equipment.
  - .7 Adjustment: Adjust the gate after installation following the manufacturer's directions.
  - .8 Instruction: A factory trained installer shall demonstrate to the owner's maintenance crew, or designated representative, the proper operation and the necessary service requirements of the equipment, including exterior maintenance.
  - .9 Cleaning: Clean gate and area carefully after installation to remove excess caulk, dirt and labels.
- 3.3 **ELECTRICAL**
- .1 Supply of electrical power to terminal box in each unit is specified in Divisions 26, 27, and 28.
  - .2 Conduit, wiring and electrical power supply to control system components and card reader system shall be under work of Divisions 26, 27, and 28.
  - .3 Provide other electrical wiring, conduit junction boxes, transformers, circuit breakers and auxiliary components required for complete installation. Conform to CSA and authorities have jurisdiction.
  - .4 Card Readers: System compatible with major access control technologies for owner-provided card readers of suitable dimensions to be mounted onto pedestals. Must support integration of multiple card readers at each mounting location by manufacturer.
    - .1 Card Reader Mounting at pedestal ends: Under, or surface-mounted on Corian decorative top part.
    - .2 Turnstiles to house a cover plate for card readers to be installed within. HID Card reader to be installed and housed within the turnstile.
- 3.4 **INSTALLATION**
- .1 Installation of system in accordance with equipment manufacturer's written instructions.
  - .2 Locate equipment where indicated and in accordance with reviewed shop drawings.
  - .3 Test and adjust complete system for proper function and leave in perfect working order.
  - .4 Floor Protectors: Modular system designed to support turnstile pedestals without need for drilling mounting bolts into floor or running a conduit under floor between pedestals for cables.
  - .5 Floor Drilling Precautions: Note on Drilling Floor Tiles: The Contractor uses a drill equipped with a vacuum attachment that includes a HEPA filter. Additionally, the worker must, at a minimum, wear an N95 mask during this task.
- 3.5 **ADJUSTING AND CLEANING**
- .1 Verify that installed equipment functions properly, and adjust it accordingly to ensure satisfactory operation.

- .2 Refinish damaged or defective work so that no variation in surface appearance is discernible.

**3.6 PROGRAMMING**

- .1 The Contractor shall include all associated costs required to program the system, ensuring that all configuration and naming conventions are approved by the Owner or the Owner's Representative.
- .2 Pre-Installation Meetings: The Contractor is required to attend pre-installation meetings with the Owner, the Owner's Representative, and key staff to determine specific requirements for system programming.
- .3 Documentation: The Contractor must document all agreed-upon software configuration parameters and submit them for approval.
- .4 Integration in Drawings: The Contractor shall incorporate all approved software configuration parameters into the final revision of shop drawings.
- .5 C-Cure Programming: The document detailing C-Cure programming will be shared with the awarded contractor upon the signing of a Non-Disclosure Agreement (NDA).

**3.7 CLOSEOUT ACTIVITIES**

- .1 Demonstration
  - .1 Before acceptance of system, arrange for demonstration of equipment with authorized representatives of Owner, to be performed by competent representative of equipment manufacturer to assure proper function, operation and explanation. Give Owner's representative a minimum of 48 hours advance notice in writing of demonstration date.
  - .2 Conduct comprehensive demonstration for Owner's staff on operation and care of parking control system.

END OF SECTION

# **DIVISIONS 26 27 28 SPECIFICATIONS**

FOR

**TORONTO PARAMEDIC SERVICES  
TURNSTILES ADDITION  
4330 DUFFERIN STREET  
NORTH YORK, ONTARIO**

Project number: 02304

PREPARED BY

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**1 General**

- 1.1 This Section covers items common to Sections of Division 26. This section supplements the general requirements of the City of Toronto.
- 1.2 Performance of the work under this contract shall be scheduled and coordinated with the General Contractor and Project Manager. For pricing purposes, the bidder shall assume that the work will be executed outside of normal working hours. Allow for over-time pay when preparing bid.
- 1.3 The exact scheduling and work procedure shall be determined at the time of execution of the work.
- 1.4 The electrical contractor shall provide a total turnkey service and shall be accountable for all the work as stipulated on the drawings and these specifications.
- 1.5 The contractor shall list the names of any sub-contractors that shall be used in the bid.

**2 Codes and Standards**

- 2.1 Do complete installation in accordance with the Ontario Electrical Safety Code, CSA C22.1-21, 28<sup>th</sup> edition except where specified otherwise.
- 2.2 Do overhead systems in accordance with the latest edition of CSA C22.3No.1-M87(R1997) except where specified otherwise.
- 2.3 Abbreviations for electrical terms: to the latest edition of CSA Z85-1983.

**3 Care, Operation and Start-Up**

- 3.1 Instruct operating personnel in the operation, care and maintenance of equipment.
- 3.2 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with all aspects of its care and operation.

**4 Voltage Ratings**

- 4.1 Operating voltages: to the latest CAN3-C235.

**5 Permits, Fees and Inspection**

- 5.1 Apply for, obtain and pay for all permits, licenses, inspections, examinations and fees required, for the Work pertaining to this Division.
- 5.2 For any electrical work required within the jurisdiction of the Ontario Electrical Safety Code, the electrical contractor shall provide drawings and specifications required by the Electrical Safety Authority and obtain a permit as required. Pay any associated fees for permit application and inspection by the E.S.A.
- 5.3 Furnish Certificates of Acceptance from Electrical Safety Authority on completion of work to the Consultant and Engineer. Provide a copy in each maintenance manual.

**6 Materials and Equipment**

- 6.1 All equipment and material to be CSA certified.
- 6.2 Lifting platforms, scissor lifts, extension ladders etc. required to execute the work under this contract are to be provided by the electrical contractor.

**7 Finishes**

- 7.1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- 7.2 Clean and prime exposed non-galvanized hangers, racks and fastenings with white enamel paint to prevent rusting.

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7.3 Paint all surface mounted conduits installed under this contract with white enamel paint.

**8 Equipment Identification**

8.1 All electrical equipment shall be identified with lamacoid plastic plates, blue background with white etched letters.

8.2 Identify new circuits on existing panel board directories.

**9 Wiring Identification**

9.1 Identify wiring and cabling with permanent indelible identifying markings, either numbered or coloured plastic tapes, on both ends of phase conductors of feeders, branch circuit wiring, data and voice communication cabling.

**10 Wiring Terminations**

10.1 Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors.

**11 Manufacturers and CSA Labels**

11.1 Visible and legible after equipment is installed.

**12 Temporary Power**

12.1 Provide under this Contract a temporary service on job site for use by construction facilities. Exact location to be determined on site.

12.2 Exact description of services required must be negotiated with General Contractor and/or Owner.

12.3 'Used' wiring and equipment may be utilized for temporary wiring. All temporary wiring and equipment shall remain the property of the Electrical Contractor and shall be removed from the site at the time directed by the General Contractor.

**13 Submittals**

13.1 Submit shop drawings, prepare record drawings and provide maintenance and operating instructions in accordance with the requirements of the City of Toronto.

**14 Mounting Heights**

14.1 Mounting height of equipment is from finished floor to center line of equipment unless specified or indicated otherwise.

14.2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

**15 Demolition and Removal**

15.1 All removed conduit, wiring, fixtures, boxes etc. shall be disposed and removed from the site by the Contractor.

15.2 Remove and turn over all removed devices and fixtures to the City if the City wishes to keep them.

15.3 Remove old cabling where practical and dispose to scrap.

15.4 Provide blank white cover plates on all unused outlet boxes that have been vacated.

**16 Site Visit**

16.1 The Contractor shall visit the facility in accordance with the City of Toronto's general requirements.

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- 16.2 The Contractor shall make absolutely sure of the existing conditions and location of existing electrical equipment prior to submitting a bid.
- 17 Cutting and Patching**
- 17.1 In existing work and work already finished as part of this Division, cutting and patching will be carried out by the electrical contractor (unless noted otherwise) at the expense of this Division. Obtain the approval of the prime consultant before doing any cutting. Supporting members of any floor, wall or the building structure shall be cut only in a manner approved by the consultant. Provide all patching as required. This work shall be performed in accordance with the requirements of the corresponding Division of the specifications.
- 17.2 Prior to core drilling any floor slabs, the contractor shall scan and/or x-ray the slab to ensure that there are no existing buried electrical conductors or any elements that would affect the structural integrity.
- 18 Access Doors**
- 18.1 Access doors shall be sized and located to suit the applied wall and ceiling materials. Use ULC labeled access doors that act as fire barriers.
- 19 Clean Up**
- 19.1 Clean up daily and remove all debris from site.
- 20 Contract Drawings**
- 20.1 The contract drawings for the electrical work are performance drawings, diagrammatic intended to convey the scope of work and indicate general arrangement and approximate location of equipment, raceways etc. The drawings do not intend to reflect architectural and structural details.
- 20.2 Do not scale drawings but obtain information involving accurate dimensions shown on drawings and by site measurements.
- 20.3 Make at no additional cost, any changes or additions to material and equipment necessary to accommodate structural conditions (runs around beams, columns etc.).
- 20.4 Alter at no additional cost the location of materials and/or equipment as directed provided that the changes are made before installation and do not necessitate additional material.
- 20.5 (Reserved).
- 20.6 Leave space clear and install work to accommodate future materials and/or material supplied by other trades. Verify spaces in which work will be installed. Install conduit, cable and bus duct runs to maintain headroom and clearances to conserve space in shafts and ceiling spaces.
- 20.7 Confirm on site the exact location of outlets and fixtures. Confirm location of outlets for equipment supplied by others.
- 21. Shop Drawings**
- 21.1 Submit shop drawings and product data in accordance with the City of Toronto General Requirements.
- 21.2 Process shop drawings to suit the manufacturing schedule and construction schedule. Do not manufacture any equipment until final review of shop drawings has been completed.
- 21.3 Submit shop drawings to the authorities having submission, as required.
- 21.4 Provide shop drawings for the following:

- 21.4.1 New Access Control System Card Readers.
- 21.4.2 New Access Control System Power Supplies.
- 21.4.3 New Access Control System Control Panels.
- 21.4.4 New Fire Alarm Voice Communication System Devices.
- 21.4.5 New Cabling for Access Control, 24 VDC Power and Fire Alarm Voice Communication Systems.
- 21.4.6 New Wiremold (or equivalent) Raceway.
- 21.4.7 Surge Suppression Equipment/Devices.
- 21.5 Bind one set of all shop drawings in each operation and maintenance manual.

## 22 **Reserved**

## 23 **Operation and Maintenance Manuals**

- 23.1 Submit Operation and Maintenance manuals in accordance with City of Toronto General Requirements.
- 23.2 Assemble three (3) manuals each containing all approved shop drawings, operating and maintenance instructions for all equipment provided under the contract. Present copies for review and provide the Project Manager the reviewed copies. Manuals shall be in a three-ring hard-covered binder.
- 23.3 Manuals shall include but not be limited to the following information and documentation:
  - 23.3.1 All approved shop drawings.
  - 23.3.2 ESA certificate.
  - 23.3.3 Fire Alarm Verification Report (Final).
  - 23.3.4 Warranties.
  - 23.3.5 "As-built" drawings.

## 24 **Completion of Contract**

- 24.1 Systems shall be complete, tested and ready for use with all equipment operating satisfactorily.
- 24.2 Any circuit breakers for new circuits provided under the contract shall be clearly identified at panels.
- 24.3 Provide certificates of guarantee of workmanship, materials and equipment for one year after the date of substantial completion. Repair and or replace without charge to the City all defects due to imperfect materials or workmanship that appear within one year of acceptance of work.

## 25 **Workmanship and Supervision**

- 25.1 Workmanship and installation methods shall conform to the best standard practice. Work shall be performed by skilled tradesmen under the supervision of fully qualified personnel.
- 25.2 Install equipment in strict accordance with manufacturer's written recommendations.
- 25.3 When requested, submit samples of materials proposed for review before proceeding with the work.
- 25.4 Conceal conduit in finished areas and where practical. Where exposed conduit is used, run straight and perpendicular with building lines.
- 25.5 Install equipment and materials to present a neat appearance. Ensure that horizontal raceway is level and that equipment is plumb.
- 25.6 Maintain on the jobsite, at all times, qualified superintendents and foremen with proven experience in supervising, testing and adjusting projects of a similar nature and complexity.

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**26 Asbestos**

- 26.1 If, during the course of work, materials suspected of containing asbestos are encountered, the following procedure shall be followed:
- 26.1.1 Cease work immediately that may disturb the suspect material. Do not clean up, cover, move or contact suspect material.
- 26.1.2 Isolate the immediate work area by locking doors, installing barricades etc.
- 26.1.3 Notify the General Contractor and Project Manager in charge of the project of the situation.

**27 Noise and Vibration**

- 27.1 Electrical equipment shall operate without objectionable noise or vibration.
- 27.2 If such objectionable noise or vibration should be produced and transmitted to occupied portions of the building by apparatus, ducts, conduits, ballasts or other parts of the electrical work, make the necessary changes and/or additions, as approved, without extra cost to the Owner.
- 27.3 Connections to rotating, vibrating, magnetic or other noise producing equipment such as motors, transformers, contactors, etc. shall be by way of looped flexible conduits.

**28 Vouchers**

- 28.1 When called upon to do so by the Owner, provide vouchers to show that the work and materials are being paid for as the work progresses, and to substantiate the value of the work complete to that date.

**29 Valuation of Changes**

- 29.1 Refer to and conform with the requirements set out in the Instructions to Bidders.
- 29.2 Submissions will be scrutinized by the consultant and, therefore, require complete breakdown of all material, labour units and mark-ups.
- 29.3 In the event of any extra or additional work of any nature being required during the progress of the work, this Trade Contractor is hereby warned that in order to secure settlement for such extras, he has to obtain the Owner's, General Contractor's and the consultant's approval prior to starting the extra work and shall definitely state in writing the cost of such extras and credits at the time he is requested to do the work.
- 29.4 Unless the extras are approved they will not be allowed.

**30 (Reserved)**

**31 Expediting**

- 31.1 Continuously check and expedite delivery of all pretended equipment; equipment to be supplied under this contract and all materials required for the successful execution of this contract.
- 31.2 If necessary, inspect at the source of manufacture to confirm status.
- 31.3 Continuously check and ensure that the necessary information is communicated to all parties involved.
- 31.4 Immediately inform the Project Manager and/or Owner of any anticipated delays in writing, confirming date of order and release for shipment of materials or equipment delayed.

**32 (Reserved)**

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**33 Painting**

- 33.1 Supply exposed ferrous metal work, except conduits, with at least one factory prime coat, or paint one prime coat on the job. Clean up or wire brush equipment, conduit, etc., before painting. Finish painting will be done under painting and finishing division 9 unless specifically noted otherwise.
- 33.2 Clean up and wire brush concealed ferrous supports and hangers, in ceiling space and shafts, and supply two coats of zinc chromeate (C.G.S.B. 1-GP-140B)

**34 Plywood**

- 34.1 All plywood backboards will be supplied and installed by the Electrical Contractor, as required. These backboards will be primed and painted grey on one side by the Electrical Contractor.

**35 Sleeves, Sealing and Fireproofing**

- 35.1 Through all interior walls, use standard weight steel pipe, machine cut, flush with the finished structure. Coordinate with room finish schedule.
- 35.2 Through all exterior walls above grade, use standard weight steel pipe, machine cut, flush with finished structure inside and to suit flushing on the outside.
- 35.3 Through all waterproof floor, through janitors closets, boiler rooms, mechanical rooms, kitchens, and roofs, use genuine wrought iron or extra heavy cast iron sleeves, machine cut. Extend sleeves a minimum of 50mm. above finished floor and cut flush with underside of floor.
- 35.4 Pack all sleeves with ThermaFibre Fire Stop material manufactured by Canadian Gypsum Co. and to the Architect's approval.

**36 Trial Use**

- 36.1 The trial or temporary use of the system or any part thereof by the owner shall not be construed as evidence of acceptance. The owner shall have the privilege of testing and learning the operational procedure for such length of time as deemed reasonable by the architect. These operations shall be carried out only after due notice has been given and no responsibility shall be waived because of this operation.

**37 Tests**

- 37.1 A review of the work shall be carried out after completion of the work. Furnish required personnel to assist the consultant witnessing the test specified. Advise the consultant when the equipment is ready for testing and then set a date for tests.
- 37.2 If the results of these tests do not meet the requirements of the specification, make the appropriate corrections and provide, as set out above, for further similar test.

**38 "As-Built" Drawings**

- 38.1 The Contractor shall obtain from the Owner a complete and separate set of white prints (drawings) and specifications to keep on the site at all times.
- 38.2 These prints shall be marked up by the Contractor to record clearly, neatly, accurately and promptly and all locations of electrical work and deviations from and changes to the contract documents.
- 38.3 All changes from the contract documents shall be marked in red ink.
- 38.4 The accurate location, size and type of each service line shall be recorded before concealment to ensure accurate and direct future access to these buried lines.
- 38.5 The as-built drawings will be reviewed by the Consultant and will be taken into consideration when reviewing the applications for progress payment.



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- 38.6 Incorporate all changes made to the drawings through Change Orders, Change Directives, Supplemental Instructions, Site Conditions etc.
  - 38.7 Prepare specification as-builts. Record as-built products including manufacturer and model numbers.
  - 38.8 Before applying for a Certificate of Substantial Performance of Work, obtain the electronic files from the Engineer, pay any electronic files fee and sign the copyright waiver.
  - 38.9 The electronic files are non-transferrable and shall be used solely by the contractor that paid the fee and signed the copyright waiver.
  - 38.10 **As-Built Documentation**
    - 38.10.1 Upon satisfactory review, submit two (2) copies of as-built documents.
    - 38.10.2 Submit as-built pdf and AutoCAD files of as-built documents.
    - 38.10.3 A list of AutoCAD and pdf files required at closeout are to be compiled in a master. CAD drawings and pdf drawings are to be on separate spread sheets.
    - 38.10.4 Excel sheet database heading:
      - 38.10.4.1 Location – Project location information from title block.
      - 38.10.4.2 Component – Property or structure use.
      - 38.10.4.3 Year – Year the drawing was completed as indicated on title block.
      - 38.10.4.4 Drawing # - Drawing number as indicated on title block.
      - 38.10.4.5 Description – Purpose of the drawing as indicated in title block.
      - 38.10.4.6 Type – Drawing status.
      - 38.10.4.7 File Name – City file naming standard.
    - 38.10.5 PDF and AutoCAD Drawing Names as follows:
      - 38.10.5.1 Facility Name.
      - 38.10.5.2 Year.
      - 38.10.5.3 Drawing Number.
      - 38.10.5.4 Pdf or Dwg.
    - 38.10.6 When submitting as-built drawings, submit the following together in one package:
      - 38.10.6.1 Colour scan in pdf format of site marked-up drawings on compact disc.
      - 38.10.6.2 As-built drawings in both CAD and pdf formats on compact disc. CAD file and pdfs shall be prepared with font, line weights etc. conforming to the consultant's drawing standard.
  - 38.11 An incomplete submission will be considered as not received and will not be reviewed.
  - 38.12 The electrical contractor acknowledges that the Owner or Consultant shall withhold funds from his contract not exceeding the cost of producing "As Built" drawings by a third party if the above is not strictly adhered to.

#### 39 **Workplace Safety**

- 39.1 Perform all work in accordance with CSA Standard Z462-21, "Workplace Electrical Safety" and the Ontario Electrical Safety Code, 28<sup>th</sup> edition.

#### 40 **Cash Allowances**

- 40.1 Cash allowances shall be included in the base bid contract. Should any draws against cash allowances not be required, the amounts of the cash allowances shall be deducted from the contract value.
- 40.2 Draws against cash allowances shall not be subject to additional charges for overhead and profit in accordance with City of Toronto policies.
- 40.3 Any and all cash allowances pertaining to electrical work shall be carried by the electrical contractor.

- 40.4 Any draws against the cash allowances shall be backed up with invoices from the respective third parties, sub-contractors, suppliers etc.
- 40.5 All cash allowances pertaining to electrical work shall be included in the tender price schedule front end documents.
- 40.6 (Reserved).
- 41 **Separate Prices**
- 41.1 Provide separate prices for work described below. Separate prices shall not be included in the base contract. Should any of the work for which a separate price has been requested proceed, the contractor will be given an instruction to proceed accordingly and will be paid an extra amount equal to the separate price stipulated.
- 41.2 It will be established either at the onset or during the progress of construction whether any work for which a separate price has been assigned is to be included in the scope of work. Confirm with the Consultant and/or Project Supervisor whether the work is to proceed.
- 41.3 (Reserved).

**- END OF SECTION 26 01 00 -**

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## 1 PART 1 - GENERAL

### 1.1 Product Data

1.1.1 Conform to the General Requirements in Section 26 01 00.

### 1.2 Scope

1.2.1 Electrical contractor shall provide all power wiring in conduit unless noted otherwise.

## 2 PART 2 - PRODUCTS

### 2.1 Materials

#### 2.1.1 Normal Distribution Voltage Wiring (600V & Lower):

2.1.1.1 All feeders shall be RW-90 cross-linked polyethylene copper conductors in EMT conduit unless otherwise noted on drawings.

2.1.1.2 Main secondary (underground) feeders shall be RWU-90 cross-linked polyethylene copper conductors in concrete-encased ductbank.

2.1.1.1 Armoured cables: Corflex or Teck are allowed to be used where stated on the drawings.

2.1.1.2 All branch circuits shall be RW90 or T90 copper, minimum #12AWG. All shall be installed in EMT conduit or as otherwise indicated on drawings.

2.1.1.3 BX or armoured cable size #14 and #12AWG copper for concealed wiring.

#### 2.1.2 Control Wiring:

2.1.2.1 Thermostats or other low voltage devices shall be wired with #18 LVT in plastic jacket.

2.1.2.2 120V control circuits use #14 TWH or R90 in EMT conduit.

#### 2.1.3 Heavy Duty Service Cords

2.1.3.1 Type SOW.

2.1.3.1.1 Outdoor cords rated at 90°C to -34°C (CSA rating), for use in wet or dry locations.

2.1.3.1.2 Copper conductors with rubber insulation, twisted with fillers and an oil resistant, flame retardant jacket, FT1 rated.

2.1.3.1.3 Conductors colour coded black, white, green, red.

2.1.3.1.4 To CSA C22.2 No. 49-M.

## 3 PART 3 - EXECUTION

### 3.1 Installation

#### 3.2 Armoured Cables:

3.3 Do not directly bury armoured cables in or below concrete slabs or walls.

3.4 Where several armoured cables are routed together they shall be supported on trays or conduits, ladders, channels or inserts.

3.5 Single armoured cables of a 3 or 4 wire circuit shall be run with uniform spacing not less than one cable diameter throughout the feeder length for free air rating.

3.6 Use isolation type cable clamps to ensure proper and uniform cable spacing.

3.7 Where cables are installed on walls, provide mechanical protection over them up to 2400 mm above finished floor, using a 12 gauge U-section steel cover.

- 
- 3.8 Cable connections to all enclosures, boxes and panels shall be by means of a water tight malleable aluminum connector.
  - 3.9 Megger all cables after installation and before energization.
  - 3.10 Caution - Do not encircle single conductor cable with ferrous metal.

**3.11 Low Voltage Armoured Cables (BX):**

- 3.12 These cables must be run concealed and be used only for the following purposes:
- 3.13 Final connection from a ceiling outlet box to a lighting fixture.
- 3.14 Final connection from a ceiling outlet box to a utility pole.
- 3.15 Drop from a ceiling outlet box to a partition outlet.
- 3.16 Use throat connectors and anti-short sleeves at all dressed ends.
- 3.17 2/C #12 AWG plus ground may be used for final connection to suspended fixtures.

**3.18 Wiring in Conduit:**

- 3.19 Minimum wire size shall be as previously mentioned, unless otherwise stated.
- 3.20 Maximum voltage drop between the furthest outlet of a fully loaded circuit and the panel to which it is connected shall not exceed 2%.
- 3.21 Provide pigtails at all outlets for fixtures and wiring devices. All neutrals and branch circuits shall be connected in each outlet box to avoid a break in the neutral or circuit wire when fixture or wiring device is disconnected.
- 3.22 Feeder cable connections shall be made with solderless type lugs having sufficient contact areas and large enough screw to apply proper pressure for the feeder cables used.
- 3.23 All wiring shall be identified.

- END OF SECTION 26 05 19 -

## 1 **PART 1 - GENERAL**

### 1.1 **Scope**

- 1.1.1 Provide grounding of all new electrical equipment installed under the scope of work.

### 1.2 **Standards**

- 1.2.1 Provide all system grounding and bonding in accordance with the requirements of the 2024 Ontario Electrical Safety Code and IEEE report #953 (Grounding of Industrial Power).

## 2 **PART 2 - PRODUCTS**

### 2.1 **Equipment**

- 2.1.1 Clamps for grounding of conductor, size as required to electrically conductive underground water pipe.
- 2.1.2 Copper conductor minimum 6 m long for each concrete encased electrode, bare, stranded, soft annealed.
- 2.1.3 Rod electrodes, copper clad steel 19 mm diameter by 3 m long.
- 2.1.4 System and circuit, equipment, grounding conductors, bare stranded copper, soft annealed.
- 2.1.5 Insulated grounding conductors: green, type RW90.
- 2.1.6 Ground bus: copper complete with insulated supports, fastenings, connectors.
- 2.1.7 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:
  - 2.1.7.1 Grounding and bonding bushings.
  - 2.1.7.2 Protective type clamps.
  - 2.1.7.3 Bolted type conductor connectors.
  - 2.1.7.4 Thermite welded type conductor connectors.
  - 2.1.7.5 Bonding jumpers, straps.
  - 2.1.7.6 Pressure wire connectors.

## 3 **PART 3 - EXECUTION**

### 3.1 **Installation - General**

- 3.1.1 Install complete permanent, continuous, system and circuit, equipment, grounding systems including, electrodes (if required), conductors, connectors, accessories, as indicated, to conform to requirements of Electrical Safety Authority over installation. Where EMT is used, run ground wire in conduit.
- 3.1.2 Install connectors in accordance with manufacturer's instructions.
- 3.1.3 Protect exposed grounding conductors from mechanical injury.
- 3.1.4 Make buried connections, and connections to substation electrodes and ground bus, using copper welding by thermite process.
- 3.1.5 Use mechanical connectors for grounding connections to equipment provided with lugs and to existing ground bus.
- 3.1.6 Soldered joints not permitted.
- 3.1.7 Install bonding wire for flexible conduit, connected at both ends to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly cleat bonding wire to exterior of flexible conduit.

- 3.1.8 Install flexible ground straps for bus duct enclosure joints, where such bonding is not inherently provided with equipment.
- 3.1.9 Provide bonding of new metallic gas service piping inside building to the electrical service ground in accordance with the OESC and applicable bulletins. Install clamp on metal gas piping (downstream of gas meter) and provide a #6 AWG copper conductor from clamp to building service ground.

### 3.2 **Equipment Grounding**

- 3.2.1 Install grounding connections to typical equipment included in, but not necessarily limited to service equipment, transformers, switchgear, duct systems, building steel work.

### 3.3 **Field Quality Control**

- 3.3.1 Perform tests in accordance with Section 26 01 00 – Electrical General Requirements.
- 3.3.2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of local authority having jurisdiction over installation.
- 3.3.3 Perform tests before energizing electrical system.
- 3.3.4 Disconnect ground fault indicator during tests.

**- END OF SECTION 26 05 26 -**

**1 PART 1 - GENERAL**

- 1.1 Conform to the General Requirements of Section 26 01 00.

**2 PART 2 - PRODUCTS**

**2.1 Materials**

- 2.1.1 Expandable inserts to secure equipment to hollow masonry.
- 2.1.2 Twist clip fasteners to secure surface mounted equipment to inverted T-bar ceilings. Ensure that the T-bars are adequately supported to carry weight of equipment specified before installation of same.
- 2.1.3 Support channel, length as required, U-shaped, No. 12 gauge Unistrut, Series P-1000 for surface or suspended applications.

**3 PART 3 - EXECUTION**

**3.1 Installation**

- 3.1.1 Secure equipment to masonry, tile and plaster surfaces with lead anchors or nylon shields.
- 3.1.2 Secure equipment to poured concrete with expandable inserts.
- 3.1.3 Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.
- 3.1.4 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.
- 3.1.5 Fasten exposed conduit or cables to building structure or support system using straps.
  - 3.1.5.1 One-hole steel straps to secure surface conduits and cables 50 mm and smaller.
  - 3.1.5.2 Two-hole steel straps for conduits and cables larger than 50 mm.
  - 3.1.5.3 Beam clamps to secure conduit to exposed steel work.
- 3.1.6 Suspended support systems.
  - 3.1.6.1 Support individual cable or conduit runs with 13 mm diameter threaded rods and spring clips.
- 3.1.7 For surface mounting of two or more conduits use channels at 1.5 m oc spacing.
- 3.1.8 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.
- 3.1.9 Do not use wire lashing or perforated strap to support or secure raceways or cables.
- 3.1.10 Do not use supports or equipment installed other trades for conduit or cable support except with permission of other trade.
- 3.1.11 Provide adequate support for raceways and cables dropped vertically to equipment where there is no wall support.
- 3.1.12 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

**- END OF SECTION 26 05 29 -**

**1 PART 1 - GENERAL**

**1.1 Location of Conduit**

- 1.1.1 Drawings do not indicate all conduit runs. Those indicated are in diagrammatic form only.

**2 PART 2 - PRODUCTS**

**2.1 Conduits**

- 2.1.1 Electrical Metallic Tubing (EMT).  
2.1.2 Rigid Aluminum Conduit.

**2.2 Conduit Fastenings**

- 2.2.1 One hole steel straps to secure surface conduits 2" and smaller. Two hole steel straps for conduits larger than 2". Beam clamps to secure conduits to exposed steel work.  
2.2.2 Channel type supports for two or more conduits at 1.5 m o.c.  
2.2.3 1/2" diameter threaded rods to support suspended channels.

**2.3 Conduit Fittings**

- 2.3.1 Fittings: Manufactured for use with conduit specified. Coating: same as conduit.  
2.3.2 Factory "ells" where 90° bends are required for 1" and larger conduits.

**3 PART 3 - EXECUTION**

**3.1 Installation**

- 3.1.1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.  
3.1.2 Use EMT except where specified otherwise.  
3.1.3 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.  
3.1.4 Mechanically bend steel conduit over 3/4" diameter.  
3.1.5 Where conduits become blocked, remove and replace blocked section. Do not use liquids to clean out conduits.  
3.1.6 Dry conduits out before installing wire.  
3.1.7 For exterior applications, use rigid aluminum conduit, threaded with waterproof fittings.

**3.2 Surface Conduits**

- 3.2.1 Run parallel or perpendicular to building lines. Group conduits wherever possible on channels. Do not pass conduits through structural members except as indicated. Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

**- END OF SECTION 26 05 33.13 -**



## **1. Part I - General**

### **1.1 General Requirements**

- 1.1.1. Conform to the General Conditions and Requirements of Division 1.
- 1.1.2. Conform to the General Requirements of Section 26 01 00.

## **2. Part II - Products**

### **2.1 Materials**

- 2.1.1 Splitter Boxes and Troughs:
  - 2.1.1.1 Sheet metal splitters with welded corners and formed hinged cover suitable for locking in closed position.
  - 2.1.1.2 At least three spare terminals on each set of lugs in splitters less than 400 Amps.
  - 2.1.1.3 Only main junction and pull boxes are indicated on the drawings. Provide pull boxes so as not to exceed 30M of conduit run between boxes.
- 2.1.2 Cabinets:
  - 2.1.2.1 CSA Type I enclosure for all devices unless otherwise indicated.
- 2.1.3 Outlet Boxes:
  - 2.1.3.1 Steel Outlet boxes:
    - 2.1.3.1.1 Electro-galvanized steel single and multi gang flush device boxes for flush installation, minimum size 75x50x38mm unless otherwise indicated. 100mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.
    - 2.1.3.1.2 100mm square or octagonal boxes for lighting fixture outlets.
    - 2.1.3.1.3 100mm square outlet boxes with extension & plaster rings for flush mounting devices in finished walls.
    - 2.1.3.1.4 Weatherproof c/w gaskets for outdoor applications.
  - 2.1.3.2 Masonry Boxes:
    - 2.1.3.2.1 Electro-galvanized steel single & multi gang boxes for device flush-mounted in exposed block wall.
- 2.1.4 Pull and Junction Boxes:
  - 2.1.4.1 Steel, finish in gray enamel, size to accommodate conduits and cabling or as shown on drawings.

## **3. Part III – Execution**

### **3.1 Installation**

- 3.1.1 Install splitters where indicated and mount plumb, true and square to the building lines. Mount splitter trough on 20mm grey painted plywood.
- 3.1.2 Install pull boxes in inconspicuous but accessible locations.
- 3.1.3 Pull boxes shall be provided so that there will be no more than the equivalent of 2-90 deg. bends in any conduit run, so that straight runs do not exceed 30M between pull boxes.
- 3.1.4 Mount cabinets with top not greater than 1980 mm above finished floor.
- 3.1.5 Support boxes independently of connecting conduits.
- 3.1.6 Fill boxes with paper or foam to prevent the entry of construction material.
- 3.1.7 For flush installation mount outlets flush with finished wall using plaster rings to permit wall finish to come within 70mm of opening.

- 3.1.8 Provide correct size of openings in boxes for conduit, to armoured cable connection, reducing washers not allowed.
- 3.1.9 Colour code interior of all outlet and pull boxes to distinguish between systems and voltages.
- 3.1.10 Boxes installed in exterior walls shall be wrapped in 6 mil. poly taped at conduit joints and folded into the box. Poly to extend 300mm all around the box when forms are stripped. This material is to be used to ensure continuity of the vapour barrier.

**-END OF SECTION 26 05 33.16 -**

**1 PART 1 - GENERAL**

- 1.1 Conform to the General Requirements of Section 26 01 00.

**2 PART 2 - PRODUCTS**

**2.1 Materials**

**2.1.1 Cable Connectors:**

2.1.1.1 For armoured cables, use aluminium connectors with open compounded head.

2.1.1.2 For armoured BX cables, use connectors and locknuts.

**2.1.2 Building Wire Connectors:**

2.1.2.1 For wire sizes #12 to #6 AWG rated for 105 deg. C. or less - Ideal "Super Nut" or approved equal.

2.1.2.2 For wire sizes #4 AWG and larger:

2.1.2.2.1 End to end splices - Burndy YS

2.1.2.2.2 Parallel splices - Burndy UC

2.1.2.2.3 At studs and bars - Burndy QQA(CU/AL)

2.1.2.2.4 Two to three conductors in parallel - Burndy Q2A or Q3Q(CU/AL).

**3 PART 3 - EXECUTION**

**3.1 Installation**

**3.1.1 Connectors:**

3.1.1.1 Before installation of the connectors, clean the contact surfaces.

3.1.1.2 Use Burndy PENETROX compound or equivalent for all copper/aluminium stud and bus connections.

**3.1.2 Insulation Tapes:**

3.1.2.1 Apply minimum of three (3) half-wrapped layers of tape. Pad all connectors with irregular surfaces with additional layers of tape prior to the application of the final three half-lapped layers.

**- END OF SECTION 26 05 83 -**

**1 PART 1 - GENERAL**

**1.1 General Requirements**

- 1.1.1 Conform to the General Requirements in Section 26 01 00.

**2 PART 2 - PRODUCTS**

**2.1 Materials**

**2.1.1 General Purpose Switches:**

- 2.1.1.1 Hard use specification grade for all switches. White.

**2.1.2 General Purpose Receptacles:**

- 2.1.2.1 Hard use specification grade 15 or 20 amps 120 volt, U-ground type for side or backwiring, nylon face. White.

**2.1.3 Wall Plates:**

- 2.1.3.1 Service areas - galvanized steel.

- 2.1.3.2 Finished areas – stainless steel.

- 2.1.3.3 Exterior –ground fault type complete with weatherproof when-in-use, heavy-duty cover.

**3 PART 3 - EXECUTION**

**3.1 Installation**

**3.1.1 Switches:**

- 3.1.1.1 Mount switches in groups behind common plates at a height of 1016 mm A.F.F. on centre (unless noted otherwise) at latch side of doors. Check door swings in each case prior to rough-in.

**3.1.2 Receptacles:**

- 3.1.2.1 Mount receptacles vertically 450 mm A.F.F. on centre (unless noted otherwise) and 150 mm on centre (unless noted otherwise) above counter tops or vanities.

**- END OF SECTION 26 27 26 -**

## TABLE OF CONTENTS

### **DIVISION 27 - COMMUNICATIONS**

<b>SECTION</b>	<b>DESCRIPTION</b>	<b>PAGES</b>
27 15 00	Data Communications System	2
27 30 00	Voice Communications System	2

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## 1 **PART 1 - GENERAL**

### 1.1 **General Requirements**

1.1.1 Conform to the General Requirements in Section 26 01 00.

### 1.2 **Scope**

- 1.2.1 Provide distribution raceways, sleeves, empty conduits, metal raceways, outlets and grounding for a complete data network distribution system.
- 1.2.2 Data system cabling shall be by the City of Toronto and/or Toronto Paramedic Services vendor of record for data communications systems.
- 1.2.3 The cost of the services by the vendor of record shall be carried by the general contractor.

### 1.3 **Vendor of Record**

- 1.3.1 The current vendor of record for data cabling for the facility is Bell Canada. Contact Roger Vachon, phone 905-540-7442, email [roger.vacon@bell.ca](mailto:roger.vacon@bell.ca).
- 1.3.2 The general contractor shall be responsible for coordinating the work of the vendor of record and shall provide supervision and coordination of all aspects of the work with respect to data cabling.

## 2 **PART 2 - PRODUCTS**

### 2.1 **Conduits**

- 2.1.1 Electrical Metallic Tubing (EMT).
- 2.1.2 Horizontal and vertical conduits shall be EMT or size noted on drawings. Exterior raceways shall be rigid aluminium conduit, gasketed and sealed to prevent ingress of water.

### 2.2 **Conduit Fastenings**

- 2.2.1 One hole steel straps to secure surface conduits 2" and smaller. Two hole steel straps for conduits larger than 2". Beam clamps to secure conduits to exposed steel work.
- 2.2.2 Channel type supports for two or more conduits at 1.5 m o.c.
- 2.2.3 1/2" diameter threaded rods to support suspended channels.

### 2.3 **Conduit Fittings**

- 2.3.1 Fittings: Manufactured for use with conduit specified. Coating: same as conduit.
- 2.3.2 Factory "ells" where 90° bends are required for 1" and larger conduits.

### 2.4 **Outlets**

- 2.4.1 All outlets shall be a minimum 100 mm square with suitable plaster ring where required.

### 2.5 **One Piece Surface Steel Raceway**

- 2.5.1 Surface metal raceway shall be Wiremold Series V700, 2000 or 2400 unless shown otherwise on the drawings.
- 2.5.2 Raceway and all fittings and boxes shall be finished in a white polyester topcoat suitable for field painting.
- 2.5.3 Fittings shall include clips and straps, couplings, elbows, tees, entrance fittings, conduit connectors and bushings. Provide device boxes as required for data outlets and other associated devices.

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**2.6 Cabling**

- 2.6.1 Data cabling shall be provided by the City of Toronto and/or Toronto Paramedic Services vendor of record for voice and data communication cabling.

**3 PART 3 - EXECUTION**

**3.1 Installation**

- 3.1.1 Be responsible for coordinating and expediting the work of the data network system.
- 3.1.2 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
- 3.1.3 Use EMT except where specified otherwise.
- 3.1.4 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- 3.1.5 Conduits shall have not more than two 90 deg. or equivalent bends in each run. Bending radius shall be at least ten (10) times the trade diameter of the conduit.
- 3.1.6 Additional accessible steel pull boxes shall be installed where necessary to reduce the number of bends per run.
- 3.1.7 Raceway shall be securely supported at intervals not exceeding 10 feet (3.05 meters) or in accordance with manufacturer's recommendations.
- 3.1.8 Mechanically bend steel conduit over 3/4" diameter.
- 3.1.9 Where conduits become blocked, remove and replace blocked section. Do not use liquids to clean out conduits.
- 3.1.10 Dry conduits out before installing cable.
- 3.1.11 Additional accessible steel pull boxes shall be installed where necessary to reduce the number of bends per run.
- 3.1.12 Install nylon pull wire in empty conduits.
- 3.1.13 The electrical contractor shall comply with the conduit requirements of the City of Toronto.
- 3.1.14 The electrical contractor and vendor of record shall comply with the latest Structured Cabling Systems Design Guide for the City of Toronto. Refer to Appendix A.
- 3.1.15 Use Wiremold raceway for any new exposed surface mounted runs of cabling at the Reception Area.

**3.2 Surface Conduits**

- 3.2.1 Run parallel or perpendicular to building lines. Group conduits wherever possible on channels. Do not pass conduits through structural members except as indicated. Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

**3.3 Finishing**

- 3.3.1 All interior exposed raceways and boxes shall be painted with a rust-inhibitive primer coat and finished with two coats of white enamel paint (Tremco or equal).

- END OF SECTION 27 15 00 -

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## 1 **PART 1 - GENERAL**

### 1.1 **General Requirements**

1.1.1 Conform to the General Requirements in Section 26 01 00.

### 1.2 **Scope**

- 1.2.1 Provide distribution raceways, sleeves, empty conduits, metal raceways, outlets and grounding for a complete voice communication system.
- 1.2.2 Voice communications cabling shall be by the City of Toronto and/or Toronto Paramedic Services vendor of record for voice communications systems.
- 1.2.3 The cost of the services by the vendor of record shall be carried by the electrical contractor.

### 1.3 **Vendor of Record**

- 1.3.1 The current vendor of record for voice communications cabling for the facility is Bell Canada. Contact Roger Vachon, phone 905-540-7442, email [roger.vacon@bell.ca](mailto:roger.vacon@bell.ca).
- 1.3.2 The general contractor shall be responsible for coordinating the work of the vendor of record and shall provide supervision and coordination of all aspects of the work with respect to voice communications cabling.

## 2 **PART 2 - PRODUCTS**

### 2.1 **Conduits**

- 2.1.1 Electrical Metallic Tubing (EMT).
- 2.1.2 Horizontal and vertical conduits shall be EMT or size noted on drawings. Exterior raceways shall be rigid aluminium conduit, gasketted and sealed to prevent ingress of water.

### 2.2 **Conduit Fastenings**

- 2.2.1 One hole steel straps to secure surface conduits 2" and smaller. Two hole steel straps for conduits larger than 2". Beam clamps to secure conduits to exposed steel work.
- 2.2.2 Channel type supports for two or more conduits at 1.5 m o.c.
- 2.2.3 1/2" diameter threaded rods to support suspended channels.

### 2.3 **Conduit Fittings**

- 2.3.1 Fittings: Manufactured for use with conduit specified. Coating: same as conduit.
- 2.3.2 Factory "ells" where 90° bends are required for 1" and larger conduits.

### 2.4 **Outlets**

- 2.4.1 All outlets shall be a minimum 100 mm square with suitable plaster ring.

### 2.5 **One Piece Surface Steel Raceway**

- 2.5.1 Surface metal raceway shall be Wiremold Series V700, 2000 or 2400 unless shown otherwise on the drawings.
- 2.5.2 Raceway and all fittings and boxes shall be finished in a white polyester topcoat suitable for field painting.
- 2.5.3 Fittings shall include clips and straps, couplings, elbows, tees, entrance fittings, conduit connectors and bushings. Provide device boxes as required for data outlets and other associated devices.



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2.6 **Cabling**

- 2.6.1 Cabling shall be provided by the City of Toronto and/or Toronto Paramedic Services vendor of record for voice and data cabling.

3 **PART 3 - EXECUTION**

3.1 **Installation**

- 3.1.1 Be responsible for coordinating and expediting the work of the voice communications system.
- 3.1.2 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
- 3.1.3 Use EMT except where specified otherwise.
- 3.1.4 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- 3.1.5 Conduits shall have not more than two 90 deg. or equivalent bends in each run. Bending radius shall be at least ten (10) times the trade diameter of the conduit.
- 3.1.6 Additional accessible steel pull boxes shall be installed where necessary to reduce the number of bends per run.
- 3.1.7 Raceway shall be securely supported at intervals not exceeding 10 feet (3.05 meters) or in accordance with manufacturer's recommendations.
- 3.1.8 Mechanically bend steel conduit over 3/4" diameter.
- 3.1.9 Where conduits become blocked, remove and replace blocked section. Do not use liquids to clean out conduits.
- 3.1.10 Dry conduits out before installing cable.
- 3.1.11 Additional accessible steel pull boxes shall be installed where necessary to reduce the number of bends per run.
- 3.1.12 Install nylon pull wire in empty conduits.
- 3.1.13 The electrical contractor shall comply with the conduit requirements of the City of Toronto.
- 3.1.14 The electrical contractor and vendor of record shall comply with the latest Structured Cabling Systems Design Guide for the City of Toronto. Refer to Appendix A.
- 3.1.15 Use Wiremold raceway for any new exposed surface mounted runs of cabling at the Reception Area.

3.2 **Surface Conduits**

- 3.2.1 Run parallel or perpendicular to building lines. Group conduits wherever possible on channels. Do not pass conduits through structural members except as indicated. Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

3.3 **Finishing**

- 3.3.1 All interior exposed raceways and boxes shall be painted with a rust-inhibitive primer coat and finished with two coats of white enamel paint (Tremco or equal).

- **END OF SECTION 27 30 00** -

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### **DIVISION 28 – ELECTRONIC SAFETY AND SECURITY**

<b>SECTION</b>	<b>DESCRIPTION</b>	<b>PAGES</b>
28 10 00	Turnstile Access Control System	9
28 31 00	Fire Alarm System Work	3

## 1 **PART 1 - GENERAL**

### 1.1 **General Requirements**

- 1.1.1 Conform to the General Requirements in Section 26 01 00.
- 1.1.2 This division shall be responsible for the supply and installation of all material and labour described herewith for the subject system.

### 1.2 **Quality Assurance**

- 1.2.1 Conform to the latest standards of C.S.A., C.E.C., U.L.C., provincial codes, ordinances and all other authorities having jurisdiction.
- 1.2.2 Installation in accordance with the latest applicable Ontario Electrical Safety Code (OESC).

### 1.3 **Submittals**

- 1.3.1 Submit shop drawings of all new devices and associated cabling. Provide system wiring diagram showing each device and wiring connection required.
- 1.3.2 Provide name, address and telephone number of the service representative of the manufacturer to be contacted during the warranty period.
- 1.3.3 Provide a copy of the approved shop drawings in the Operation and Maintenance manuals.

### 1.4 **Scope**

- 1.4.1 Provide new devices and cabling where required and to ensure continuity of the existing access control system.
- 1.4.2 The contractor noted throughout this specification includes the electrical contractor and the security sub-contractor.
- 1.4.3 The contractor shall furnish, install and place in operating condition all equipment, accessories, cabling and material necessary for a fully operational access control system for the new turnstiles.
- 1.4.4 Contractor shall be responsible for applying for any permits required and for arranging testing and inspection by the City of Toronto.
- 1.4.5 City refers to City of Toronto.

### 1.5 **Qualifications**

- 1.5.1 The installer/security sub-contractor shall be a third party that is an authorized installer of the specified manufacturer's equipment and approved by the City of Toronto. Services of the third party shall be carried in the electrical contractor's bid.

### 1.6 **Relevant Documents**

- 1.6.1 The installation shall be in complete accordance with the latest revision of "City of Toronto Corporate Security Access Control System Installation and System Requirements". Refer to Appendix B of the specifications.
- 1.6.2 Provide and install cabling in conformance with the latest City of Toronto Structured Cabling Design Guide. Refer to Appendix A of the specifications.
- 1.6.3 The programming of the system shall be in accordance with the latest City of Toronto Corporate Security "C-Cure 9000 Programming Standards." This document will be available to the successful bidder at the City's discretion.

## **1.7 Performance Requirements**

- 1.7.1 The security sub-contractor will be required to supply and install a fully functional integrated access control system for the new turnstiles.
- 1.7.2 The contractor shall be responsible for a complete functioning system. This work may include design, procurement, installation, programming, integration, testing and commissioning.
- 1.7.3 The contractor shall supply and install all required cabling, connectors, hardware, software, hardware and software updates, hardware and software upgrades and licenses to allow for the required functionality under this specification.
- 1.7.4 The Turnstile Access Control System (TACS) shall be based on the Software House manufactured C-Cure 9000 system. Alternative architectures and solutions are not acceptable.
- 1.7.5 The products and performance levels specified are those that have been standardized by the City of Toronto and are intended as mandatory performance levels for the system. Alternative architectures and solutions are not acceptable.
- 1.7.6 The contractor shall review the current site conditions and existing system configurations prior to submitting a bid.
- 1.7.7 The contractor shall provide at all times sufficient competent labor, materials, and equipment to properly carry on construction work and insure completion of each part in accordance with the work schedule and within the contract time period.
- 1.7.8 Provide necessary labour and material to comply with manufacturer's requirements and applicable standards and codes for grounding of devices supplied through this contract.
- 1.7.9 Equipment shall be installed as per manufacturer recommendations or as otherwise noted in this specification and drawings.
- 1.7.10 The contractor shall secure and be responsible for the safe keeping and protection of the system equipment until the system is fully accepted by the City after the commissioning process.
- 1.7.11 The contractor shall coordinate all work with applicable trade contractors on site.
- 1.7.12 The contractor shall coordinate all work regarding network with City of Toronto IT Services and Corporate Security groups.
- 1.7.13 Equipment and material provided for this contract shall be CSA/ULC certified. Where there is no existing rating to equipment specified, the contractor shall obtain special prior written approvals from the Electrical Safety Authority.
- 1.7.14 The contractor shall warrant the completed TACS including all equipment/hardware, software and documentation. Maintain the TACS in compliance with manufacturer specified preventative maintenance schedule during the project installation period.
- 1.7.15 All system testing shall follow the City testing, commissioning and acceptance processes.

## **1.8 Operational Systems**

- 1.8.1 Locations where the proposed system interferes with or overlaps existing card readers, the contractor shall be required to maintain the exiting functionality and not disrupt, disconnect, or impact the other connected readers.
- 1.8.2 Work shall be executed to minimize the impact or the disruption of the existing, operational, systems and terminal operations. At any time during the performance of the work, if the existing operational systems are affected or if there is an imminent danger to be affected beyond the approved expectation, the contractor shall stop work and minimize the impact on the operational systems. The contractor shall immediately inform the owner or owner's representative. On the owner's request, the contractor shall

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perform all work to implement a temporary solution to enable the functionality for the operational systems. The contractor is to proceed with permanent work only after a solution is approved by the City.

- 1.8.3 Failure to fully comply with the above paragraph will make the contractor directly responsible for all damages and all costs required to respond to the incident and to remedy the failure.

**1.9 System Description**

- 1.9.1 The Turnstile Access Control System (TACS) shall consist of readers, control panel, power supplies, monitoring devices, hardware, software, cabling etc. as required to provide a fully automated system to control authorized traffic in and out of controlled areas of the facility served by the new turnstiles.
- 1.9.2 The contractor shall connect all turnstiles and devices to a new Software House iStar Ultra panel located at the reception area as shown on drawings.
- 1.9.3 Connectivity from the new access control panel to the system front end will be based on Ethernet IP based protocols over a City of Toronto supplied network.
- 1.9.4 The conduit/cable path installation from the turnstiles to the access control panel shall be consistent with the specification drawings and all norms and regulations applicable. In the event the proposed pathway becomes infeasible, the contractor shall source an alternative route and propose to the owner or owner's representative for approval. Alternative routing of pathways shall not incur any additional costs to the project.
- 1.9.5 The contractor shall provide detailed wiring diagrams to City of Toronto standards to the owner or owner's representative. It is the responsibility of the contractor to finalize the wiring diagrams to meet any site specific conditions and provide a fully functional system. The contractor shall submit the finalized drawings for approval to the owner or owner's representative in raw editable format.
- 1.9.6 The TACS shall be comprised of the devices specified on the electrical drawings.
- 1.9.7 The contractor shall be expected to provide an integrated C-Cure 9000 access control system that is a scalable enterprise solution. This system shall be a complete solution that is scalable from the existing scope of this project to future turnstiles which can be added on a unit-by-unit basis. This future expansion capacity shall not require significant replacement or upgrading of equipment provided as part of the initial solution.
- 1.9.8 The TACS shall provide continuous unattended access control and alarm monitoring at required locations while meeting the technical, operational and feature requirements of the specification.
- 1.9.9 Under no circumstances shall a false acceptance be allowed.
- 1.9.10 TACS equipment shall be wall mounted as per specification, drawings and manufacturer's specifications. In the event the proposed layout becomes physically or technically infeasible the contractor shall propose an alternative layout to the owner or owner's representative and architect for approval. Alternate equipment layout, cabling, and conduit shall not incur any additional costs to the project.

**1.10 Security Network**

- 1.10.1 The Contractor shall connect turnstile access control equipment to communication and electrical rooms containing City of Toronto network devices and connect to associated network patch panels as required.
- 1.10.2 The TACS shall be configured to communicate with full functionality via the City of Toronto local and/or wide area networks.
- 1.10.3 The contractor shall coordinate and facilitate all network connections with the City of Toronto IT department as required.

**1.11 City of Toronto Network**

- 1.11.1 This Contractor shall ensure all IP addressing schemes used on the security network are coordinated and approved by the City of Toronto IT department.

**1.12 Monitoring and Control Locations**

- 1.12.1 Supply and install all necessary C-Cure client licenses for City of Toronto console workstations as required.

**1.13 Power Requirements**

- 1.13.1 120 VAC power (on UPS/generator back-up if available) shall be provided for the turnstile access control system at each location required. This includes all modifications to existing systems required to accomplish this task.
- 1.13.2 The power solution shall comprise of CSA listed power supplies and transformers to distribute low voltage power to system components.
- 1.13.3 The power solution shall include lockable, hinged covered, terminal cabinets for all power supplies, transformers, and power distribution terminal strips. The Contractor shall provide all conduit and wiring from the 120 VAC facilities to the terminal cabinets.
- 1.13.4 The power solution shall provide protection against surges, spikes, noise, and other line problems for all system equipment and their components. In addition to generator and/or UPS support, all power sources shall be equipped with uninterrupted power supply capable of supporting all attached equipment for a period of 20 minutes.
- 1.13.5 All equipment and system components which are powered by more than 48 volts AC or DC shall be ULC listed for safety. This includes equipment or system components classified as non-power limited.
- 1.13.6 All system power supplies shall be monitored by the TACS for line failure on a dedicated monitoring input point. Therefore, when an AC line fails, a unique alarm condition will be caused.

**1.14 System Operability**

- 1.14.1 The TACS shall be complete and capable of operation upon City of Toronto acceptance of the system. The contractor shall be responsible for preparing all systems for user operation.
- 1.14.2 The contractor shall be responsible to load the entire site specific database into the building security system up to the inaugural day of City of Toronto controlled use. The City of Toronto will assist in establishing procedural guidelines, terminology, and conditions unique to the City's facility and facility needs.
- 1.14.3 The contractor shall ensure all controls and devices are labelled, in a manner that is self-explanatory, to agree with their proper function and in accordance with provided labeling/naming conventions.
- 1.14.4 The contractor shall ensure card readers and other devices normally operated by end users shall remain covered until commissioned, to prevent attempted usage of a partially completed installation.

**2 PART 2 - PRODUCTS**

**2.1 Manufacturers**

- 2.1.1 The access control system panel shall be as manufactured and supported by Software House. There is no acceptable equivalent.

## **2.2 Approved Security System Vendors**

- 2.2.1 The system installer/programmer (security sub-contractor) shall be insured and bonded to work in Canada and shall be C-Cure Software House certified.
- 2.2.2 The system installer/programmer shall be a security vendor pre-approved by the City of Toronto. The approved vendors are listed on the electrical drawings.

## **2.3 Access Control System**

- 2.3.1 The contractor shall be fully responsible for the ultimate design and implementation of the system topology (physical and logical) best suited for the project.
- 2.3.2 The access control system shall be based on the Software House C-Cure 9000 system.

## **2.4 Access Controller**

- 2.4.1 The access controller shall be an iStar Ultra unit manufactured by Tyco Software House.
- 2.4.2 Access controller shall be network-ready, wall mounted and shall support up to 32 card readers.
- 2.4.3 Access controller shall comprise the following:
  - 2.4.3.1 A General Controller Module (GCM) that includes standard 2 GB RAM and 16 GB SD card for memory.
  - 2.4.3.2 Two (2) onboard gigabit network ports.
  - 2.4.3.3 Four (4) Access Control Modules (ACMs).
  - 2.4.3.4 An alphanumeric LCD to provide status and troubleshooting information.
  - 2.4.3.5 A real-time clock and battery.
  - 2.4.3.6 Two (2) onboard gigabit network ports for primary and secondary communications to the host.
- 2.4.4 Each ACM shall support up to eight (8) Wiegand, RM or OSDP card readers as well as 24 supervised inputs and 16 outputs which can be individually wet or dry configured.
- 2.4.5 Database backups and all buffered transactions shall be stored to non-volatile SD card memory.
- 2.4.6 The real-time clock battery shall keep the clock powered during a power failure.
- 2.4.7 The access controller and ACMs shall accommodate the following inputs to the turnstile input/output (I/O) control boards:
  - 2.4.7.1 Good Card Entry.
  - 2.4.7.2 Bad Card Entry.
  - 2.4.7.3 Free Passage Entry.
  - 2.4.7.4 Close Direction Entry.
  - 2.4.7.5 Single Override Entry.
  - 2.4.7.6 Visitor Mode.
  - 2.4.7.7 Good Card Exit.
  - 2.4.7.8 Bad Card Exit.
  - 2.4.7.9 Free Passage Exit.
  - 2.4.7.10 Close Direction Exit.
  - 2.4.7.11 Horizontal Arm Breakaway.
  - 2.4.7.12 Normally Open Mode.
  - 2.4.7.13 Barrier Disable Mode.
  - 2.4.7.14 Emergency Override.
- 2.4.8 The contractor shall confirm the inputs required by the City for the turnstiles and provide control cabling and connections as required.
- 2.4.9 The access controller and ACMs shall accommodate the following outputs from the turnstile input/output (I/O) control boards:

- 2.4.9.1 Authorized Passage Entry.
- 2.4.9.2 Unauthorized Passage Entry.
- 2.4.9.3 Unauthorized Presence Entry.
- 2.4.9.4 Tailgate Passage Entry.
- 2.4.9.5 Authorized Passage Exit.
- 2.4.9.6 Unauthorized Passage Exit.
- 2.4.9.7 Unauthorized Presence Exit.
- 2.4.9.8 Tailgate Passage Exit.
- 2.4.9.9 Blocked Sensor.
- 2.4.9.10 Cross Passage Detection.
- 2.4.9.11 Barrier Held Open.
- 2.4.9.12 Barrier Broken Away.
- 2.4.9.13 Lid Alarm.
- 2.4.10 The contractor shall confirm the outputs required by the City for the turnstiles and provide control cabling and connections as required.
- 2.4.11 Provide grounding conductors between the turnstile I/O control boards and the access control modules as required.
- 2.4.12 Contractor shall coordinate all cabling and cabling connections with the City and the turnstile installer.

## 2.5 **Power Supply**

- 2.5.1 The power supply for the access controller shall be manufactured by Tyco Software House.
- 2.5.2 The power supply shall be wall-mounted, complete with cabinet.
- 2.5.3 Input: 120 VAC.
- 2.5.4 Output: 12/24 VDC.
- 2.5.5 The power supply shall have sufficient output capacity for the access controller and access control modules power requirement. Ensure that there is at least 25% spare power capacity.
- 2.5.6 Security system sub-contractor shall determine the exact power supply required.

## 2.5.7 **Card Readers**

- 2.5.7.1 The card readers shall be HID Signo model 40. There is no acceptable equivalent.
- 2.5.7.2 Able to support HID Prox, iCLASS, MIFARE and multi-technology Prox/iCLASS cards.
- 2.5.7.3 Tamper-resistant, weatherproof.
- 2.5.7.4 Credential compatibility: 2.4 GHz (Bluetooth), 13.56 MHz (NFC) and 125 kHz.
- 2.5.7.5 Communications: Wiegand, Clock-and-Data and RS-485 Half Duplex (OSDP).
- 2.5.7.6 Input: Tri-colour LED, buzzer, hold @ active low.
- 2.5.7.7 Output: Tamper relay 0-60V DC @ 100 mA max (dry contact).
- 2.5.7.8 Card readers shall read the encoded data from the credential and transmit data to the host panel.
- 2.5.7.9 Card reader shall present audio and visual feedback to the user that a card read operation is either valid or invalid.
- 2.5.7.10 Card reader shall have low current consumption and operate at 12 VDC.
- 2.5.7.11 Tamper alarm.
- 2.5.7.12 Operating temperature: -35°C to 66°C. Operating humidity: 0-95% relative humidity, non-condensing.
- 2.5.7.13 cUL listed.
- 2.5.7.14 Lifetime warranty against defects in materials and workmanship.



### **2.5.8 Local Alarms**

- 2.5.8.1 All turnstiles shall have a local audible/visible alarm feature.
- 2.5.8.2 The local alarms shall be implemented by the TACS.
- 2.5.8.3 Local audible/visible alarms shall enunciate from the turnstile at each location.
- 2.5.8.4 Shall be controllable by the City's security desk operator.

### **2.5.9 System Cables**

- 2.5.9.1 All low voltage wiring for devices shall be plenum type with an FT6 rating and shall be concealed wherever possible. Provide conduit or raceway where it's not possible to conceal.
- 2.5.9.2 Where it's impractical to install conduits, cables may be run in free air but must be fastened to the structure at least every ten (10) feet.
- 2.5.9.3 All cabling shall be ULC listed and conform to manufacturer's specifications.
- 2.5.9.4 Splicing of cables is not permitted.
- 2.5.9.5 Card Readers:
  - 2.5.9.5.1 Refer to drawings for cable specifications.
- 2.5.9.6 Turnstile Power (24 VDC):
  - 2.5.9.6.1 Refer to drawings for cable specifications.
- 2.5.9.7 Turnstile Input/Output Signaling:
  - 2.5.9.7.1 Refer to drawings for cable specifications.
- 2.5.9.8 Turnstile TCP/IP Communications:
  - 2.5.9.8.1 Refer to drawings for cable specifications.
- 2.5.9.9 Fire Alarm System Interlock:
  - 2.5.9.9.1 Refer to drawings for cable specifications.

### **2.5.10 Conduits, Boxes and Raceways**

- 2.5.10.1 The contractor shall be responsible for providing all cable, conduits, boxes and raceways as called for in the specification and drawings or deemed necessary to provide a quality and complete installation.
- 2.5.10.2 All electronics modules shall be properly housed in steel enclosures or junction boxes as required.
  - 2.5.10.2.1 The contractor shall be responsible for providing these enclosures or boxes where necessary.
  - 2.5.10.2.2 The contractor shall be responsible for ensuring that all back boxes, conduit and raceways meet equipment and wiring requirements for the system.
  - 2.5.10.2.3 The contractor shall inspect the raceway system during construction and shall notify the City representative of any problems found, prior to the finishing of the wall, ceiling or floor surface.
  - 2.5.10.2.4 All junction boxes are to be accessible.
  - 2.5.10.2.5 Location of all boxes and access panels are to be approved by the City's facility staff.
  - 2.5.10.2.6 No access panels may be located where they will affect the finished appearance of the surrounding area.

### **2.5.11 Operator Workstations**

- 2.5.11.1 Supply and install client application software required for administrative and monitoring functions of the TACS on each workstation as required.
- 2.5.11.2 All workstations shall be provided by the City of Toronto IT department.
- 2.5.11.3 This contractor shall provide and coordinate all workstation quantities, requirements, and specifications to the City of Toronto IT department. Requirements shall be provided a minimum of 60 days prior to installation.

#### **2.5.12 Equipment Cabinets**

2.5.12.1 As required.

#### **2.5.13 Keyboard, Video Display and Mouse**

2.5.13.1 As required.

#### **2.5.14 Information Backup/Retrieval**

2.5.14.1 The existing security system server shall be capable of transferring all programmed data and transactional history to an appropriate archive storage media. All programmed data shall be restorable from the back-up media in case of system hardware failure.

### **3 PART 3 – EXECUTION**

#### **3.1 Installation**

- 3.1.1 Install equipment and cabling to the manufacturer's requirements.
- 3.1.2 Coordinate compatibility of controls, devices and equipment with the turnstile supplier/installer.
- 3.1.3 All cabling shall be installed in conduit unless noted otherwise and shall be concealed.
- 3.1.4 Controller shall be located on secure side of turnstiles in an inconspicuous location as shown on drawings. Provide access panels in drywall ceilings where required.
- 3.1.5 Connect system to emergency building power (UPS) as shown on drawings.
- 3.1.6 Provide programming of the entire system to the satisfaction of the administrator of the facility.
- 3.1.7 Provide system demonstration and training for owner's staff.

#### **3.2 Programming**

- 3.2.1 The contractor shall include all associated costs to program the system and ensure all configuration and naming conventions are approved by the City of Toronto.
- 3.2.2 Contractor shall document all software configuration parameters and submit to City.
- 3.2.3 Include all software configuration parameters in Operations and Maintenance manuals.

#### **3.3 Commissioning**

- 3.3.1 The contractor shall be responsible for the commissioning of the turnstile access control system.
- 3.3.2 Perform commissioning in accordance with the City of Toronto's requirements and in accordance with NFPA 730 "Guide for Premises Security", 2023 edition and NFPA 731 "Standard for the Installation of Premises Security Systems", 2023 edition.

#### **3.4 Training**

- 3.4.1 The contractor shall instruct personnel designated by the owner in the proper use, basic care, and maintenance of the equipment. Such training shall be provided as an integral component of the system.
- 3.4.2 Arrange to have the manufacturer's representative supply a reasonable amount of technical assistance to the administrative staff and maintenance personnel. Provide for a minimum of 10 hours training in bid. Final training schedule shall be approved by the City.
- 3.4.3 Provide literature along with hands-on training during training sessions.

**3.5 Warranty**

- 3.5.1 The contractor shall warrant the equipment to be new and free from defects in material and workmanship, and will, within two (2) years from date of installation, repair or replace any equipment found to be defective. This warranty shall not apply to any equipment which has been subject to misuse, abuse, negligence, accident, or unauthorized modification or to any existing equipment or existing cabling.
- 3.5.2 Provide 24-hour, 7-days a week service as required.
- 3.5.3 The warranty period shall commence on the date of substantial performance.

- **END OF SECTION 28 10 00** -

## 1 **PART 1 - GENERAL**

### 1.1 **General Requirements**

- 1.1.1 Conform to the General Requirements in Section 26 01 00.
- 1.1.2 This division shall be responsible for the supply and installation of all material and labour described herewith for the subject system.

### 1.2 **Quality Assurance**

- 1.2.1 Conform to the latest standards of C.S.A., C.E.C., U.L.C., provincial codes, ordinances and all other authorities having jurisdiction.
- 1.2.2 Installation in accordance with the applicable Electrical Safety Code and the latest CAN/ULC-S524 standard.
- 1.2.3 If any requirement of these specifications are different, omitted or contrary to the ULC-S524, then the ULC code governs and overrides these specifications, but in no instance the standards established by the drawings and specifications are to be reduced by any of the codes referred to above.

### 1.3 **Submittals**

- 1.3.1 Submit shop drawings of all new devices.
- 1.3.2 Provide name, address and telephone number of the service representative of the manufacturer to be contacted during the warranty period.
- 1.3.3 Provide a copy of the approved shop drawings and final verification report in the Operation and Maintenance manuals.

### 1.4 **Scope**

- 1.4.1 The provision of new initiating and notification appliances (i.e. smoke detectors, pull stations etc.) and ancillary devices (i.e. relays etc.) as shown on drawings and verification of these devices shall be included in the base contract.
- 1.4.2 (Reserved).

## 2 **PART 2 - PRODUCTS**

### 2.1 **General**

- 2.1.1 The Contractor shall furnish, install and place in operating condition all Fire Alarm equipment, accessories and material necessary compatible with the existing system.
- 2.1.2 All equipment shall be listed by Underwriters Laboratories of Canada and shall include, but not be limited to Initiating Devices, Alarm Sounding Devices and Auxiliary Devices, all located as shown on the plans and wired in accordance with the manufacturer's recommendations, to form a complete and workable system.
- 2.1.3 The existing system comprises a Mircom "Flexnet" series fire alarm voice communication system control panel, remote annunciator panel, manual pull stations, smoke detectors, heat detectors, speakers and strobes.
- 2.1.4 The installed system shall comply with the applicable provisions of U.L.C. and applicable Building Codes and shall meet all requirements of the authorities having jurisdiction.
- 2.1.5 New devices shall be compatible with the existing system.
- 2.1.6 Provide additional power supplies and zone modules, synchronizing modules etc. as required in the existing panel or as separate panels connected to the existing as required to accommodate new alarm and signal zones (if required).

---

## 2.2 **Manual Pull Stations**

- 2.2.1 Description: Single- or double-action type, red LEXAN, with molded, raised-letter operating instructions of contrasting color. Station will mechanically latch upon operation and remain so until manually reset by opening with a key common with the control units.
- 2.2.2 Pull stations shall be compatible with the existing fire alarm system.

## 2.3 **Automatic Smoke Detectors**

- 2.3.1 General: New devices shall comply with CAN/ULC-S529-09, "Smoke Detectors for Fire Alarm Systems".
- 2.3.2 Smoke detectors shall be compatible with the existing fire alarm system.

## 2.4 **Approved Vendors**

- 2.4.1 The electrical contractor shall include the services of the manufacturer's representative as a third party. Include all costs of this service in the base bid.
- 2.4.2 The manufacturer's representative shall be the approved vendor of record with the City of Toronto and/or Toronto Paramedic Services for fire alarm system work for the facility.
- 2.4.3 The current vendor of record for the facility is J.D. Collins Fire Protection Co., 101 Innovation Drive, Unit 1, Woodbridge ON L4H 0S3, Phone 905-660-4535, [www.jdcollins.ca](http://www.jdcollins.ca).

# 3 **PART 3 - EXECUTION**

## 3.1 **Installation**

- 3.1.1 Install new devices accurately and carefully, aligned complete with all mounting hardware and in strict accordance with manufacturer's requirements.
- 3.1.2 Mount ceiling mounted devices not less than 18" (460mm) from adjacent wall or partition. Ensure that devices are no less than 48" (1220mm) from any supply air diffuser.
- 3.1.3 All wiring shall be installed in conduit and conform to the requirements of the Ontario Electrical Safety Code (OESC) and applicable provincial codes, CSA and as per manufacturer's instructions. Armoured, CSA approved fire alarm cabling may be used where concealed.
- 3.1.4 Installation personnel shall be supervised by persons who are qualified and experienced in the installation, inspection and testing of fire alarm systems. Examples of qualified personnel includes factory trained and certified personnel and ULC certified installers of fire alarm systems.

## 3.2 **Wiring Installation**

- 3.2.1 System Wiring: Wire and cable shall be new and of a type listed for its intended use and shall be installed in accordance with the appropriate articles from the Ontario Electrical Safety Code, 2021 edition.
- 3.2.2 Use only CSA approved wiring in conduit. Conductors shall be copper, plenum (FT6) rated.
- 3.2.3 The minimum size of conductors shall be in accordance with the OESC.
- 3.2.4 Contractor shall obtain from the Fire Alarm System Manufacturer written instruction regarding the appropriate wire/cable to be used for this installation. No deviation from the written instruction shall be made by the Contractor without the prior written approval of the Fire Alarm System Manufacturer.

- 
- 3.2.5 Color Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color code for alarm initiating device circuits wiring and a different color code for supervisory circuits. Color-code notification appliance circuits differently from alarm-initiating circuits. Paint fire alarm system junction boxes and covers red.
  - 3.2.6 Terminate circuits in control panel for Class A supervision. Mount end-of-line device in box with last device or separate box adjacent to last device for Class B supervision.

### 3.3 **Verification**

- 3.3.1 Service personnel shall be qualified and experienced in the inspection, testing and maintenance of fire alarm systems. Individuals shall be factory trained and Canadian Fire Alarm Association (CFAA) certified or otherwise trained and qualified personnel employed by an organization listed by a national testing laboratory for the servicing of fire alarm systems.
- 3.3.2 The manufacturer's representative shall make an inspection of all new and existing (affected by construction) fire alarm devices and cabling and verify all components in writing.
- 3.3.3 Correct all deficiencies noted in the verification report. Allow for retesting and verify that the deficiencies have been corrected.
- 3.3.4 Assist manufacturer's representative in verification of system.
- 3.3.5 Provide engineer and owners one copy each of the verification report of system.
- 3.3.6 The system verification shall be done in accordance with ULC Standard CAN/ULC-S537-13 or latest applicable version thereof.
- 3.3.7 Test the system as required by the fire department in order to obtain a certificate of occupancy.

### 3.4 **Warranty**

- 3.4.1 The fire alarm manufacturer's representative shall provide a 12-month warranty from date of final verification for all replaced, relocated and new devices and appliances.

- **END OF SECTION 28 31 00** -

# **APPENDIX A**

## **CITY OF TORONTO STRUCTURED CABLING DESIGN GUIDE**



# **City of Toronto - Commercial Facilities Structured Cabling Systems Design Guide For Consulting Engineers, Architects, Designers & Contractors**

**Revision: 1.0**

**January 2023**

**Corporate Services | Network Services**

**Information Technology**

**Standards & Procedures**



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## SECTION-1: INTRODUCTION

This design guide is to provide consulting engineers, architects and designers working for the City of Toronto (CoT) with a document for the design of commercial facilities (owned, controlled, or leased buildings) communications distribution and structured cabling systems that accurately reflects the City of Toronto (CoT) and industry standards in effect as of this publication. This document shall be referenced to develop project specification and tender documents, specifically extra costs, and Bell standard pricing.

Therefore, it is obligatory for consulting engineers, architects, and designers of telecommunications systems of City of Toronto (CoT) to follow and practice the most updated revision to reflect the methods, materials and standards that have been used for providing telecommunications services to the existing facilities. The updated document also reflects changes in industry practice as of this publication.

In general, it is the responsibility of the building communications distribution designer to coordinate with the other designers on a project (architect, structural, electrical, mechanical, etc.) to ensure that other systems are both compatible with and complementary to the communications cabling system. The City of Toronto (CoT) design philosophy is that it is critical to coordinate between disciplines during the design phase of a project, rather than attempting to make adjustments in the field during construction.

Communications distribution systems designed for the City of Toronto (CoT) commercial facilities are expected to support and integrate voice, data and video communications with common media (fiber optic and unshielded twisted pair copper cable).

## DOCUMENT INTENT AND LIFE CYCLE

The purpose of this standard is to define the general guidelines and standards for the design, specification, installation, testing, troubleshooting, documentation and handing over of the commercial facilities (owned, controlled, or leased) communications distribution and structured cabling systems. This standard follows published industry standards and best practices applicable to the commercial buildings of City of Toronto (CoT). The life cycle of this document version is from January to December every year from 2023. Always consult City of Toronto (CoT) Network Services (IT) Division for the latest version of this standard guide.

This document addresses commercial buildings communications distribution and structured cabling system design as it relates to:

- Design guide, topology and methodology
- Communications Media – fibreoptics and copper unshielded twisted pair (UTP)
- Pathway System – cable trays, conduits, etc.
- Products

- Execution (installation)
- Testing and Commissioning
- Handing over (final acceptance)

This document should serve as a guide for making standards compliant project specification which, in due course, will be reflected in a master tender specification document. In addition to specifications for a telecommunications project, plan drawings and schematic diagrams will also need to be produced by the designer. The drawings should conform to the guidelines contained in this document. This document is to be used in conjunction with the latest edition of BICSI TDMM.

Though every attempt is made to cover unforeseen issues, every building and project has its own issues, therefore IT - Network Services and Telecommunication Services should be included right at beginning of the project and the communications specifications must be reviewed and approved by these groups within the City of Toronto (CoT).

## TYPES OF CONSTRUCTION

Throughout this document, reference will be made to three types of construction as defined below: new, overbuild and basic construction. These definitions are applicable to the purposes of this document only. A new commercial building communications distribution and structured cabling system as well as the addition to and/or modification of existing cabling system is included in these construction projects. Tradeoffs between design standards and practicality will many times be dependent upon the type of construction. Different design approaches may be warranted for differing types of construction.

### A- NEW CONSTRUCTION

New construction is defined as construction that results in a new (or new portion of an existing) commercial buildings communications distribution and structured cabling systems. For the most part, new pathway will be constructed, and new cabling will be installed in the pathway.

### B- OVERBUILD CONSTRUCTION

Overbuild construction is defined as construction which may include demolition and/or abandonment of existing pathway and cabling, reuse of existing pathway for installation of new cabling and/or the addition of new pathway and/or cabling to existing pathway and/or cabling. Common terms referring to this type of construction include expansion, renovation, remodel, addition and retrofit, among others.

### C- BASIC CONSTRUCTION

Basic construction is defined as construction that includes reuse of existing distribution pathway for the installation of new cabling. Demolition of existing cabling may be involved as well. Basic construction is focused on the installation of new cabling with no (minor) modifications to the existing pathway system.

## CITY OF TORONTO AGREEMENT WITH BELL CANADA FOR COMMERCIAL FACILITIES

Effective January 10, 2010, the City of Toronto (CoT) has entered into a multiyear Voice and Data cabling agreement with Bell Canada. Bell Canada is to be used for all Data and Voice cabling for all owned and leased buildings of the City of Toronto.

A pricing table of services regarding this agreement having unit cost is available to share from CoT-IT with the permission to only authorized recipients.

Based on the agreement, current cabling vendor of record (VOR) shall be used. The cabling VOR shall be verified by CoT-IT Network Services at the time of proposed work or RFP.

Analog devices such as fax, POS (dialup), modems and other specialized monitoring lines are using Centrex. The voice cabling system for Centrex will be supplied and installed by Bell as part of an agreement between Bell and the City of Toronto. Bell will have ownership of the voice cabling system.

Please contact CoT-IT-Telecommunications Services, voice infrastructure group for more details.

## CITY OF TORONTO TENDER DRAWINGS

This standard guide should be read in conjunction with the City of Toronto (CoT) standard drawings. The drawings shall typically be produced by the consulting engineers / designers and shall consist of (if applicable to the project) the followings but not be limited to:

1. Title Page and Drawing Index
2. Symbols (legends) and Notes General
3. Campus / Building Layout – Fibreoptics Backbone Network Layout (if applicable)
4. Fibreoptics Patch Panel Port Assignment (if applicable)
5. Campus / Building Layout – Voice (copper) Backbone Network Layout (if applicable)
6. Copper Patch Panel / BIX Blocks Port Assignment
7. Building Floor Plan
8. Serving Zone Floor Plan
9. Wireless Heatmap Plan
10. Entrance Facility Layout
11. Equipment Room Layout



12. Telecom Room Layout
13. Building Riser Layout – Horizontal / Backbone
14. Ceiling / Wall / Furniture / Floor Mounted Work Area Outlet Details and Bill of Materials
15. Telecom Enclosure Elevation and Bill of Materials
16. Telecom Enclosure Power Distribution Diagram
17. Telecom Enclosure UPS Panel Layout
18. Entrance Facility Backboard Elevation and Bill of Materials
19. Telecom Pathways (Cable Trays / Conduits) Layout
20. Typical Details of Cable Tray, Conduit / Sleeve, Fire-stopping, Horizontal/Backbone Labeling
21. Telecom Grounding and Bonding Layout (Riser and Floor Plan)
22. HVAC – Mechanical System Layout for Equipment Room / Telecom Room
23. Electrical / Power Layout for Equipment Room / Telecom Room / Work Areas
24. Demolition Drawings (all applicable drawings / layouts – if applicable)

#### SERVICES NOT PROVIDED BY THE CITY OF TORONTO

- The voice system technology (Bell Centrex etc.) shall be supplied and installed by Bell Canada.
- Entrance Facility and demarcation point shall be outlined in the specific design drawings. Service providers shall terminate the incoming copper cables on BIX and BIX cross-connect between the ISP and the OSP cabling at the Entrance Facility.
- Service providers shall terminate the incoming fibre cables in either wall mount or rack mount fibre enclosures between the ISP and the OSP cabling at the Entrance Facility.
- Witnessing field cable testing at site is NOT CoT's responsibility. The Contractor shall submit the test results to Consultant for their review, validation, witnessing and comment. Consultant shall forward the test results to CoT-IT/Network Services for further review (only if approved by the Consultant after their review). If there is no Consultant on the project, the contractor/cabling installer shall submit the test results to CoT's IT/Network Services for their review.
- BOQs/BOMs, layouts, elevations, drawings and schematics shall be prepared/reviewed by the Consultant.

## MANDATORY DESIGNERS' QUALIFICATION REQUIREMENTS

- The standard is to be observed by the City of Toronto - IT Network Services Staff and Consultants involved with the design and implementation of structured cabling systems for data networks which include data networks, security networks, VoIP networks and any other networks that require a structured cabling system that is unified and connected to the City of Toronto network.
- The preparation and review of any network cabling system design, drawings and specification documents shall be conducted by a **Registered Communications Distribution Designer (RCDD)**. The credential holder shall be in good standing who have demonstrated knowledge in the design, integration and implementation of telecommunications and data communications transport systems and related infrastructure.
- All consultant design drawings and specification document shall be sealed / stamped by RCDD.
- All cabling is to be provided from the manufacturers noted with the following sections. Cabling provided by alternate manufacturers is not acceptable.

In addition, the RCDD shall have the following qualifications:

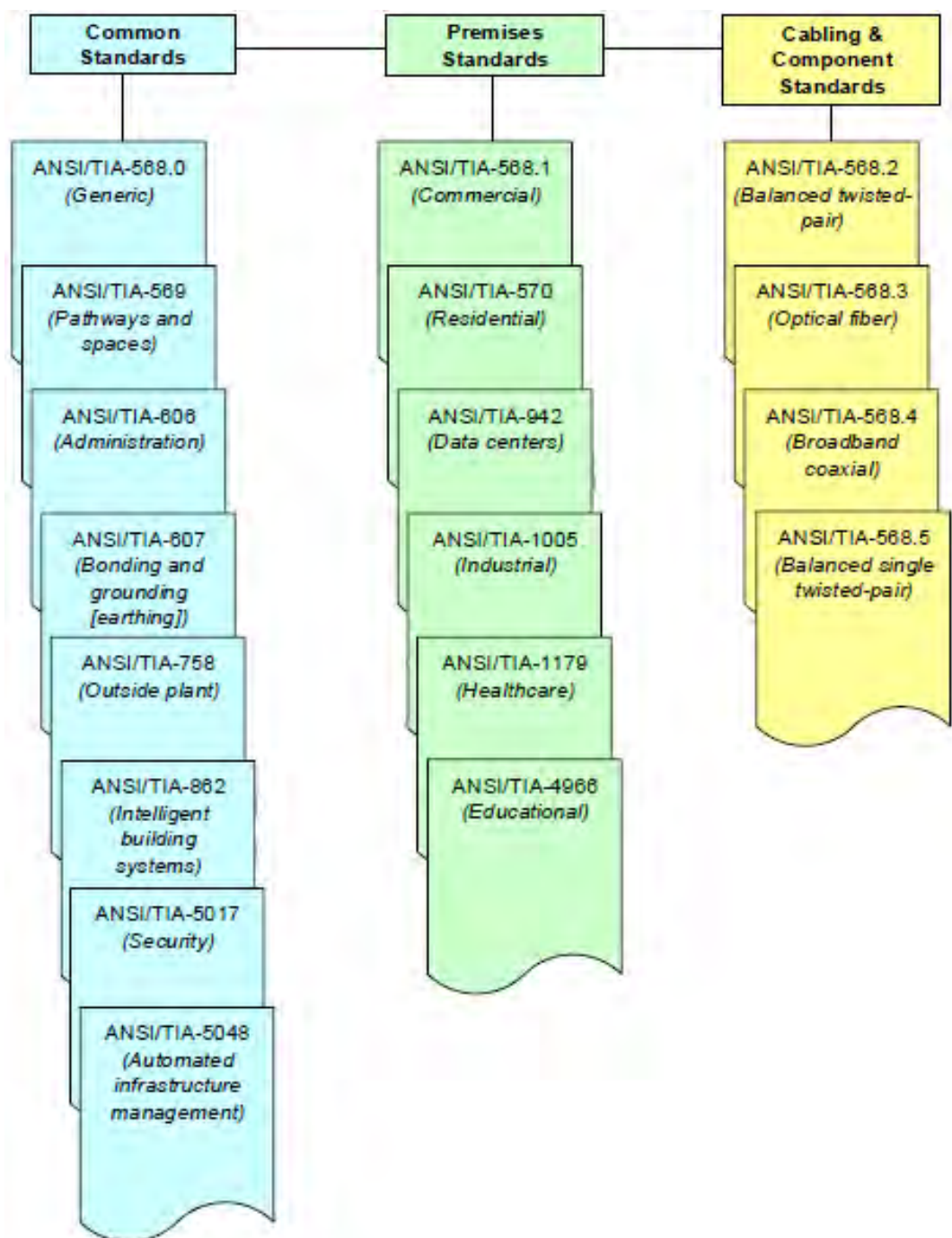
- The RCDD shall demonstrate a minimum of 5 years of experience in the design of commercial buildings communications distribution systems. Experience not directly related to the design and installation of commercial buildings communications distribution systems, such as sales and/or marketing, is not acceptable.
- The RCDD shall demonstrate that he/she has designed or has had personal design oversight of a minimum of five projects similar in size and construction cost to the current CoT project.
- The RCDD consultant must have verifiable design experience with products and solutions from **Belden**.

Before commencing any work for or on behalf of the City of Toronto, the RCDD shall provide a copy of their RCDD certificate showing up to date registration in accordance with the **Building Industry Consultant Services International (BICSI)** policies and guidelines.

## MANUFACTURERS

In addition to the standards listed below, the City of Toronto has selected **Belden** as a manufacturer of communications cabling infrastructure products for commercial buildings. The manufacturer is identified in the Product Section. The commercial building communications distribution designer is required to incorporate only this manufacturer into the design and to design a communications distribution structured cabling system that will be suitable for the use of products from the manufacturer.

## ANSI/TIA RELATIONSHIP DIAGRAM



***Relationships between ANSI/TIA Standard Documents***

## DESIGN AND REFERENCE STANDARDS

It is required that the designer be thoroughly familiar with the content and intent of these references, standards, and codes and that the designer be capable of applying the content and intent of these references, standards, and codes to all commercial communications system designs executed on behalf of the City of Toronto.

Listed in the table below are references, standards, and codes applicable to commercial communications systems design. If questions arise as to which reference, standard, or code should apply in a given situation, the more stringent shall prevail. As each of these documents is modified over time, the latest edition and addenda to each of these documents is considered to be definitive.

Standard	Title	Date
TIA-568.0-E	Generic telecommunications cabling for customer premises	2020
TIA-568.1-E	Commercial Building Telecommunications Cabling Standard	2020
TIA-568.2-D	Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted- Pair Cabling Components	2018
TIA-568.3-E	Optical Fibre Cabling Components Standard	2022
TIA-568.4-E	Broadband Coaxial Cabling and Components Standard	2022
TIA-568.5	Balanced Single Twisted-pair Telecommunications Cabling and Components Standard	2022
TIA 606-D	Administration standard for telecommunications infrastructure	2021
TIA- 607-D	Generic telecommunications bonding and grounding (earthing) for customer premises	2019
TIA-569-E	Telecommunications Pathways and Spaces	2019
TIA-758-B	Customer-Owned Outside Plant Telecommunications Infrastructure Standard	2012
TIA-942-B	Telecommunications Infrastructure Standard for Data Centers	2017
TIA-598-D	Optical Fibre Cabling Coding	2014

Standard	Title	Date
TIA-862-C	Structured Cabling Infrastructure Standard for Intelligent Building Systems	2022
TIA-1152-A	Requirements for field test instruments and measurements for balanced twisted-pair cabling	2016
TIA-1005-A	Telecommunications infrastructure standard for industrial premises	2012
TIA-526-14-C	Optical Power Loss Measurement of Installed Multimode Fiber Cable Plant; Modification of IEC 61280-4-1 edition 2, Fiber-Optic Communications Subsystem Test Procedures- Part 4-1: Installed Cable Plant-Multimode Attenuation Measurement	2015
TIA-526-7-A	Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant, Adoption of IEC 61280-4-2 edition 2: Fibre-Optic Communications Subsystem Test Procedures – Part 4-2: Installed Cable Plant – Single-Mode Attenuation and Optical Return Loss Measurement	2015
TIA-TSB-162-B	Telecommunications Cabling Guidelines for Wireless Access Points	2021
TIA-TSB-184-A	Guidelines for Supporting Power Delivery Over Balanced Twisted-Pair Cabling	2017
TIA-604-10-C	FOCIS 10 Fiber Optic Connector Intermateability Standard- Type LC	2021
BICSI TDMM	Telecommunications Distribution Methods Manual, 14th Edition	2020
ANSI/BICSI 002-2019	Data Center Design and Implementation Best Practices	2019
ANSI/BICSI 007-2020	Information Communication Technology Design and Implementation Practices for Intelligent Buildings and Premises	2020
ANSI/BICSI 008-2018	Wireless Local Area Network (WLAN) Systems Design and Implementation Best Practices	2018

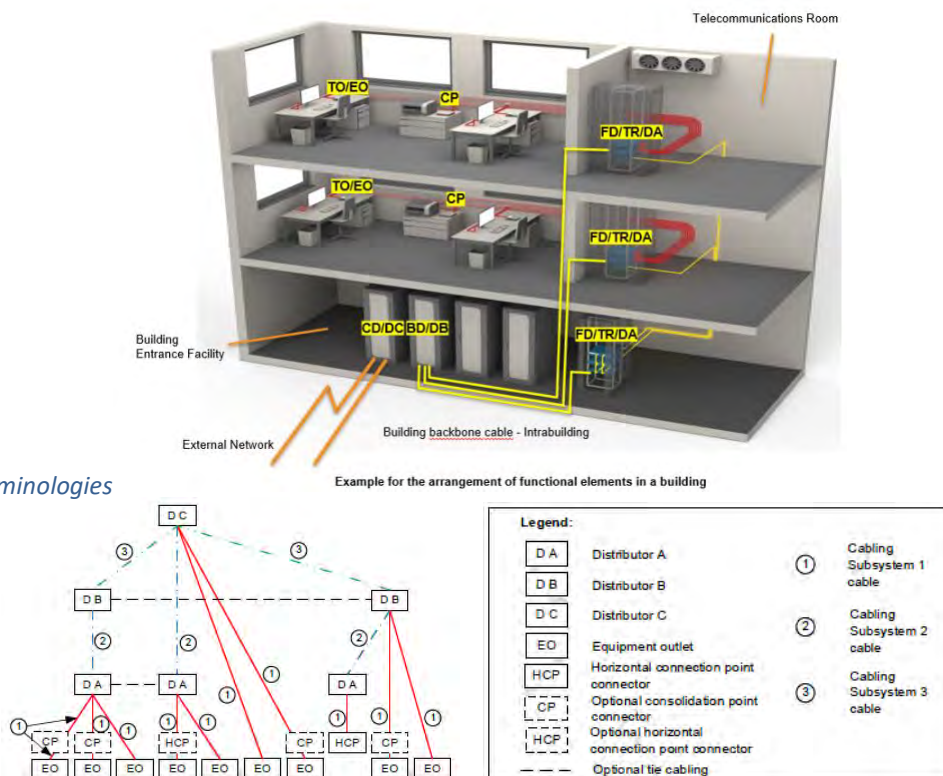
## DEVIATION FROM STANDARDS

It is the intent of City of Toronto (CoT) to rigidly impose standards on every aspect of a commercial building communications system design. However, each design is unique and may be subject to situations in which deviations from the standards are warranted.

If the designer feels that deviation from a given standard is warranted, the designer shall submit a written deviation request to City of Toronto (CoT-IT). The request will, at a minimum, indicate the standard from which there is a proposed deviation, the substitution being proposed in place of the standard, the reason of the request being made, and an explanation of the justifications (economic, technical or otherwise) for the deviation. The designer may, upon written approval from CoT-IT, incorporate the design deviation into the overall design. The City of Toronto (CoT) approval is required on a project-by-project basis. The designer should not assume that a deviation approval for one project means that the deviation will necessarily be approved for a subsequent project.

## GENERIC TOPOLOGY

The figure below is an illustration of a generic cabling topology for Cabling Subsystem 1, Cabling Subsystem 2, Cabling Subsystem 3, Distributor A, Distributor B, Distributor C, an optional consolidation point and the equipment outlet. Elements of Generic Cabling Topology in both Standards are as below:

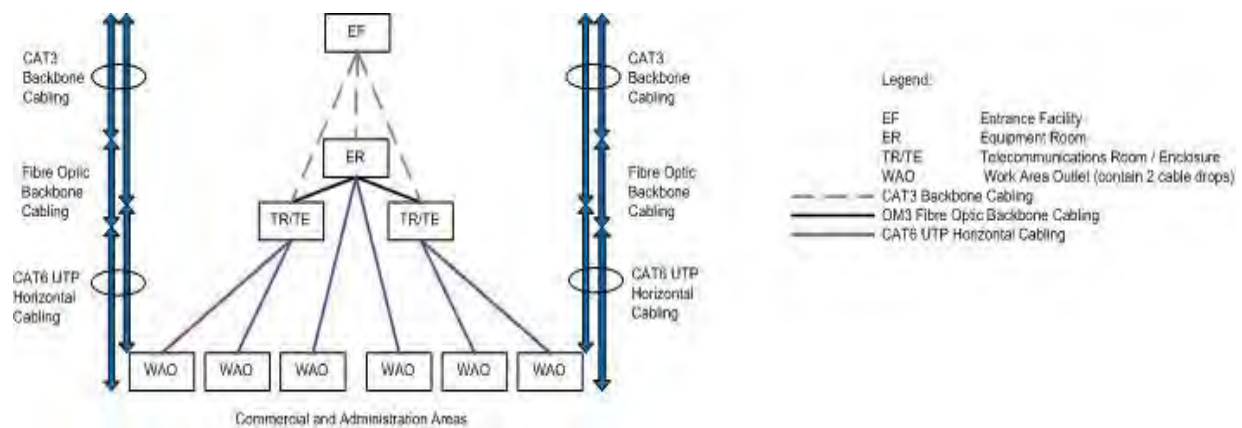


## CITY OF TORONTO - STRUCTURED CABLING SYSTEM - DESIGN CONSIDERATIONS

This section highlights design considerations of particular importance to City of Toronto (CoT). It also discusses different CoT construction arrangements (new, overbuild, or basic) for a particular project.

## CITY OF TORONTO - COMMERCIAL BUILDING CABLING TOPOLOGY

The figure below is an illustration of the City of Toronto commercial building cabling topology. Some of the cabling system such as CAT3/5e backbone, may or may not be applicable to the project.

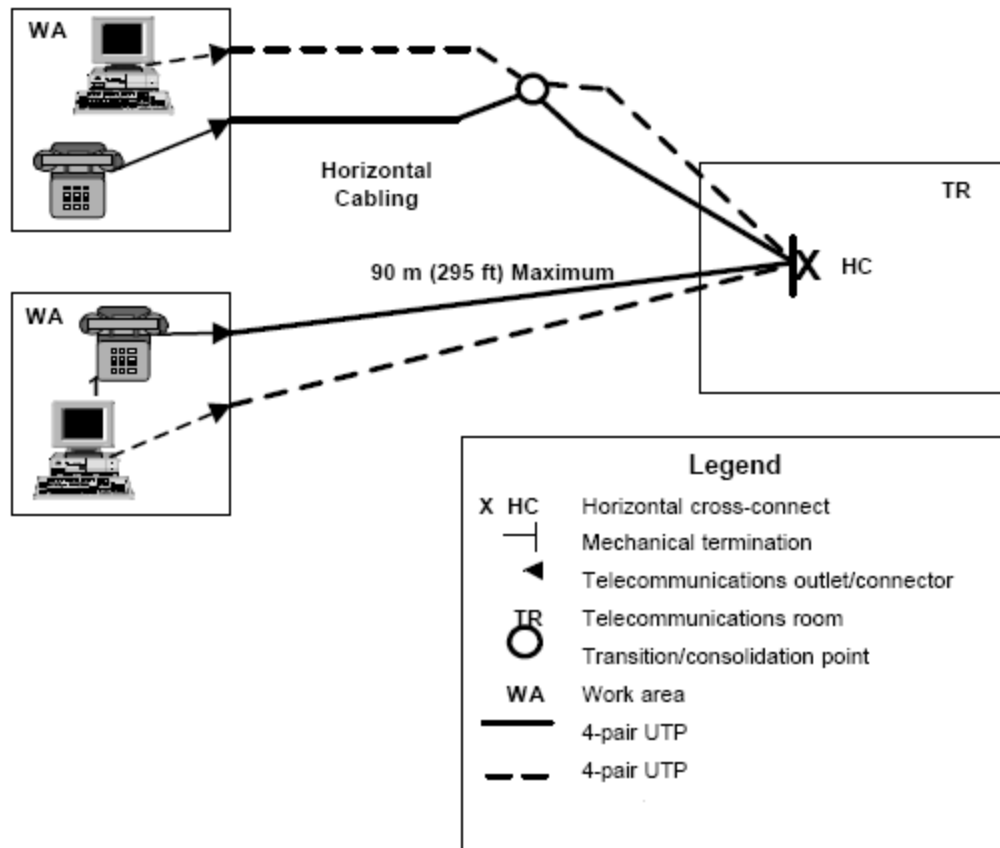


*Elements of the City of Toronto Standard Topology for Commercial Facilities*

## DESIGN SUMMARY

- The network shall be a distributed star topology network.
- All horizontal copper cables shall connect to the TE/TR from the WAO and fibre backbone cable shall connect to the ER (Server Room) from the TR/TE. The CAT3/5e backbone cabling from the TR/TE to the ER, may or may not be applicable to all the CoT projects.
- The specified copper network cables for all commercial buildings shall be Belden.
- The horizontal copper cable shall be U/UTP Category 6/6A and shall be in accordance to this specification.
- Length of the patch cables from WAO to the end device shall be in compliance to the Ethernet and structured cabling applicable standards.





- The backbone copper multi-pair (minimum 25 pairs) cable shall be U/UTP Category 3/5e and shall be in accordance to this specification. The multipair backbone, may or may not be applicable to all the CoT projects.
- The containment system for the voice and data network shall be as per the specified material mentioned in this document, unless specified otherwise on the design drawings/project scope. The approved conduit system is EMT type, appropriately sized as per TIA-569 standard. The cable tray shall be basket wire mesh type, corrosion resistant, standard sized as per TIA-569.
- The horizontal copper cables shall be permanently terminated at the patch panel in the Telecommunications Enclosure (TE) on one end, to a work-area outlet on the other end located on the walls of a commercial building.
- Horizontal cables in the commercial buildings shall always be collated of two (2) cables per work area outlet (WAO) located on the wall/furniture of the closed office or a cubicle.
- Office cubicles shall contain 1 WAO with 4 ports (1 Voice/VoIP, 1 Data and 2 Blank ports).



- Closed offices shall contain 1 WAO with 4 ports (1 Voice/VoIP, 1 Data and 2 Blank ports), shall be provided to every 10m<sup>2</sup> (100ft<sup>2</sup>) of office space (i.e. if the office is 10m<sup>2</sup> then it shall have 1 WAO). If the office is larger than 10m<sup>2</sup> (100ft<sup>2</sup>), then 2 WAOs shall be provided (with 2 Data and 2 Blank ports for the 2<sup>nd</sup> WAO).
- Each group of horizontal cables shall be associated with a single 4-port, work-area outlet on the wall/furniture and a 4-port, snap-in faceplate in the Telecommunication Enclosure patch panel.
- Approval for additional ports per cubicle or office must be granted by CoT IT/Network Services Technical Representative before proceeding with this work.
- Containment pathways shall be designed and sized for a minimum of four (4) horizontal cables, unless otherwise mentioned differently in the design drawings.
- The Fibre Optic Backbone is defined as the fibre optic segments radiating out from the Network Core Closet to the Telecommunications Enclosure/Room.
- The fibre allocation within the fibre optic backbone cable is as follows:
  - 12 Core fibre backbone: Multimode (OM4) and/or Singlemode (OS2)
  - City of Toronto LAN — 4 fibre strands active (2 primary, 2 redundant and 8 reserved)
  - All fibre cables shall be terminated and tested bi-directionally to the appropriate wavelengths (850/1300nm | 1310/1550nm) using calibrated certified testing equipment
- All passive network components shall be from a single manufacturer (Belden).
- The term "free-issue" refers to equipment supplied by the City. All the Network Switching and Routing Equipment will be freely issued by the City. The network equipment will be configured, tested and installed by City of Toronto IT/Network Services group.

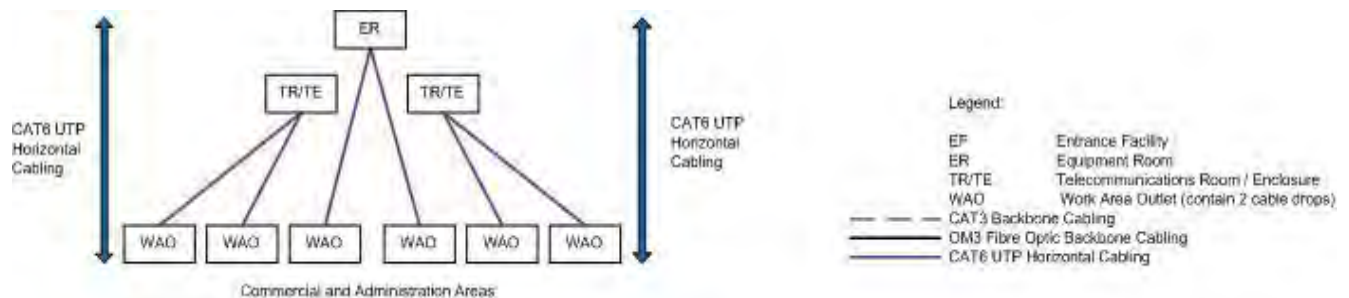
#### DESIGN DETAILS OF HORIZONTAL CABLING SYSTEM (CABLING SUBSYSTEM – 1)

Horizontal cabling includes installation cable, telecommunications connector/jack/module at the work area outlet (WAO), and mechanical terminations at both ends. Patch cords are required at WAO and TR/TE. Horizontal cabling length limitation requirements as specified in the ANSI/TIA-568.0-E and ANSI/TIA-568.1-E standards apply unless otherwise specified in this Standard.

#### TOPOLOGY

The horizontal cabling shall meet the star topology requirements of ANSI/TIA-568.0 and ANSI/TIA-568.1. Each telecommunication work area outlet (WAO)/connector/module shall be connected to the

horizontal cross-connect (HC) located at the TE/TR as shown in figure below. The horizontal installation cable shall be terminated on a jack/module (balanced twisted pair) at one or both ends.



*Horizontal Cabling Topology*

## LENGTH

The horizontal cable length extends from the termination of the media on a patch panel at the TE/TR to the telecommunications connector/jack/module at the work area outlet (WAO). For balanced twisted-pair cabling the max permanent link length in the office/administration areas shall be 90m (295ft).

The length of the cross-connect/inter-connect jumper or patch cord at the cross-connect facility, including TE/TR, shall not exceed 5m (16ft) in the office/admin work area and 5m (16ft) in the TE/TR.

## RECOGNIZED MEDIA

The recognized media, which shall be used individually or in combination, are:

- Minimum 4-pair 100 ohm balanced twisted-pair cabling, category 6 or higher
- 4-pair 100 ohm balanced twisted-pair cabling, category 6A (as per ANSI/TIA-568.2-D, preferred)

The Recognized media and associated connecting hardware, jumper, patch cord, equipment cord, and work area cord shall meet the requirements specified in this document.

## CHOOSING MEDIA

Cabling specified by this Standard is applicable to different requirements within the commercial premises. Depending upon the characteristics of the individual application, choices with respect to transmission media should be made. In making this choice, factors to be considered include:

- Environmental classifications;
- Mitigation such as separation, protection or isolation;

- Cabling performance enhancements in accordance with performance test requirements;
- Applications to be supported by the cabling system;
- Equipment vendor recommendations or specifications;
- Configuration of cabling components;

The recognized cable has individual characteristics that make it suitable for a myriad of applications such as voice, data, video, automation and building controls, security, fire alarm, HVAC and audio visual (AV).

### DESIGN DETAILS OF BACKBONE CABLING SYSTEM (CABLING SUBSYSTEM – 2 AND 3)

Backbone cabling is the portion of the commercial building telecommunications cabling system that provides interconnections between Entrance Facility (EF), Equipment Room/Server Room (ER) and Telecommunications Room/Enclosure (TR/TE). Primary and redundant, 12 strands in each cable shall run between the equipment room and the telecom room. Total of 2 x 12 strands shall run with diverse pathways between the equipment and telecom rooms. As such, the backbone cabling shall meet the requirements of ANSI/TIA-568.0, ANSI/TIA-568.2 and ANSI/TIA-568.3 for Cabling Subsystem 2 and Cabling Subsystem 3.

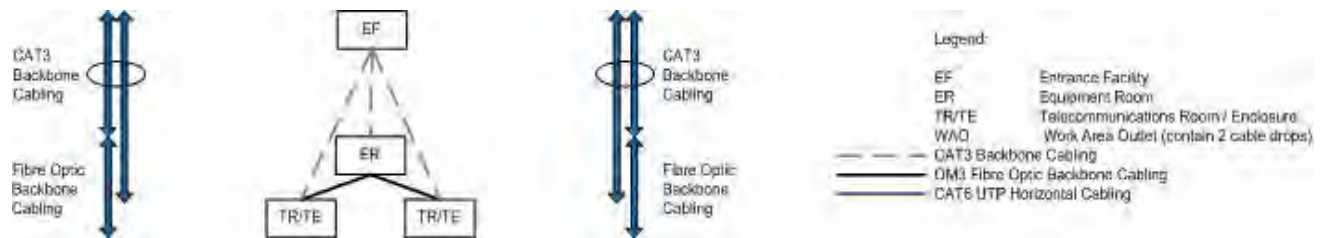
Backbone cabling consists of the multipair copper/fibre cable(s), intermediate and main cross-connect mechanical terminations and patch cords or jumpers used for backbone-to-backbone inter-connection. The cabling should be planned to accommodate future equipment needs, diverse user applications, ongoing maintenance, service changes and relocation.

#### TOPOLOGY

The backbone cabling shall meet the hierarchical star topology requirements of ANSI/TIA-568.0, unless otherwise specified by this Standard.

There shall be no more than two hierarchical levels of cross-connect in the backbone cabling. From the Horizontal Cross-Connect (HC) or Telecommunications Enclosure/Room (TE/TR), no more than one cross-connect shall be passed through to reach the Main Cross-Connect (MC) or Equipment Room (ER) depending on configuration. Therefore, connections between any two HCs shall pass through three or fewer cross-connect facilities.

NOTE – The topology required by this specification has been selected because of its acceptance and flexibility in meeting a variety of application requirements. The limitation to two levels of cross-connects is imposed to limit signal degradation for passive systems and to simplify moves, adds and changes. This limitation may not be suitable for facilities that have a large number of buildings or those that cover a large geographical area.



*Backbone Cabling Topology*

### COMMERCIAL FACILITIES

The incoming fibre cable from the service provider enters the building Entrance Facility (EF) and spliced to ISP fibre at EF if the distance from the EF to the ER exceeds 15m (50ft). The ISP service provider cable runs from EF and terminates at Equipment Room (ER).

The multipair copper cable (if applicable to the project) for centrex voice runs from the ER/TR/TE to EF.

### SMALL COMMERCIAL SITES

In small commercial buildings of City of Toronto, there is no ER. The TE/TR acts as an ER. The incoming fibre cable from the service providers enters the facility and spliced to ISP fibre if the distance from the facility entrance to the TE/TR exceeds 15m (50ft). The ISP service provider cable runs from entrance point and terminates at Telecom Enclosure (TE)/Telecom Room (TR)/Equipment Room (ER).

### LENGTH

The backbone cable length extends from the termination of the media at the EF (Entrance Facility) to an IC (Equipment Room) or HC (Telecommunications Enclosure/Room). To minimize cabling distances, it is often advantageous to locate the EF near the center of the premises. Cabling installations may be divided into areas, which can be supported by backbone cabling within the scope of this Standard.

Cabling length is dependent upon the application and upon the specific media chosen (see ANSI/TIA-568.0 and the specific application standard). The backbone length includes the backbone cable, patch cords and cross-connect/inter-connect jumpers.

The length of the cross-connect/interconnect jumpers and patch cords in the EF or IC should not exceed 20m (66ft). The length of the cord used to connect telecommunications equipment directly to the EF or IC should not exceed 30m (98ft). For backbone link length less than 150m (492ft), OM4 multimode fibreoptics cable shall be used. More than 150m (492ft), OS2 singlemode fibreoptics cable shall be used.

### BACKBONE RECOGNIZED MEDIA

Recognized cables with associated connecting hardware, jumpers, patch cords, and equipment cords shall meet the requirements specified in this document. The recognized media of backbone shall be:

- For Data, the fibre allocation within the fibre optic backbone cable is as follows:
  - 12 Core fibre backbone: Multimode (OM4) and/or Singlemode (OS2) as per backbone cable link length requirements mentioned above
- For Centrex Voice:
  - CAT3/5e multipair U/UTP cabling (if applicable), 25 pair (or higher pair count)

### CHOOSING MEDIA

Backbone cabling specified by this Standard is applicable to a wide range of different user requirements. Depending upon the characteristics of the individual application, choices with respect to transmission media have to be made. In making this choice, factors to be considered include:

- Link length [ $\leq 150\text{m}$  (492ft) is OM4 multimode,  $> 150\text{m}$  (492ft) is OS2 singlemode]
- Useful life of backbone cabling
- Site size, user population and environmental conditions

Each recognized cable has individual characteristics that make it useful in a variety of situations. A single cable type may not satisfy all user requirements. It is then necessary to use more than one media in the backbone cabling. In those instances, the different media shall support the same facility architecture.

## **CABLING DIRECTLY BETWEEN TELECOMMUNICATIONS ROOMS / TELECOMMUNICATIONS ENCLOSURES**

Cabling directly between HCs (Telecommunication Enclosures/Rooms) is not permitted. All backbone cabling must follow the star topology specified in ANSI/TIA-568.0 by connecting back to the IC (Equipment Room/Server Room).

## **DESIGN CONSIDERATIONS FOR SPACES, ENCLOSURES AND ROOMS**

### SPACES

- Spaces in commercial premises shall meet the requirements of ANSI/TIA-569-E.
- Spaces shall comply with local codes and regulations.

- Spaces should be designed to be compatible with the worst-case environment to which they will be exposed (see ANSI/TIA-568.0 and TIA/TSB-185 for information on environmental classifications).
- Temperature and humidity shall meet the requirements for Class 4 as per ANSI/TIA-569-E, unless stated otherwise.
- Perform additions and modifications to the existing Local Area Network as shown on the Contract Drawings.

#### DESIGN GUIDE OF EQUIPMENT ROOM / NETWORK / SERVER ROOM (ER)

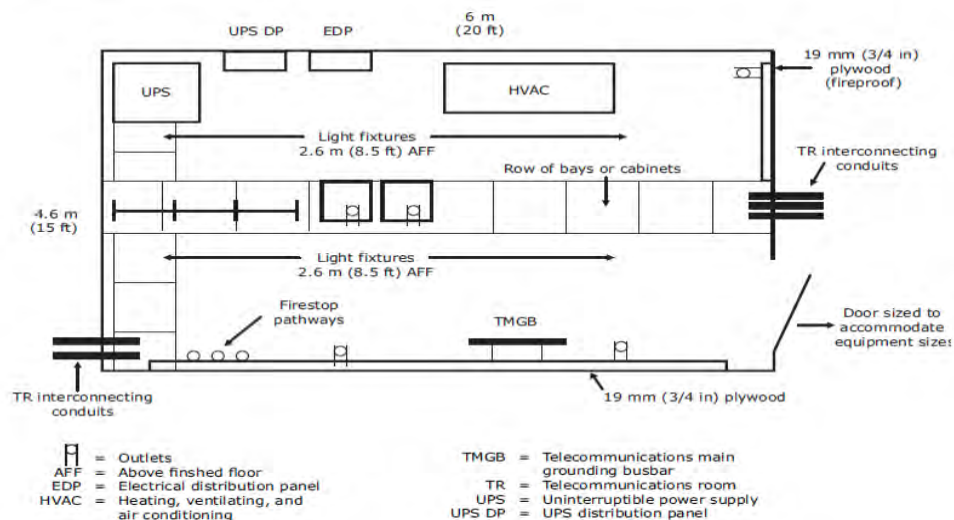
- If designing ER, consult this standard as a reference guide for Equipment Room (ER). Follow architectural/engineering drawings and project specifications as a design guide.
- The ER shall be strategically located to minimize the size and length of the backbone, especially in multiple-backbone situations.
- The ER shall accommodate the delivery of large equipment.
- The doors and hallways shall be sized appropriately for the movement of large equipment.
- Elevator or hoist and loading docks shall be available for large equipment movement.
- The weight capacity of the floors must be rated for large equipment.
- Any potential difficulties in scheduling and use of access routes and facilities for moving large equipment during installation and future changes shall be considered.
- Present and future needs shall be considered in properly locating and designing the ER.
- The ER telecommunications infrastructure shall be sized as required and capable of supporting a broad range of telecommunications applications required by the building or campus.
- Infrastructure shall be present for a large volume of cable between main distribution equipment and server racks.
- The ER telecommunications infrastructure shall be capable of supporting existing telecommunications equipment and/or cabling.
- The length of electrical power feeds from the electrical service entrance to the ER shall be minimized to aid in an optimal bonding and grounding arrangement.
- Access Card Reader should be added to access ER. Refer to CoT CORP SEC Standard for ACR/Sys.

- The distance (no closer than 3m [10ft]) to potential EMI and RFI sources shall be considered. These include transformers, motors, generators, radio transmitters, induction heating devices, photocopier, arc welding equipment, etc.
- The ER shall not be located in any place that may be subject to:
  - Water infiltration
  - Steam infiltration
  - Humidity from nearby water or steam
  - Heat (e.g. direct sunlight)
  - Corrosive atmospheric or adverse environmental conditions
  - Locations below water level unless infiltration preventive measures are employed.
- The ER shall not be located in any space in or adjacent to:
  - Mechanical rooms
  - Washrooms
  - Custodial closets
  - Storage rooms
  - Loading docks
  - Any area that contains sources of excessive EMI, hydraulic equipment, heavy vibration, steam pipes, plumbing, and cleanouts
- The ER must provide space for all planned equipment and access to all equipment for maintenance, administration and growth.
- The ER must meet the space requirements specified by equipment providers. Space and layout requirements for different telecommunications applications (e.g. voice, data) must be taken into account.
- For voice and data, provide 0.07m<sup>2</sup> (0.75ft<sup>2</sup>) of ER space for every 10m<sup>2</sup> (100ft<sup>2</sup>) of usable work area space.
- The minimum ER size shall be based on the known number of work areas as shown on the table below and not on usable floor area:

Equipment outlets served	Minimum floor space m <sup>2</sup> (ft <sup>2</sup> )	Typical dimensions m (ft)
Up to 100	9 (100)	3 X 3 (10 X 10)
101 to 200	13.5 (150)	3 X 4.5 (10 X 15)
201 to 800	36 (400)	6 X 6 (20 X 20)
801 to 1600	72 (800)	6 X 12 (20 X 40)
1601 to 2400	108 (1200)	9 X 12 (30 X 40)

- The guidelines for other support equipment, such as power distribution, conditioner systems, and UPS up to 100kVA shall be permitted in the ER. UPS larger than 100kVA should be located in a separate room.
- The ER layout and floor plan shall comply with TIA-568, TIA-569 and BICSI TDMM latest edition.
- A minimum ER space of 3m (10ft) by 4.5m (15ft) shall be allocated.
- The ER shall include adequate space to support equipment changes with minimal disruption. Sizing shall include projected future as well as present requirements.
- Equipment not related to the support of the ER (e.g. piping, ductwork, pneumatic tubing, etc.) shall not be installed within, pass through, or enter the ER.

Typical equipment room layout



- The ER shall include space for environmental control equipment, power distribution/conditioners, and uninterruptible power supply (UPS) systems that may be installed.
- The ER shall be designed and comply with the City of Toronto (CoT) Security requirements.

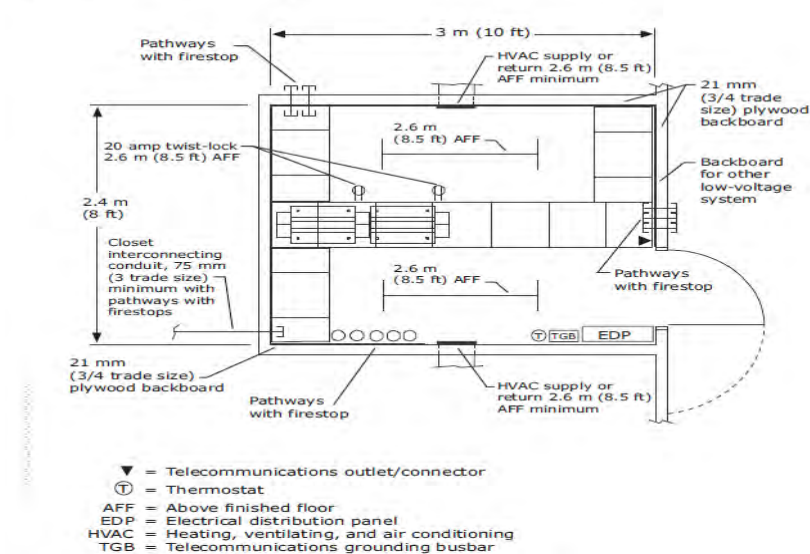


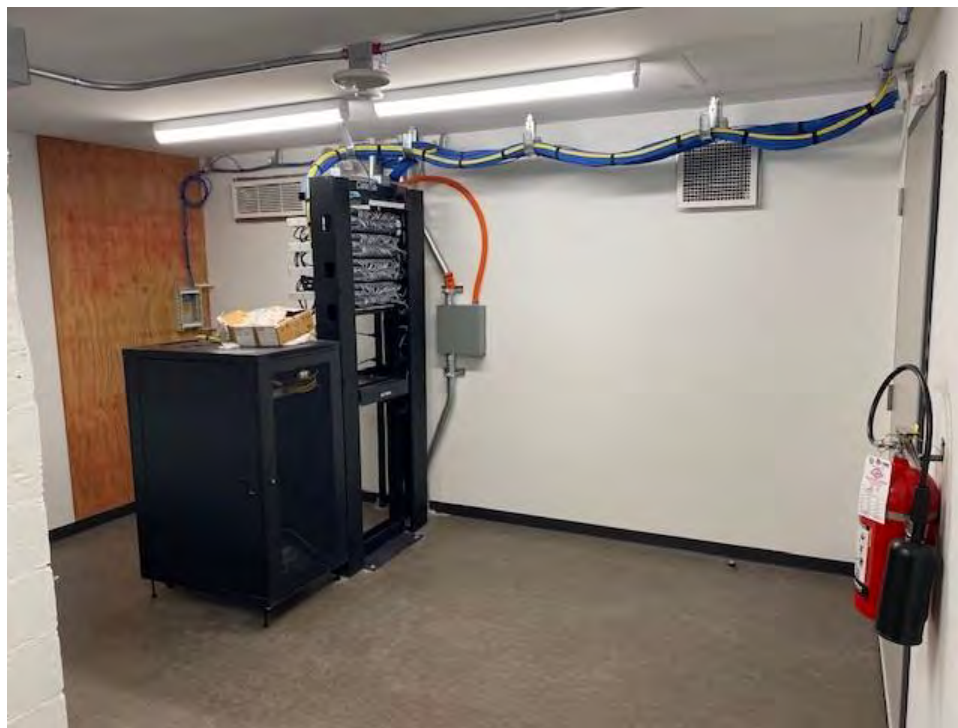
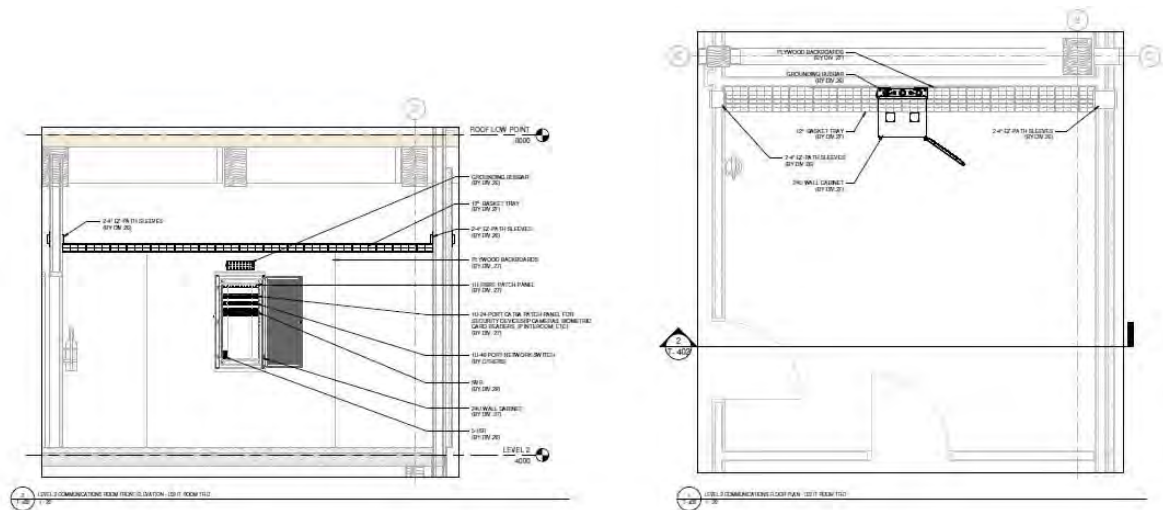


## DESIGN GUIDE OF TELECOMMUNICATIONS ROOM (TR)

- If designing TR, consult this standard as a reference guide for Telecommunications Room (TR). Follow architectural/engineering drawings and project specifications as a design guide.
- A properly designed TR includes an HC (FD) that provides a floor-serving distribution facility for horizontal cabling. This cross-connect is capable of providing horizontal cabling connections to floor-serving telecommunications equipment and backbone cables from other TRs|TEs|ERs|EFs.
- Access Card Reader should be added to access ER. Refer to CoT CORP SEC Standard for ACR/Sys.
- The TR should be provisioned to house telecommunications equipment. In some cases, it may be necessary to combine the building and floor-serving functions of the ER and TR in one room. Instances where the two may be combined include smaller buildings (i.e., less than 500 m<sup>2</sup> [5400 ft<sup>2</sup>]) and those with limited space for distribution facilities.
- There must be at least one TR per floor. Multiple rooms are required if the cable length between the HC (FD) and the telecommunications outlet location, including slack, exceeds 90m (295ft) or if the usable floor space to be served exceeds 929m<sup>2</sup> (10,000ft<sup>2</sup>). For TRs that serve areas with an office density of less than one work area per 9.3m<sup>2</sup> (100ft<sup>2</sup>) of usable floor space, a TR may serve larger areas, provided the horizontal cable length requirements are met.
- Figure below shows a typical layout of a full-size TR, suitable for a maximum of 480, 4 twisted-pair cable terminations. The drawing illustrates architectural, mechanical, electrical, and telecommunications requirements on a single plan view perspective for purposes of showing coordination issues. Actual design documents will typically separate requirements by discipline.

Typical telecommunications room layout

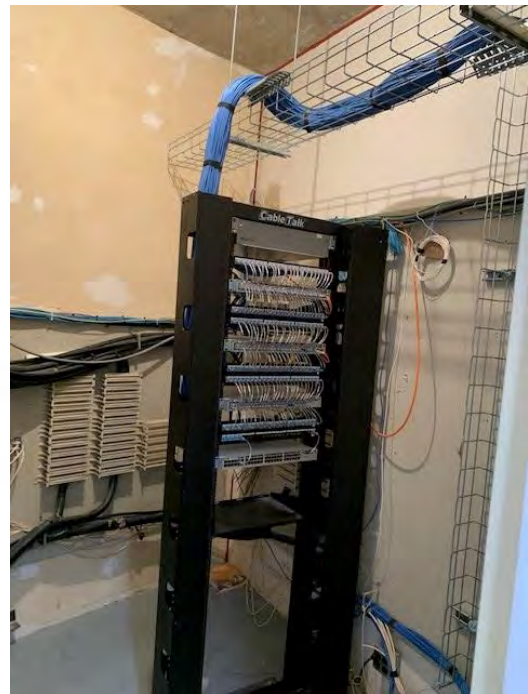
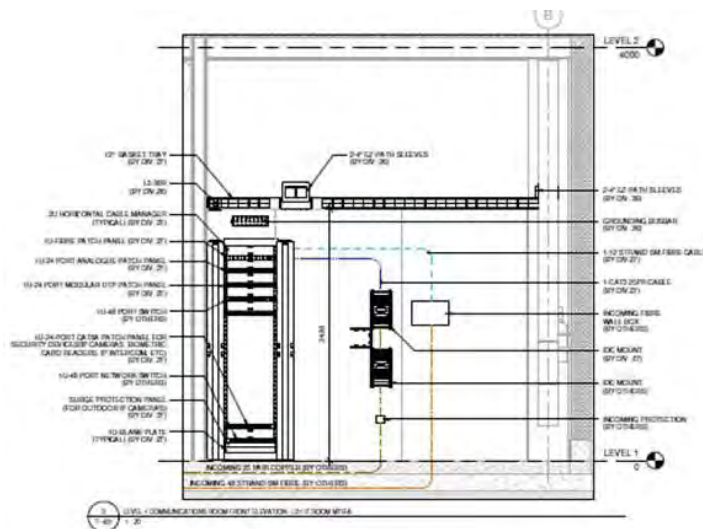




## ENTRANCE FACILITY REQUIREMENTS (EF) | SHARED LAN/NETWORK ROOMS

- If designing EF, follow architectural/engineering drawings and project specifications as a design guide.
- Where functions of an entrance facility (EF) are combined with functions of the ER in the same space, the ER may house equipment dedicated to the Access Provider (AP). Requirements specified by the AP must be considered.

- As per ANSI/TIA-569-E, in shared LAN/Network Rooms between CoT-IT and other Agency/Third Party, individual spaces should be segregated by means of partitions using full size lockable cabinets or collocate cabinets. In extreme conditions, partitions may be comprised of cages, architectural assemblies or wire mesh walls.
- Where access providers and service providers share space (shared LAN/Network Rooms), individual spaces should be segregated by means of partitions. Partitions may be comprised of wire mesh walls or architectural assemblies.
- If separate AP space is required, it shall be adjacent to the EF. The design may require a mesh partition or locked cabinet. Space size at least 1.2m x 1.83m (4ft x 6ft) should be allocated for each AP.



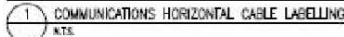


## WORK AREA OUTLET (WAO)

- The work area outlet (WAO) components extend from the telecommunications outlet/connector end of the horizontal cabling system to the work area equipment. The telecommunications outlet/connector shall meet the requirements of this Standard. To simplify relocations, consider a single style of outlet/connector for all work area outlets of the same media type.

## WORK AREA OUTLET (WAO) FOR OFFICE AREAS

- Provide one 4-ports, single-gang, work area outlet in each work area for termination of the horizontal CAT6/6A cables. Faceplate or decora module frame shall be from Belden.
- One 4-port, work-area outlet shall be associated with as many ports necessary (in groups of 2 or 4) on the snap-in faceplate installed in the patch panel of the Telecommunication Enclosure.
- In the majority of cases the 4-port, work-area outlet shall be installed within the cubical partitions. In some situations, the work-area outlet shall be installed directly on the wall in office areas.
- All UTP connectors in the office area shall be unshielded modular jacks and wired for a T586A wire-map.



## U/UTP PATCH CORD FOR WAO IN OFFICE AREAS

- Patch cords used in the WAO shall meet the requirements of ANSI/TIA-568.2. WAO cabling may vary in form depending on the application. When application-specific adaptations are needed at the WAO, it shall be external to the telecommunications outlet/connector.
- Supply two (2) 5-metres or less, CAT6/6A U/UTP patch cords for each work area outlet.
- The contractor is responsible for certifying that the supplied patch cords shall meet or exceed the requirements for U/UTP patch cords as described in the ANSI/TIA-568.0 standard.

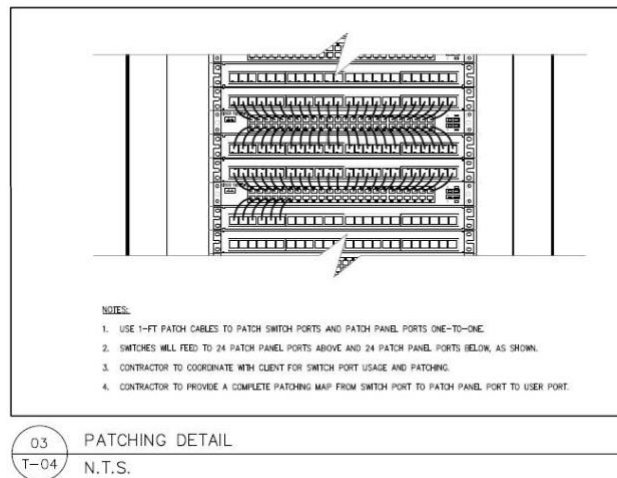
## WORK AREA OUTLET (WAO) FOR WIRELESS ACCESS POINT (WAP)

- Provide one (1) 4-port, single-gang, work-area outlet, connectors and accessories for termination of the horizontal UTP cables (2 for each WAP) dedicated for Wireless Access Point (WAP). Where ever, it is possible to connect to the closest TR, additional and separate WAO may not be required.
- CAT6/6A modular jacks shall populate two (2) modules/jacks in a 4-port WAO for each WAP.
- Each 4-port, work-area outlet shall be associated with a 4-port, snap-in faceplate installed in the Telecommunication Enclosure patch panel.

- WAP Heatmaps are required for accurate location of WAOs. Sample heatmaps are in Appx-C.

### UTP PATCH CORD FOR TE/TR/ER

- Supply minimum of 0.5 metre (2ft) CAT6/6A U/UTP patch cord for each data/VoIP drop (jack/module) to patch at TE/TR/ER.



### DESIGN CONSIDERATION OF PATHWAYS AND CONTAINMENT SYSTEM

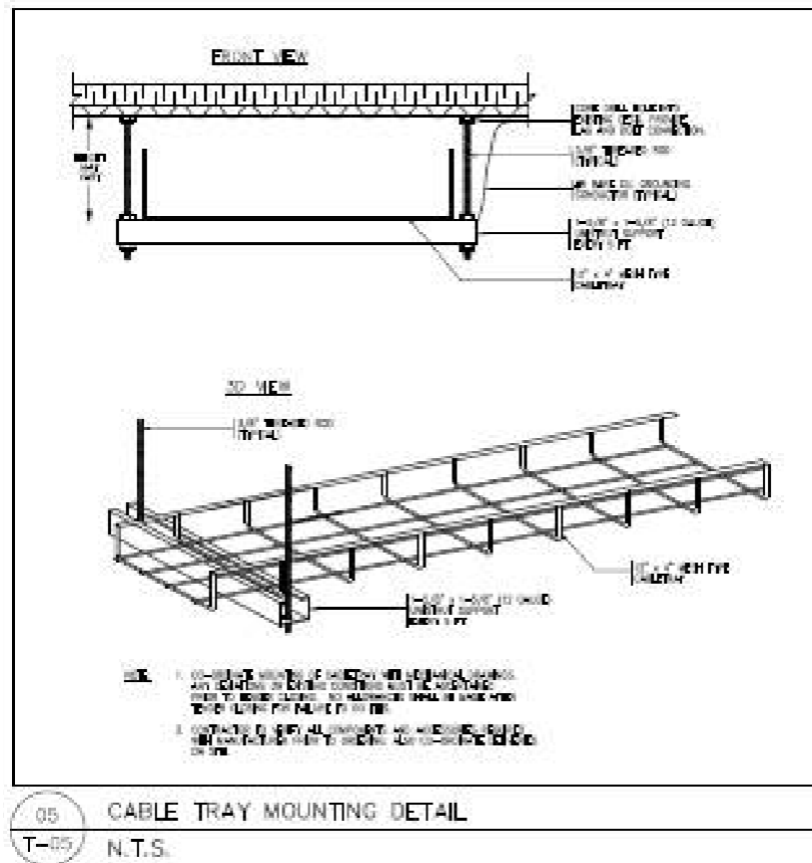
- Pathways in commercial premises shall meet the requirements of latest ANSI/TIA-569 standard.
- Pathways should be designed to be compatible with the worst-case environment to which they will be exposed (see ANSI/TIA-568.0 for information on environmental classifications).
- Pathways in commercial premises shall comply with local codes and regulations.

### DESIGN GUIDE OF CABLE TRAY SYSTEM

- All cable trays shall be either a ventilated trough, wire-mesh or ladder-rack type, pre-fabricated structure 300mm (12 inches) in width or greater.
- Ventilating trays shall be equipped with two side rails with a maximum height of 150mm (6 inches) and consisting of a light, rugged and tubular steel or aluminum construction.
- Should aluminum trays be specified (CoT approval is mandatory), the engineer is to ensure that, during the grounding or bonding aspects of the installation, the contractor uses tin plated or zinc coated ground connectors.

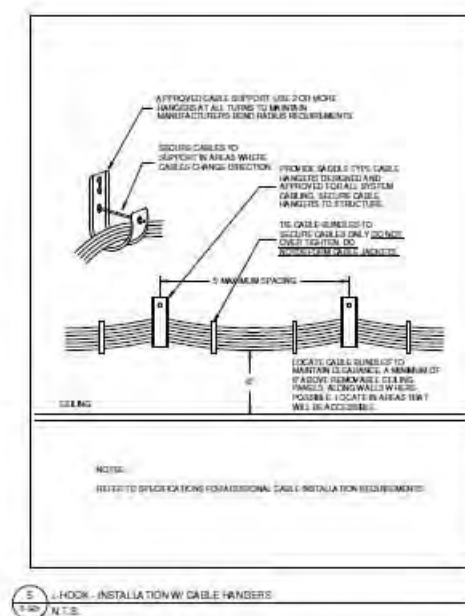
- Install the ventilated cable tray in the horizontal cable distribution system such as hallways and under floor.
- A cable ladder rack system is to be installed within the Equipment/Server Room (ER) and Telecom Rooms (TR). Refer to the project specifications/drawings or reference in this document for the type of ladder rack to be used in the horizontal cable distribution system and within the applicable ER/TR's. Spine type and improperly centre hung cable trays will not be accepted.
- All metal cable trays shall be bonded together to the TMGB/PBB or a TGB/SBB.
- All metal cable trays shall be coated to prevent rust or galvanic action.
- Accessories and fittings such as elbows and reducers shall be manufactured by the cable tray manufacturer.
- Install cable trays at least 300mm (12in) away from fluorescent luminaries and cross power cables at right angles.
- The minimum clearances for cable trays shall be in accordance with Canadian Electrical Code C22.1-09.
- Allow 300mm (12in) vertical clearance excluding the depth of cable trays, between cable trays installed in tiers.
- 300mm (12in) vertical clearance from the top of cable trays to all ceilings, heating ducts and heating equipment.
- 600mm (24in) horizontal clearance on one side of cable tray mounted adjacent to one another or to walls or other obstructions.
- All cable trays/ladders shall be labeled at regular intervals. The distance separating labels shall not exceed 15 metres (50ft).
- The design fill ratio of a cable tray is 25% to a maximum fill ratio of 50% as per ANSI/TIA-569 standard.





## DESIGN GUIDE OF CONDUIT SYSTEM

- All telecommunications cables shall be installed in home run EMT conduits originating from the outlet to the cable tray system, Telecommunications Enclosure, or Telecommunications Room. The use of J-hooks, brackets and other attachments are not preferred but acceptable. Only Velcro ties are allowed. Plastic cable ties are not allowed in any condition.



- The inside radius of a bend in a conduit shall be not less than six times the internal diameter when the conduit is less than 50mm (2in) in diameter and ten times the internal diameter when conduit is 50mm (2in) in diameter or larger.
- All zone conduits shall be identified and labeled at both ends and at regular intervals not to exceed 10 metres (32.8ft). Tags shall identify start and finish of conduit runs. Pull boxes shall be labeled on the exposed exterior.
- All conduits shall originate and be physically connected to the telecom backboards in the Equipment Room, Telecommunications Room, cable tray and pull box.
- All metallic parts of the cable distribution supporting system shall be bonded together mechanically inclusive of all transition points (i.e. cable tray and distribution conduit not mechanically connected) using a 6 AWG green jacketed stranded copper ground wire. The metallic components of the cable distribution system shall be bonded together at the ER and TRs and then bonded to their respective telecom ground busbars.
- All fittings, connectors and couplings shall be of the same material as the conduit used on site.
- All conduits/sleeves that enter the ER or any TR shall be fitted with an approved ground bushing with ground lug and bonded together mechanically (one continuous piece preferred). This shall be connected to the approved building ground by means of a No. 6 AWG to the grounding busbar.

- Cable fill capacities of conduit shall not be greater than 40%.
- All conduits entering or existing through the ceiling or walls of the ER or TR shall protrude into the room 25-50mm (1-2in).
- Riser sleeves in the Equipment Room/Server Room and Telecommunication Rooms shall protrude through the floor 50-75mm (2-3in) above finished floor (AFF).
- All conduit runs shall follow building grid lines and shall be concealed where possible.
- All conduits shall be EMT, reamed and bushed at both ends and bonded to the distribution system unless installed in areas deemed chemically hazardous in which cases PVC coated or Aluminum conduit shall be used. Approval from the City of Toronto is required in such instances.
- All conduit runs shall be a maximum of 30 meters (100ft) in length with a maximum of two 90 degree bends between pull points, unless otherwise specified.
- Conduits ending in the vicinity of a cable tray shall be terminated at a height of no less than 100mm (4in) and no more than 150mm (6in) from the top of the cable tray. Conduit runs shall not be punched through the side of the tray. Conduit ends shall be bonded to the cable tray.
- The use of LB, LL, LR, C and T type fittings are not permitted. Only LBs designed and manufactured for communications systems are allowed where applicable.
- Conduit fittings shall not be used in place of pull boxes or bends.

#### DESIGN GUIDE OF PULL BOX

- A pull box shall be placed in conduit runs where the sum of the bends exceeds 180 degrees, where the overall length of the conduit run is more than 30m (100ft), or if there is a reverse bend in the run.
- Pull boxes shall be constructed and sized in accordance with Canadian Electrical Code, TIA and BICSI standards of code gauge steel and shall have a rust resistant finish.
- In all instances pull boxes shall be placed in straight sections of conduit run and shall not be used in lieu of a bend. Corresponding ends of the conduit are to be aligned with each other. Conduit fittings shall not be used in place of pull boxes or bends.
- Conduit must enter the outlet boxes from the top or bottom.
- Pull boxes shall be installed at a reasonable height, in an exposed location and such that access for installation of cables is not prohibited. Pull boxes shall not be placed in a fixed false ceiling

space, unless immediately above a suitably marked and hinged access panel. Provide indicator decals on ceiling T-bar rail or ceiling tiles showing location of pull box or splice box.

- All conduits shall be installed in accordance with Canadian Electrical Code, Part 1 Section 12, applicable building codes and ANSI/TIA 569.
- The minimum size (inside diameter) for conduit running between the Equipment Room or a Telecommunications Room and the Telecommunications outlet at an outlet location is 25mm (1in).
- The maximum horizontal cable run distance shall not exceed 90 metres (295ft).
- The cable length from the mechanical termination in the TR and ER to the telecommunications outlet, where the horizontal distance exceeds 90m (295') provided additional rooms as required.
- Future requirements for additional cables to each outlet shall be considered.
- A pull cord shall be installed in all conduits.
- The telecommunications outlet conduit system shall be labeled green.
- Place pull boxes in readily accessible locations only.
- The use of LB, LL, LR, C and T type fittings are not permitted. Only LBs designed and manufactured for communications systems are allowed where applicable.
- There shall be no attachment of pull boxes or any type of panel/enclosure onto the surface of the Telecom Enclosure/Cabinet/Rack. It is strictly prohibited and shall not be allowed in any circumstances to have a box or enclosure attached/fixed on the surface of a Telecom Enclosure/Cabinet/Rack.

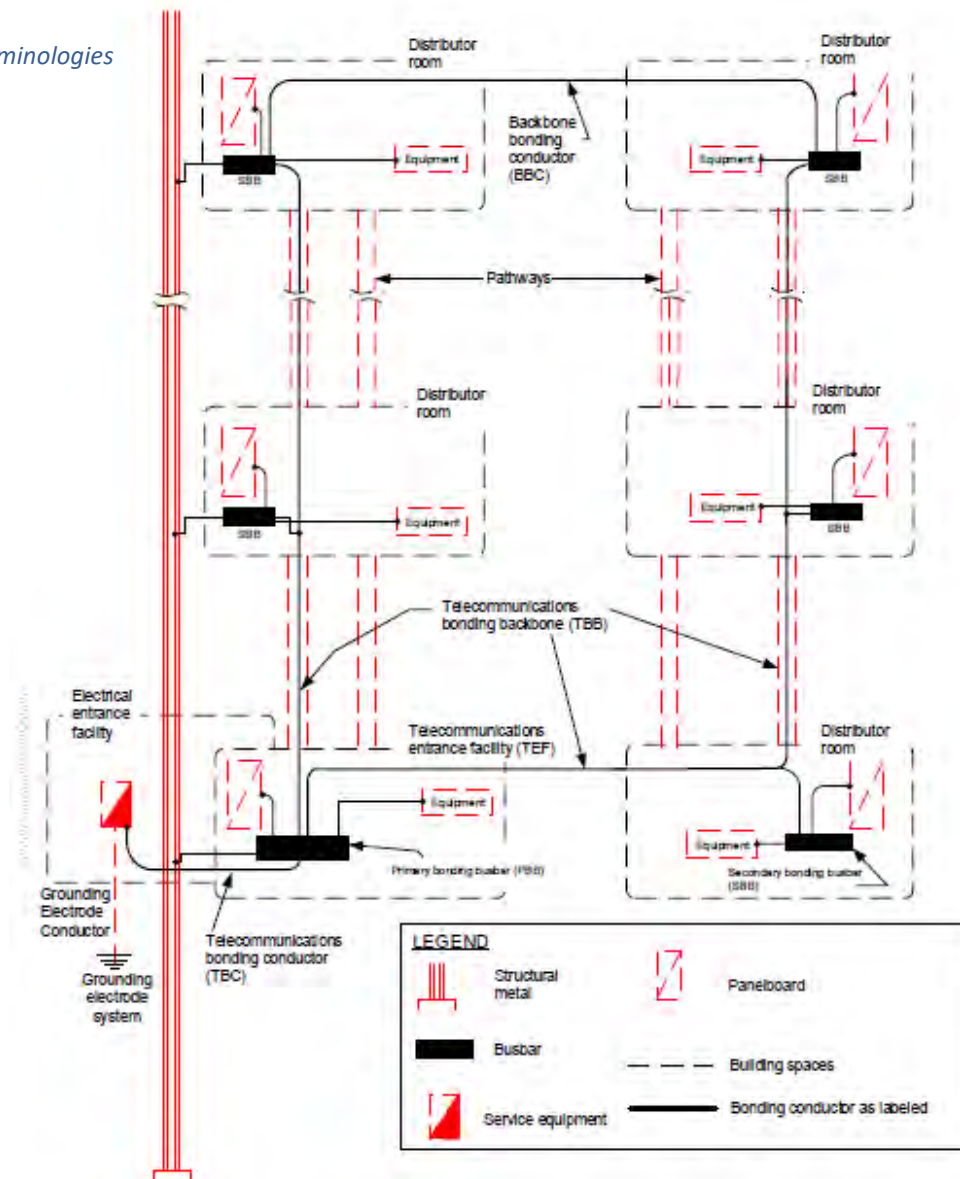
## DESIGN GUIDE OF TELECOMMUNICATIONS BONDING AND GROUNDING SYSTEM

In general, a telecommunications grounding system contains the following components:

- Primary Bonding Busbar (PBB) or Telecommunications Main Grounding Busbar (TMGB)
- Telecommunications Bonding Backbone (TBB)
- Secondary Bonding Busbar (SBB) or Telecommunications Grounding Busbar (TGB)
- Telecommunications Bonding Conductor (TBC)

- The Telecommunications Bonding Backbone (TBB) consists of green jacketed stranded copper conductors and insulated copper busbars. The system extends from the Building Grounding Electrode Conductor through the ER to the TR's, within the building. The construction of the TBB is a requirement of the latest version of the ANSI/TIA-607. This standard shall be used in the design, installation, management and administration of the TBB systems in CoT facilities.

TIA--607-Terminologies



- All metallic parts shall be bonded together mechanically and attached to the approved building ground in accordance with applicable CEC, TIA and CSA standards. In all cases, the CEC shall be met or exceeded.

- Bonding conductors shall be continuous and routed in the shortest possible straight-line path. Any bends placed in the conductor shall be sweeping bends.
- Aluminium wires, clamps or terminal connectors are not acceptable for grounding and bonding.
- The following general requirements shall apply when constructing the TBB system:
  - An insulated pre-drilled, electro tin plated copper busbar, minimum dimensions of 6mm thick x 100mm wide and variable in length, shall be installed on the wall of the ER/EF adjacent to the cable entrance conduits, 150mm from the corner of the ER/EF and 150mm AFF. This busbar is known as the Primary Bonding Busbar (PBB) or Telecommunications Main Grounding Busbar (TMGB) and shall be insulated from its support by a minimum of 50mm.
  - An insulated pre-drilled, electro tin plated copper busbar, minimum dimensions of 6mm thick x 50mm wide and variable in length shall be installed on the wall of each TR (formally known as a Telecom Closet - TC), adjacent to the cable entrance sleeves, 150mm from the corner of the TR and 300mm AFF. These busbars are known as the Secondary Bonding Busbar (SBB) or Telecommunications Grounding Busbars (TGBs) and shall be insulated from its support by a minimum of 50mm.
  - A green jacketed stranded copper ground wire sized to maintain a voltage drop of less than 40 Volts under maximum short time rating. This wire shall be sized no smaller than No. 6 AWG nor larger than a 3/0 and shall be installed from the service equipment ground (main building ground) to the PBB/TMGB in the ER/EF. This ground wire is known as the Telecommunications Bonding Conductor (TBC). The Telecommunications Bonding Conductor (TBC) may be secured to the surface of the building if not subject to physical and mechanical damage, or installed in non-ferrous conduit. If ferrous conduit, such as EMT is used, the conductors shall be bonded to each end of the conduit with a conductor minimum sized as a No. 6 AWG green jacketed stranded copper ground wire.
  - The TBC shall be connected to the Primary Bonding Busbar (PBB)/Telecommunications Main Grounding Busbar (TMGB). The connection to the PBB/TMGB shall be done using a 2-hole electro tin plated compression lug. All joints to the TBC shall be done using irreversible compression-type connectors, exothermic welding, or equivalent.
  - The Telecommunications Bonding Conductor (TBC) shall be connected to the service equipment ground (main building ground) by qualified personnel and in accordance with the CEC and ANSI/TIA-607.
  - A green jacketed stranded copper ground wire sized the same as the Bonding Conductor for Telecommunications, shall be installed from the farthest TR, through each TR to the

Bonding Conductor for Telecommunications located in the ER/EF. This ground wire is known as the Telecommunications Bonding Backbone (TBB). The TBB may be fastened to the underside of open cable tray or installed in non-ferrous conduit. If ferrous conduit, such as EMT is used, the conductors shall be bonded to each end of the conduit with a conductor sized as a No. 6 AWG minimum.

- The TBB in each TR shall be connected to the SBB/TGB. All joints to the grounding wires shall be done using irreversible compression-type connectors, exothermic welding, or equivalent. The connection to the SBB/TGB shall be done using 2-hole compression connectors.
  - The PBB/TMGB in the ER/EF and the SBB/TGB in the TR/TE(s) shall be bonded to the closest electrical panel using a No. 6 AWG green jacketed stranded copper ground wire.
  - The metallic components of the horizontal distribution supporting infrastructure (conduits, cable trays and ducts) shall be bonded to the telecommunications busbars of the ER/EF or TR/TE in which they originate using a No. 6 AWG green jacketed stranded copper ground wire.
- A No. 6 AWG green-jacketed stranded copper ground wire shall be installed from each telecommunications busbar to the metal frame (structural steel) of buildings that are effectively grounded and whose structural steel is accessible.

## SEPARATIONS FROM EMI

- Copper cables shall not be installed at a distance less than 300mm from lighting ballasts, less than 1 meter from electric motors or at a separation distance from source of 480V or less.
- Where electric power cable is not installed in EMT conduit, telecommunications cable shall not be run in parallel with it for more than 10 meters if the separation is less than 300mm.
- Electrical protection must be provided for copper cables entering the building. Protection shall be in accordance with the Canadian Electrical Code CSA C22.1-2006 and BICSI practices.

## DESIGN GUIDE OF TAGGING CONVENTION (IDENTIFICATION AND LABELING)

- The requirements of this section shall take precedence over other sections.
- The labeling of the City of Toronto network components, structured cabling and cable routing/containment shall comply with the ANSI/TIA-606 standard

- The codification of network components, cables and cable routing shall follow the identification standards detailed in this standard.

- For example:

- Building Location: YDE – 30 Dee Ave

- Floor and Room Location: ER – Equipment Room / Server Room / Main Communications Room

TRA – Telecom Room - A

TRB – Telecom Room – B

EF - Entrance Facility

- Service Provider / Network Cabinet Label in ER: COT-IT-YDE-0100

Network Closet

- Network Cabinet Label in ER: COT-IT-YDE-0200

Network Closet

- Server Cabinet Label in ER: COT-IT-YDE-0300

Server Closet

- Patch Panel: A – Data Patch Panel A (A,B,C, etc ...)

FP01 – Fibre Optic Patch Panel

TP01 – Telephone/Voice Patch Panel

- Patch Panel Port: 01 – Patch Panel Port (01, 02, 03, ..., 24)

- Work Area Number: 125 – Work Area number associated in the admin/office areas of the facility

- Work Area Outlet: WA01 – Work area outlet (01, 02, 03, etc...)

1 – Port number (1, 2, 3, 4)

## EQUIPMENT / NETWORK / SERVER ROOM CABINETS IDENTIFICATION AND LABELING

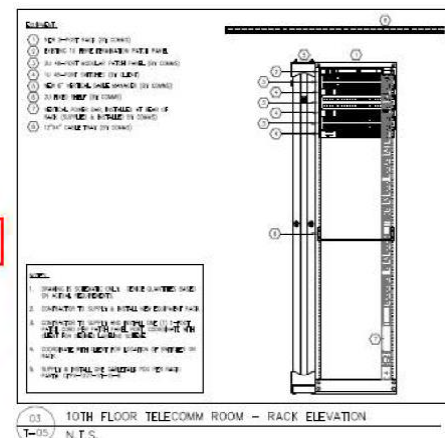
- Equipment Room/Server Room network enclosure contains active network components, including: Network Core Closet, Server Closet and Telecommunications Enclosure.
- All Network Closets/Cabinets related to the Equipment Room (ER) shall be tagged as follows.



- COT-IT-XYZ-XX00, where:
  - XYZ = Site three-character code name
  - XX00 = First two numbers (XX) identify the closet
- For all closets/enclosures/cabinets in the Equipment Room, the last two numbers are always zero (00).
- For Closets/Cabinets in the Equipment Room, they are numbered from (0100) to (1000).
- Network Core Closet and Server Closet nameplate shall conform as follows:
  - Provide nameplate for each enclosure on the bottom-center of the door, front and back.
  - Use engraved gravoply laminate nameplates using black letters on a white background.
  - The laminate nameplates shall have a dimension of 210mm W x 50mm H.
  - Minimum character height shall be 12mm. Character lettering shall be centered on each line.
  - Mount nameplates with two stainless steel machine screws.
  - Include device identification (tag) number as well as a descriptive name.
  - For example: the tag name: COT-IT-XYZ-0100 followed by the description: Sample nameplate diagram is as below:

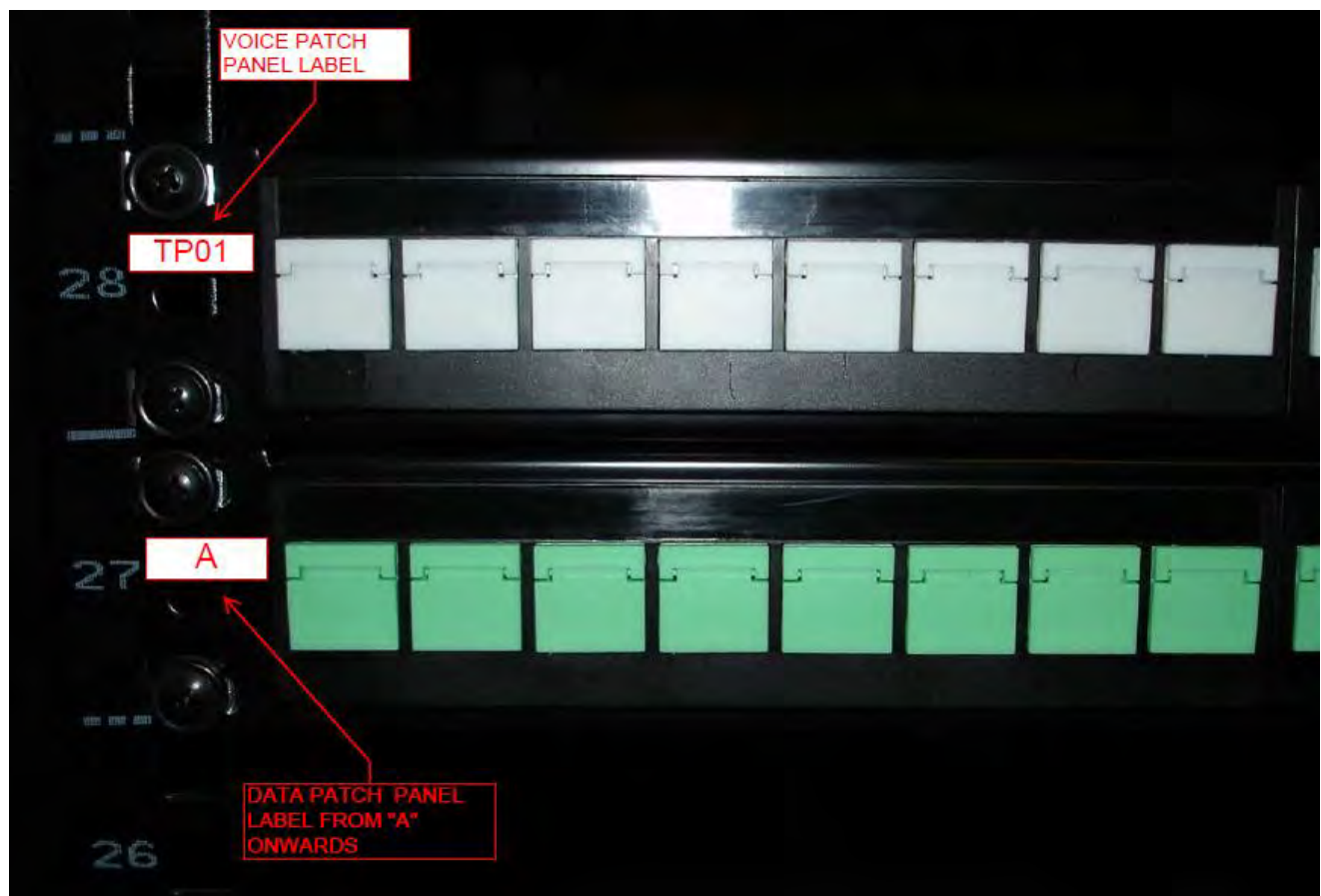


COT-IT-YDE-0100  
NETWORK CLOSET  
(Lamacoid label on  
the cabinet shall be  
at the bottom. IT  
will provide lamacoid  
spec standard )

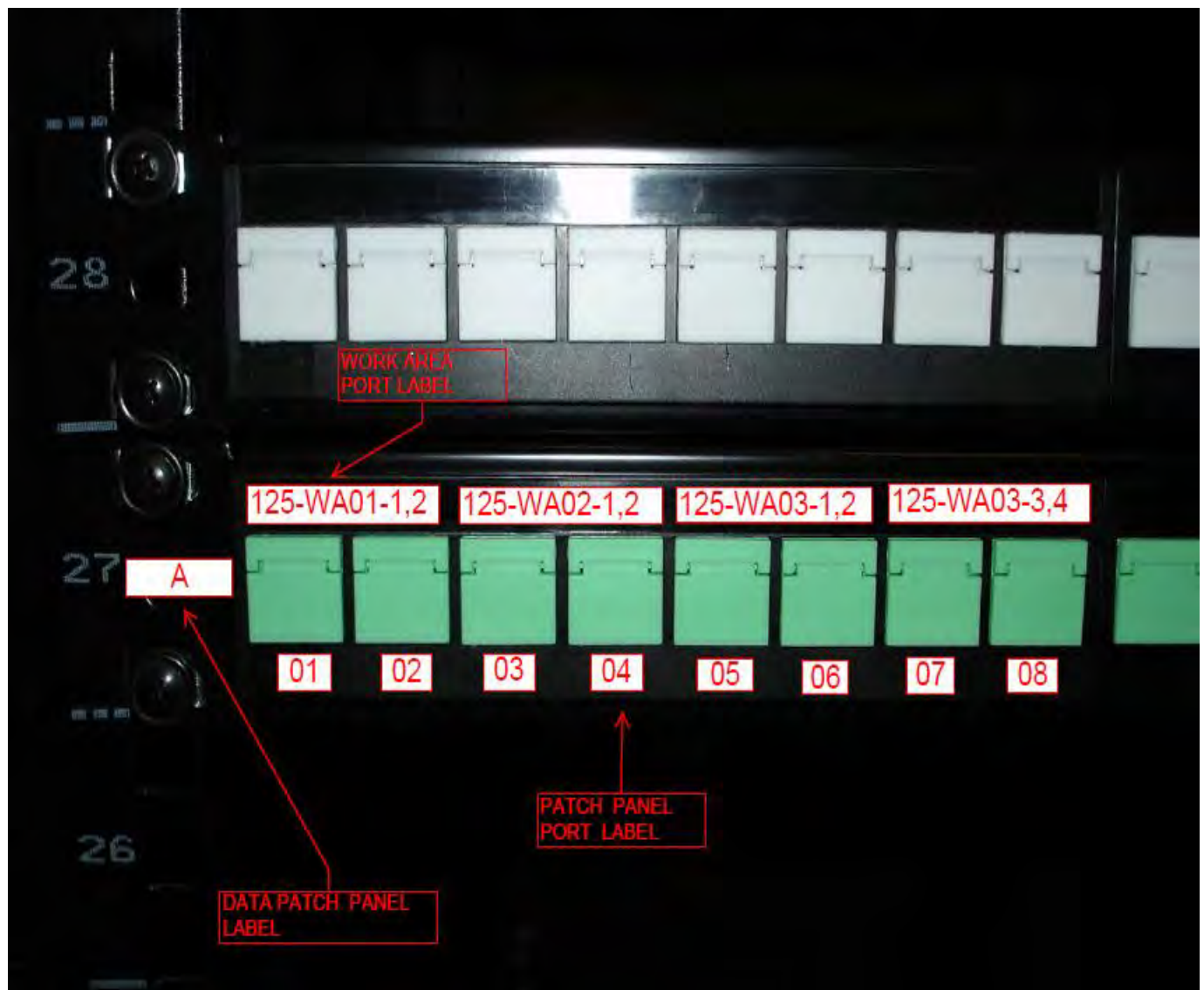


**COPPER PATCH PANEL (CP) & WORK AREA OUTLET (WA) IDENTIFICATION AND LABELING**

- The copper data patch panels in a Telecommunications Enclosure/Closet shall employ one character A, B, C, ..., Z. The rack shall be populated with patch panel(s) as necessary and labeled in sequential order from top to bottom.
- For example, the first copper data patch panel from the top of the rack shall be labeled A, the second shall be B, and so on.
- Each 24-port patch panel shall have six (6) snap-in faceplates that group four terminations. For office areas, the minimum number of ports associated with a work area outlet shall be a group of two (2) ports.
- Labels shall be applied to patch panels in such a manner as to be readily visible and not obscured by structured cabling or patch cords.



- Labels for each 4-port or 2-port, snap-in faceplate shall be laser printed, self-laminating, adhesive, polyester or polyolefin. Hand-written labels shall not be accepted.
- Lettering shall be black on a white background. Characters are a minimum of 4mm high.
- Apply a label on the top of each group of 4-ports or 2-ports on the snap-in faceplate to indicate the destination of the cables terminated on the data ports (RJ).
- For office areas, the label 125-WA01 would be applied on the patch panel for a group of 2 ports with destination cables to work area outlet 125-WA01. Whereas, 125 represents the room number of the facility and WA01 represents the work area 01.



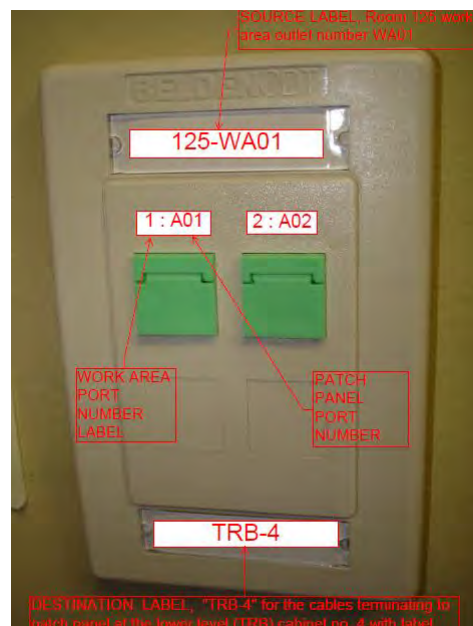
- Apply a two-digit label immediately above each data port (RJ) indicating its destination port number on the work area outlet. For example, a group of four consecutive ports on a 24-port patch panel whose destination is port numbers 1 to 4 on a WAO would have the ports labeled 1, 2, 3, 4. Provide color-coded, snap-in icons for each data port (RJ).

## FIBREOPTICS PATCH PANEL (FPP) IDENTIFICATION AND LABELING

- Lettering shall be black on a white background. Characters are a minimum of 4mm high.
- Terminate all 12 fibres of each fibre optic cable in Fibre Enclosures (Telecommunications Enclosure or Network Core Closet).
- The fibre cable for all even-numbered Telecommunications Enclosures shall terminate at Network Core Closet 02 (XYZ-0200) while odd-numbered shall terminate at Network Core Closet 01 (XYZ-0100).
  - For cases where Network Core Closet 01 and Network Core Closet 02 are located in different Equipment Rooms, Telecommunications Rooms / Telecommunications Enclosures shall have fibre terminating in both Network Core Closets.
- The ordering and color of individual fibres shall be the same for each fibre cable and compliant with the latest ANSI/TIA-568.3 and ANSI/TIA-598 standards.
- Labels for patch panels shall be laser printed, self-laminating, adhesive, polyester or polyolefin. Hand-written labels shall not be accepted.
- Labels shall be applied to patch panels in such a manner as to be readily visible and not obscured by structured cabling or patch cords.
- A label shall be applied to the top of the LC duplex adapter modules associated with a single fibre cable indicating the destination of the cable.
- For example, the adapter modules that terminate the fibre cable whose destination is Telecommunications Enclosure 1400 would be labeled as XYZ-1400.
- The fibre patch panel label shall be labeled as follows FPXX where XX is the fibre patch panel sequence i.e. 01, 02, 03...etc. The rack shall be populated with patch panels as necessary and labeled in sequential order from top to bottom.
- For example, the first patch panel from the top of the rack would be labeled as FP01, the second is FP02 and so on.

## WORK AREA OUTLET (WAO) IDENTIFICATION AND LABELING

- Labels for each 4-port, work area outlet shall be laser printed, self-laminating, adhesive, polyester or polyolefin. Hand-written labels shall not be accepted.
- Lettering shall be black on a white background. Characters shall be a minimum of 4mm high.
- A label shall be applied to the top of each 4-port, work-area outlet indicating the source of the Horizontal cables.
- For example, WAO port 1 connected to patch panel A port 1 would be labelled as A01. WAO port 2 to patch panel A port 2 is labelled A02 and so on.



## CABLE IDENTIFICATION AND LABELING

- Use durable non-fading sleeve type wire markers to identify all network cables.
- Labels for cabling shall be laser printed, self-laminating, adhesive, polyester (indoor/outdoor). Hand-written labels will not be accepted.
- Lettering shall be black on a white background. Characters shall be a minimum of 4mm in height.

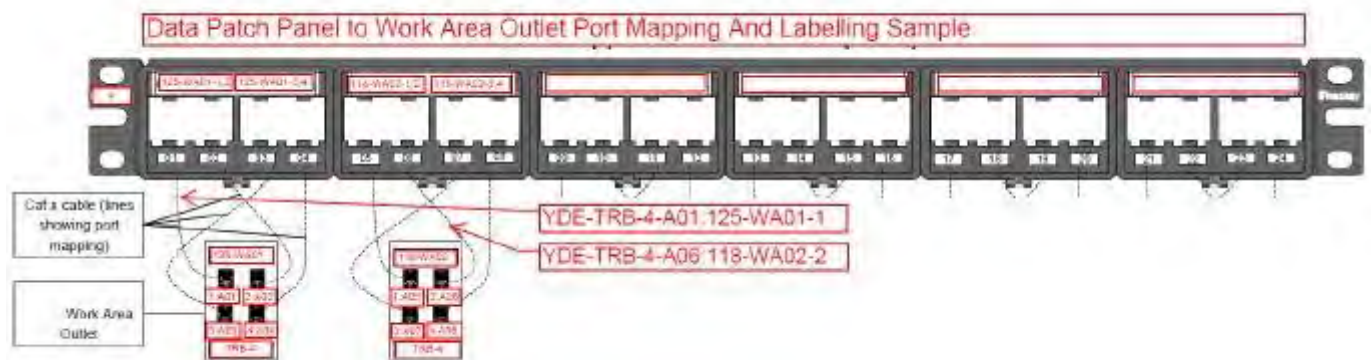
## FIBREOPTICS BACKBONE CABLE IDENTIFICATION AND LABELING

- As a minimum, all fibre optic backbone cables shall be labeled at both ends of the cable, within every pull box and every 15 metres.
- In addition, the fibre backbone cables shall be labeled at each transition. A transition is defined as: a change in ducting (e.g. cable tray to conduit), a change in direction of more than 45 degrees, or an entrance and exit of ducting through a wall or floor.
- If the fibre cable is run in conduit then the transition labels shall be applied to the conduit.
- The tagging convention for identification of fibre optic backbone cables shall indicate the source and destination of the cable separated by a colon.
- For example, a fibre optic backbone cable whose source is Network Core Closet 2 (XYZ-0200), Fibre Patch Panel 01, adapter panel A and terminates in Telecommunications Enclosure 1400 (XYZ-1400) on the fibre patch panel 01 adapter panel A would have the following tag: 0200-FP01-A.01: 1400-FP01-A.01. The last "01" digits represent fibre strands.
- The Telecommunications Enclosure fibre optic patch panel must be labeled. For example: Telecommunication Enclosure 1400 with two fibre optic patch panels would be labeled "FP01" and "FP02", where "FP01" is the first patch panel from the top.

## HORIZONTAL COPPER CABLE IDENTIFICATION AND LABELING

- As a minimum, all horizontal CAT6/CAT6A cables shall be labeled at both ends of the cable, within every pull box and every 15 metres.
- In addition, the cables shall be labeled at each transition. A transition is defined as: a change in ducting (e.g. cable tray to conduit), a change in direction of more than 45 degrees, or an entrance and exit of ducting through a wall or floor.
- If the cable is run in conduit then the transition labels shall be applied to the conduit.
- The tagging convention for identification of Horizontal cables shall indicate the source and destination of the cable separated by a colon.
- Example 1: a horizontal cable whose source is Telecommunications Enclosure TRB-4, Patch Panel A, port 01 and whose destination is port 1, Work-Area Outlet 01, in room number 125 would have the following tag: YDE-TRB-4-A01:125-WA01-1.





## VOICE BACKBONE CUPPER CABLE IDENTIFICATION AND LABELING

- As a minimum, all voice backbone cables shall be labeled at both ends of the cable, within every pull box and every 15 metres.
- In addition, the voice backbone cables shall be labeled at each transition. A transition is defined as - a change in ducting (e.g. cable tray to conduit), a change in direction of more than 45 degrees, or an entrance and exit of ducting through a wall or floor.
- If the voice cable is run in conduit then the transition labels shall be applied to the conduit.
- The tagging convention for identification of voice cables between the voice block and the Telecom Closet/Enclosure patch panel in the building shall be VFFA-CC : XYZ-A-TP01 (indicate the source and destination of the cable separated by a colon), where V indicates voice, FF indicates the floor number, EF indicates telecommunications entrance facility ID, CC indicates 2-digit voice cable number, and XYZ-A is telecommunications closet/enclosure ID.
  - For example, voice cable 01 whose source is entrance room EF and terminates in Telecommunications Room B (YDE-TRB) on patch panel TP01 would have the following tag: V01EF-01 : YDE-TRB-TP01.

## PATCH CORD IDENTIFICATION AND LABELING

- As a minimum, all Contractor installed CAT6/CAT6A or fibre optic patch cords shall be labeled at both ends of the cable.
- The tagging convention for identification of patch cords shall indicate the source and destination of the cable separated by a colon. The source is the switch port and the destination is the patch panel, termination point.

## CABLE PATHWAYS IDENTIFICATION AND LABELING

- All ducting (cable tray or conduit) carrying fibre optic and multi-pair voice backbone cables shall be tagged as "LAN BACKBONE".
- All ducting (cable tray or conduit) carrying Horizontal cables shall be tagged as "LAN HORIZONTAL" with the source and destination network panels.
- All ducting shall be labeled at each transition. A transition is defined as - a change in ducting (e.g. cable tray to conduit), a change in direction of more than 45 degrees, or an entrance and exit of ducting through a wall or floor.
- Use engraved gravoply laminate nameplates using black letters on white background.
- The laminate nameplates shall have a dimension of 210mm W x 50mm H.
- Minimum character height shall be 12mm. Character lettering shall be centered on each line.

## FIRE STOPPING

- Fire stop systems in commercial premises shall meet the requirements of latest ANSI/TIA-569.
- Fire stop systems should be designed to be compatible with the worst-case environment to which they will be exposed (refer to ANSI/TIA-568.0 for information on environmental classifications).
- Provide EZ PATH solution where conduit penetrates fire rated walls, floors, partitions and ceilings to ensure that the fire rating is maintained. Abandoned penetrations shall be properly fire stopped. Provide EZ PATH system.
- The required fire rating is minimum 2 hours.

## SUBMITTALS

- Comply with the requirements of Section 01300 - Submittals.
- Shop Drawings shall be submitted to the City of Toronto IT staff for final review before proceeding with any works.



- The shop drawings and all submissions shall be reviewed and sealed by the RCDD Contractor's PM and re-reviewed and sealed by the Consultant's RCDD before reaching the City for final review.
- Final design drawings/construction drawings shall be submitted to the City of Toronto IT staff for final review and before proceeding with any works. These drawings shall be reviewed by PM RCDD Contractor and re-reviewed and approved by RCDD Consultant before reaching to the City for final review.
- The CADD drawings shall meet the City's CADD standards. Any non-compliance shall be at the Consultants own expense.
- Submit proposed cable and enclosure tag labels to the Contract Administrator and the City of Toronto IT Technical Representative for approval before proceeding with this work.
- Submit red-lined Site Drawings identifying the proposed location of all enclosures including Telecommunication Enclosures, Termination Panels and Work Area Outlets prior to installation and as part of shop drawing submittals.
- Submit site drawings identify the fibre optic backbone cable routes and horizontal cabling routes to be used prior to installation and as part of the shop drawing submittals.
- Prior to x-raying and coring access holes submit red-lined Site Drawings showing the proposed location of the holes.
- Submit red-lined annotated working Drawings to the Contract Administrator, to clearly document the as-built network including details related to: location (closets, work area outlets), cabling (size, length, type, routing), tagging (cable ducting, cabling, closets and work area outlets).
- Submit all submissions in both a hardcopy and electronic native format. Handwritten submissions are not acceptable. Also, submit electronic files in a PDF digital format that is indexed and searchable.
- Submit the following documentation prior to starting the site acceptance test:
  - City of Toronto IT/Network Services — Cable Test Results
  - Operations and Maintenance Manual of any and all electronic equipment to or is installed.
  - Revise and annotate Contract Drawings, to clearly document the as-built network including details related to: location (closets, terminations panels) cabling (size, length,

type, routing), tagging (cable ducting, cabling, closets and termination panels) final as built drawings, cabling schematics, pathways and conduits drawings (containment system), any other documents, reports and drawings needed by the City of Toronto during or after work is completed.

- Consultants shall review and approve all submissions prior to final review by the City.
- Consultant is responsible to submit the final as-built drawings of the project / facility to the City.

**END OF SECTION**

## SECTION -2: PRODUCTS

Products and part numbers often change without notice. The Consultant shall verify all parts specified and used are current and available.

Consultant shall practice the procedure of shop drawings / products approval as stated in this section. Shop drawings shall be submitted by the Contractor to the Consultant. The Consultant / Designer shall review and approve the shop drawings submittal before sending it to the City of Toronto IT for final review. After receiving the submittal from the City IT, the Consultant / Designer shall send the final approval or approval with comments / notes to the Contractor.

### APPROVED MANUFACTURERS

- All backbone fibreoptic cables, connectors, patch cords, patch panels, cassettes and adaptors shall be from Belden.
- All CAT6/CAT6A modular jacks, faceplates, U/UTP patch cords and Category 6/6A cables shall be from Belden.
- Where cross connect punch down is required at Entrance Facility for termination of all voice backbone cables, it shall be from Belden.
  - [www.belden.com](http://www.belden.com)
- All wall mount Telecommunication Enclosures shall be from Hammond Manufacturing.
  - [www.hammondmfg.com](http://www.hammondmfg.com)
- All free standing Paramount Telecommunication Enclosures in the Equipment Room / Telecom Room shall be from Chatsworth Products.
  - [www.chatsworth.com](http://www.chatsworth.com)
- All fire-stopping EZ-PATH components shall be from Specified Technologies Inc.
  - [www.stifirestop.com](http://www.stifirestop.com)
- For UPS and Power Distribution Unit, Liebert - Emerson and APC shall be the manufacturers.
  - [www.emersonnetworkpower.com](http://www.emersonnetworkpower.com) ; [www.apc.com](http://www.apc.com)
- Manufacturer Substitution of any part other than those specified in this standard is strictly prohibited without the written consent of the City of Toronto Information Technology (IT) Network Services Division.

## ENTRANCE FACILITY PROTECTION

- Indoor voltage protector to protect entrance terminal to provide voltage and current protection and a disconnect facility at building entry points.
- Integral, 28 AWG (0.32 mm), non-replaceable fuse link wire between the incoming pairs and the protector modules.
- 25-pair connector for single-pair terminations (one pair "IN", one pair "OUT"), compatible with 22 to 26 AWG.
- The protected entrance terminal shall comply with CSA specification C22.2, No. 226-92, "Protectors in Telecommunication Networks," including the high-voltage fault test.
- Protectors to be included with supplied assembly.
- Consultant to use Belden data sheet to specify correct part number for the application.

## FIRE RATED BACKBOARD PLYWOOD

- In the Entrance Facility, Equipment Room and Telecom Room Fire Rated plywood shall be provided on the walls or struts such that there is proper cable penetration from behind.
- Plywood shall be void-free and either fire-rated or treated on all sides with at least two coats of fire-retardant light-colored paint.
- Have at least two walls lined with A/C grade or better, 2.4 m (8 ft) high with a minimum thickness of 19 mm (3/4 in). To reduce warping, plywood should be kiln-dried to maximum moisture content of 15 percent. Mount plywood 200 mm (8 in) AFF to avoid damaging the plywood. Have the plywood with the grade A surface exposed. The plywood should be securely fastened to wall-framing members to ensure that it can support attached equipment.
- All joints screw and nail holes are to be caulked and / or covered.
- The plywood is to be provided for cross-connect fields, security panels, power supplies etc. as may be required and is not intended for cabinet installation.

## NETWORK CABINETS (CORE AND SERVER CLOSETS)

- 44U Floor Standing Cabinets
  - Cabinets shall be supplied and installed complete with all accessories to provide a complete cabinet as indicated below.

- Cabinets shall be floor mounted, freestanding and have the ability to be ganged together.
- Cabinets shall have a capacity of 44U with mounting holes as per EIA-310-E.
- Each server cabinet shall be black with square hole rails.
- Each network / service provider cabinet shall be black with round hole rails.
- Specified Product:
  - W762mm X D1067mm X H2133mm Cabinet
  - Front Door
  - Rear Split Door
  - Solid Side Panels
  - Rackmount rails (square for server and round for network cabinets)
  - Top Panel
  - 483 mm (19") Mounts with cage nuts
  - 10-32 Cage nuts and screws (square for server and round for network cabinets)
- Electrical
  - Contractor is to provide the electrical distribution for each IT Network and Server cabinet as per the related Electrical Distribution drawings and relevant City standards.
  - Bond each 19" cabinet to ground.
  - Provide each Core and Server cabinet with two (2) 20A, 120 VAC, receptacles for UPS circuits. Terminate each UPS circuit at a 3-wire, duplex receptacle mounted to the rail of the 19" cabinet.
  - The duplex receptacles shall be mounted in such a manner as not to interfere with access to or removal of other equipment within the enclosures.
  - Power distribution within the enclosure shall be via vertically mounted metered power bars.
  - Redundant power supplies, within the same device, shall not be connected to the same UPS circuit.

- Power Distribution Unit (PDU – Power Bar)
  - The Liebert MPH rack PDU shall be managed three-phase power distribution unit that shall be monitoring along with receptacle control.
  - Liebert MPH units shall be available for mounting in either vertical, zero-U configuration and rack-mounting in standard, network enclosures.
  - The output receptacles support equipment requiring connection with NEMA 5-20R and IEC60320-C13 plugs.
  - Remote monitoring shall be enabled by the included communication card, the Liebert RPC™, which permits managing the Liebert MPH over a secure Web page and SNMP-based network management system.
  - The Liebert RPC shall permit interconnecting multiple Liebert MPH and / or Liebert MPX units for monitoring and management.
  - A Liebert MPH shall be monitored locally with an RPC BDM™, an optional display module that connects directly to the communication card. The display module can be handheld, mounted in or on the rack or mounted on a nearby wall.
  - Multiple Liebert MPHs can be centrally managed with Liebert Nform™, which adds group-based receptacle management.

## TELECOMMUNICATIONS ENCLOSURE (TE)

- Unless otherwise specified all indoor enclosures containing network components are to be NEMA 12.
- A lockable double hinged door allows front and rear access to rack-mounted components.
- All screws, bolts, fasteners etc. shall be corrosion resistant stainless steel.
- All wall-mounted panels shall be separated from the wall by stainless steel spacers or galvanized steel struts.
- Doors shall have continuous hinges with removable pin and oil resistance cellular neoprene gasket secured by gasket retainers. Front door handles shall be recessed type (freestanding enclosures) or 3-point external latch (wall mount), complete with key locks.
- Provide locking mechanism for rear door. All key locks shall be identically keyed.
- Key number shall be provided.

- Cable bundles shall be neatly laced, run in ducting or approved cable managers and secured to 19" cabinet or mounting back-panel.
- All enclosure doors shall open through 180 degrees without restriction from front and the back.
- Enclosure layout and equipment spacing shall be constructed to allow for device removal, calibration and maintenance without disassembly of adjacent devices.
- All enclosures shall have sufficient structural reinforcements to ensure a limited plane surface vibration and to provide rigidity during shipment, installation and operation without distortion or damage to the enclosure, mounting panel or mounted instruments.
- All enclosure seams shall be continuously welded and ground smooth to be undetectable after painting.
- Devices shall be installed on the enclosure back-panel or 19" cabinet only.
- There shall be no devices installed on the side plates of the enclosure.
- Conduit accessibility shall be per manufacturer's guidelines with conduit egress through the bottom and sides but not the top of the enclosure.
- There are three sizes of TE, 12U, 19U and 26U. All provided by Hammond Manufacturing.
- Minimum items in the TE shall include but are not limited to one fibre termination panel (1U), three 24 port (1U) patch panels (1 x Telephone and 2 x Data), two (2) 24 ports or one (1) 48 ports Cisco switch, two (2) 2U Horizontal Cable Manager, one (1) 1U monitored PDU and other optional equipment as may be requested by CoT-IT such as UPS or other equipment.
- All TEs shall be bonded to the Telecommunications Bonding System as per the standard.
- The bonding cable shall be sized according to distance and terminated at the nearest Telecommunications Grounding Busbar and run within conduit.
- The TE shall be CSA approved and sealed.
- Provide the enclosure electrical distribution as per the Telecommunication Enclosure (Typical) - Electrical Distribution drawing.
  - The Telecommunication Enclosure shall be powered by two separate 15 A, 120 VAC supplies (Utility and Network). The Utility Supply is to power non-critical components (enclosure lighting and power bar). The Network Supply (UPS) is to power the critical network components (Ethernet Switch) and environmental controls (ventilating fans).

Contractor shall provide the Utility Supply from the nearest lighting panel as per the TE Installation drawings. The Network Supply is to be provided by others. Where applicable, the Contractor shall provide a 15A Supplementary DIN rail mounted breaker for termination of the Network Supply. In addition, the Contractor shall provide a knockout for the Network Supply conduit as per the Access Closet Installation drawings. All power distribution installation shall be mounted to the top rear side of the TE.

- Provide 120 VAC, 3-wire, duplex receptacles, circuit breakers, surge suppressor, wire duct and grounding bar per the Telecommunication Enclosure Layout drawing and associated Component Schedule. The Contractor shall provide rigid-steel conduit and wiring to provide the 15 A, 120 VAC Utility Supply as per the Access Closet Installation drawings. The Utility Supply shall be terminated at a 15 A, DIN rail mounted, circuit breaker and surge suppressor. Distribution of the Utility Supply is as documented in the Telecommunications Enclosure – Electrical Distribution drawing.
- All power distribution installation shall be mounted to the top rear side of the TE.
- A rack mount UPS shall be supplied that will power the Telecommunication Enclosure Network Supply. The Contractor shall be responsible for the distribution of the Network Supply within the TE and for providing a 15 A supplemental breaker for termination of the supply by others.
- Power Distribution Unit (PDU - APC)
  - The APC rack mount PDU/transfer switch shall be managed three-phase power distribution unit that monitoring along with receptacle control.
  - The APC units shall be available for rack-mounting in standard, network enclosures.
  - The output receptacles support equipment requiring connections (10) with NEMA 5-15R.
  - Remote monitoring shall be enabled with a secure Web page and SNMP-based network management system.
  - The APC PDU shall permit interconnecting multiple units for monitoring and management.

#### WORK AREA OUTLETS FOR OFFICE AREA

- All modular jacks, faceplates and furniture inserts shall be Belden and performance rated to Category 6/6A.



- Provide one 4-port, single-gang, work area outlet in each work area for termination of the horizontal CAT6/6A cables with faceplates or decora module frames.
- For new construction, it is recommended that the outlet boxes be 100mm X 100mm X 54mm deep, complete with a mud ring cover specifically designed for single gang faceplates intended for flush mounting to the wall. This single gang outlet box aids in the maintaining of Category 6/6A and higher bend radius requirements.
- Where walls are not suitable or have insufficient depth, standard electrical size outlet boxes shall be used.
- Each manager's office shall have two (2) work area outlets on separate walls.
- One (1) 4-port, work-area outlet shall be associated with as many ports necessary (in groups of 4 or 2) on the snap-in faceplate installed in the patch panel of the TE or TR as is provided.
- Within each office outlet, only two of the ports shall be terminated at the work area faceplate and patch panel unless otherwise specified.
- Space shall be left in each conduit and faceplate for a third and fourth cable to be added at a later time.
- In the majority of cases one (1) 4-port, work-area outlet shall be installed within each systems furniture cubical work area partition.
- In some special situations where the systems furniture is configured fully the work-area outlet shall be installed directly on the wall in the office areas.
- Within systems furniture, only two of the four positions shall be terminated with work area jacks and on the patch panels unless otherwise specified.
- Space shall be left in conduits and faceplates for the inclusion of a third and fourth cable at a later time.
- In boardrooms and large general office areas, one single gang work area outlet shall be provided every 3.0 metres and within 1.0 metres of an electrical outlet if provided.
- Only two of the four positions shall be terminated with work area jacks and on the patch panels unless otherwise specified.

## FACEPLATES

- Faceplates shall be modular Belden white format opening to allow the possibility of changing connector types in the future without replacing the entire unit.
- Faceplates shall be equipped with small form factor terminating connectors to fit the individual outlet's requirements
- Faceplates shall be equipped with a minimum of four (4) openings for modules. Contractors are to equip the faceplate with the required number of blank inserts as required.

## WORKSTATION FACEPLATES AND ADAPTERS - CUBICLES

- Workstation outlets shall be supplied and installed for all terminations at the workstation end and as further specified below to suit the application.
- Each workstation shall be equipped with minimum two (2) RJ45 Cat6/6A green color jacks.
- The Communications Consultant shall confirm the color of outlets prior to placing order.
- Modular Furniture Faceplates
  - Modular furniture faceplates shall be installed in all furniture outlets that have a modular furniture knockout shall consist of 4 ports.
  - Each outlet shall be installed with the specified termination modules or a blank insert. No openings shall remain exposed.
  - Communications Consultant shall verify furniture modular faceplate requirement.
  - Belden MDVO modular furniture adapter, 4 port, white
  - Belden MDVO modular furniture adapter, 4 port, black
- Surface Mount Boxes
  - Surface mount boxes shall be installed for all furniture outlets that do not have a modular furniture knockout, exposed ceiling outlets or any location not provided with an electrical back box.
  - The surface mounted box shall consist of a minimum of two (2) ports.
  - Each outlet shall be installed with the specified termination modules or a blank insert. No openings are to remain exposed.

- Belden MDVO side entry box, white
- Belden MDVO side entry box, black

#### RJ45 CAT6/6A JACKS

- Belden Eight-position modular jack (RJ45), type Category 6/6A to TIA-568 shall be green color and shall have the following minimum performance characteristics:
  - Modular jack current rating: 1.5 Amperes maximum
  - Modular jack durability 1,000 mating cycles
  - Modular jack contact Pressure: 100 grams minimum per contact
  - Dielectric voltage strength: 1,000 V RMS at 60Hz for 1 minute
  - Insulation resistance: 200 milli-ohms minimum
  - Contact resistance 1 milli-ohms per contact
- The contact material of the jack in a modular jack connector shall be phosphor bronze with 50 micro-inches of gold over nickel.
- UTP termination modules shall be of the same category as the UTP cabling to ensure that manufacturer end to end warranties can be attained.
- UTP cables used for IP voice shall be terminated with the same specified jacks.
- All UTP termination modules shall be Belden MDVO type.
- Belden CAT6/6A modular jack, MDVO style, green color.
- Belden ID data tab, MDVO style, green color.

#### COPPER PATCH PANEL (CPP)

- All horizontal CAT6/6A U/UTP cabling shall be terminated on 1U, 24 ports, Belden CAT6/6A modular patch panel.
- All copper patch panels shall be black.
- All modular patch panels shall be populated with CAT6/6A UTP modules/jacks as required.
- The modular copper patch panel shall mount to standard TIA 482.6 mm (19") rack.

- Contractor to refer to installation instructions provided with the patch panel for proper installation.

#### COPPER CAT6/6A HORIZONTAL CABLE (U/UTP)

- Belden, four-pair, 100 ohm balanced unshielded-twisted-pair (U/UTP) cable, appropriate flame test classification, Category 6/6A (CAT 6/6A) shall be in compliance to TIA-568 standard.
- All cables fully contained within conduit or areas that are not plenum rated shall use CMR/FT4 rated cable.
- Any cable, regardless of length passing through a return air plenum ceiling and not in conduit shall be rated CMP/FT6.
- All UTP cables shall meet requirements identified below:
  - Color: Blue
  - Rating: CMR/FT4 (riser rated or in conduit) or CMP/FT6 (plenum areas or in J-hooks)
  - Category: 6/6A
  - 23 AWG, spool-in-a-box
- All CAT6/6A horizontal cables shall be eligible for the Belden 25 years Certification Warranty.
- Cabling shall be installed and terminated as per the BICSI Installation Methods Manual, Belden Certification training and the manufacturers' installation instructions.

#### COPPER CAT6/6A PATCH CORD (U/UTP)

- Patch cord shall be manufactured of stranded conductor cable with 8-position, 4-pair terminations at both ends.
- All patch cords shall be manufactured by Belden and performance rated to CAT 6/6A.
- All patch cords shall be of the same or higher performance category and manufacturer of the U/UTP horizontal cabling system that shall be warranted as part of the end-to-end solution.
- All patch cords shall be standard compliant and minimum of FT4 or LSZH rated.
- All patch cords shall be manufactured and certified, 4-pair stranded conductors copper cables, field assembled patch cords are not allowed.

- All patch cords shall be gray in color.
- The Contractor shall supply patch cords in the following length:
  - At patch panel location, provide 0.5 metres long patch cords for all terminated horizontal cables unless otherwise advised by Consultant or CoT-IT.
  - At workstation or work area outlet location, provide patch cords of suitable length and not longer than 5 metres (typically 2.1 metres but Project Consultant to finalize) for every terminated horizontal cable unless otherwise advised by Consultant or CoT-IT.
- Patch cords shall be installed and terminated into the final device by the Contractor as per the BICSI Installation Methods Manual, Belden Certification training and the manufacturer's installation instructions.

#### BACKBONE CABLE FOR VOICE CENTREX ONLY - ISP (CAT3/5E)

- Category 3/5e rated wire and cable placed in the inside environment shall be solid, 24 AWG, twisted pair and multi-conductor.
- All cables fully contained within conduit or areas that are not plenum rated shall use CMR rated cable.
- Any cable, regardless of length passing through a return air plenum ceiling and not in conduit shall be rated CMP.
  - Belden: CMR: min 25 pairs | CMP: min 25 pairs

#### TELEPHONE PATCH PANEL FOR VOICE (TPP)

- Minimum 1U 24 RJ45 UTP ports.
- Accommodates 180, 110, or 90 degree patch cord connectors on back of patch panel.
- Does or doesn't require the use of a punch-down tool and mounts to standard EIA 19" rack.
- Belden for voice unloaded patch panel - black
- Belden jacks for voice unloaded patch panel, white – CAT3/5e
- Belden ID voice tab for unloaded patch panel, white

**VOICE CROSS CONNECT AT ENTRANCE FACILITY (EF)**

- Voice cross-connect is a system that consists of various sizes of BIX blocks, cable distribution accessories (such as moulded rings and strips) and a BIX tool to terminate wires at the BIX block. The voice cross-connect system is primarily composed of two parts: the mount and the connectors.
- Cross-connect mount is a wall-mounted frame, generally built from 16-gauge steel. The frame features a rectangular plastic backplate and two plastic brackets that extend from either side of the backplate to fit between two and ten connectors. The connectors shall be oriented horizontally on the mount.
- The connectors are rectangular punch-down blocks used to terminate up to 25 pairs. The connectors shall have a slip-in fitting which automatically strips the wire as it is punched down, eliminating the need for pre-stripping. The connectors shall also have a pair-splitter to facilitate fast arranging of wires on the punch-down block.
- Backbone cables shall be terminated on the backboard (as shown on drawings) unless otherwise specified in this document.
- All cables shall be terminated on IDC connectors complete with associated hardware such as mounts, cable / cross-connect wire managers, etc.
- The IDC connectors shall accept 24 to 26 AWG solid copper conductors.
- The IDC mounts shall accept cables from behind the connector.
- Cross-connect shall be a 5-pair block and include appropriate mounting and number of designation strips and labels.
- Cable management in the form of distribution rings or approved similar shall be provided between columns and rows of IDC mounts to support cross connect management in a manner recommended by the manufacturer.
- Instruction sheets for products are available from Belden.
- Belden 50 pair BIX mount
- Belden BIX distribution connector – 5 pair marking
- Belden accessories such as jumper wires, labels etc. to complete the system.

## FIBREOPTIC CABLES

### INDOOR BACKBONE MULTIMODE OM4 FIBREOPTIC CABLE

- The cable is performance rated to OM4 and shall be used only if the backbone link length is less than or equal to 150 meters.
- Primary and redundant, 12 strands in each cable shall run between the equipment room and the telecom room. Total of 2 x 12 strands shall run with diverse pathways between the equipment and telecom rooms.
- All cables shall be fully contained within conduit or areas that are not plenum rated shall use OFNR/FT4 rated cable.
- Any cable, regardless of length passing through a return air plenum ceiling and not in conduit or using cable tray / J-hook shall be rated OFNP/FT6.
- Fiber cables shall be protected when entering the patch panel with a black color flexible conduit.
- Core-locked, tight-buffered, black, indoor/outdoor fiber-express distribution cables.
- 50/125-micron core/cladding, laser optimized.
- 4700 MHz-km bandwidth at 850nm wavelength (EMB).
- 3500 MHz-km bandwidth at 1300nm wavelength.
- Only cables from Belden shall be accepted.
- All fibreoptics cables shall be installed and terminated into fibre optic adapters contained in fibre optic patch panels by the Contractor as per the BICSI Installation Methods Manual, Belden certification training and installation instructions.
- Belden:
  - OFNR/FT4
  - OFNP/FT6

### FIBREOPTICS PATCH PANEL (FPP)

- Fibreoptics cabling shall be terminated in patch panels intended for fibre optic cable management.

- Belden Fiberoptics Rack Mount Enclosure for Telecommunication Enclosures shall be:
  - 3U - 19" Rack Mount Enclosure
  - Durable black powder coat finish
  - Be equipped with cable strain relief and slack storage
- Belden Blank Fibre Adapter Panel shall be:
  - Blank Fibre Adapter Panel to fit Fibre Adapter Patch Panel
  - Durable black powder coat finish
- Belden Fiberoptics LC Fibre Adapter Strip shall be:
  - Loaded with TIA-604 FOCIS-10 compatible adapters, TIA-568.3 standard compliant
  - Split sleeve: Zirconia Ceramic
  - Adapter housing colors follow TIA-568.3 suggested color identification scheme.
  - Belden part number for 6 LC duplex adapter strip
- Belden 1U fibre cover, smoked plexiglas
- Belden Splice Case / Modules / Trays for OM4 Cable Terminations shall be:
  - Belden splice tray for 3U rack mount fibre enclosure

#### FIBEROPTICS LC CONNECTOR FOR FIELD TERMINATION OF OM4 CABLE

- Optical fibre terminations for OM4 cable shall be made for field termination with a pre-polished connector and shall be of the same manufacturer and LC style to suit the cabling installed.
- Fibre connectors shall match the performance of the fiberoptics cable (OM4).
- Fibre terminations shall be made with a ceramic ferrule and cable boot.
- Optical fibre cables shall be terminated with pre-polished connectors having the characteristics as below:
  - Return loss: >20dB (multimode)
  - Termination Style: Pre-Polished



- Connector Type: LC
- Ferrule Type Zirconia Ceramic
- The connector shall include connector body / ferrule assemblies, crimp sleeves, dust caps, clip, and appropriate boot.
- All Fiberoptics connector terminations and adapters shall be contained in fibre optic patch panels from Belden by the Contractor as per the BICSI Installation Methods Manual, Belden certification training and installation instructions

#### FIBEROPTICS LC PIGTAIL FOR FIELD TERMINATION OF OM4 CABLE

- Optical fibre OM4 cable shall be fusion spliced to pig-tails for field termination and shall be of the same manufacturer and LC style to suit the cabling installed.
- Pigtail shall be OFNR (FT4) or LSZH rated and stamped/printed accordingly.
- The pigtail shall be 100% factory terminated and inspected end face geometry in compliance with Telcordia GR-326-CORE, issue 3.
- Typical insertion loss per pigtail connection: 0.25dB.
- Field assembled pigtails are not allowed.
- The Contractor shall supply and fusion splice every strand of the fibre backbone cable with a pigtail. The pigtail length shall be 1m.
- Belden OM4 pigtail
- Belden fusion splice heat shrink protector sleeves

#### FIBEROPTICS MULTIMODE LC-LC DUPLEX PATCH CORDS – OM4

- All patch cords shall be CSA/TIA/UL approved, CMR (FT4) or LSZH rated and printed accordingly.
- All optical fibre patch cords shall be OM4.
- All optical fibre patch cords shall be manufactured and certified, 1-pair (duplex, 2 strands). Field assembled patch cord is not allowed.
- The Contractor shall supply a minimum two (2) patch cords for every OM4 backbone cable:

- At patch panel in the telecom room (TE), provide one (1) 2-meter-long patch cord unless otherwise specified by CoT IT.
- At patch panel location in the equipment room (ER), entrance facility (EF), or any other space provide one (1) 2-meter-long patch cord unless otherwise specified by CoT IT.
- All optical fibre patch cords shall be LC to LC duplex.

### PATHWAY SYSTEM – CONDUIT AND CABLE TRAY

- Cable tray shall be used above ceilings in commercial facilities and below raised floor systems as may be found in equipment rooms or data centers.
- All pathway (conduit and cable tray) systems shall be designed in accordance with the latest version of the ANSI/TIA-569-E Standard which exceeds the minimum requirements of Canadian Electrical Code. Pathway systems that are designed only to the Canadian Electrical Code and do not include all requirements of the ANSI/TIA-569-E standard will be considered substandard and removed until such time as they are in compliance.
- Consultant to confirm with both the facility and CoT-IT regarding the areas that are suitable for Electrical Metallic Tubing (EMT).

### ELECTRICAL METALLIC TUBING CONDUIT - EMT

- To be used within the office areas only (if applicable).
- Electrical Metallic Tubing shall be electro-galvanized steel.

### FITTINGS

- Fittings for electrical metallic tubing shall be single screw indenter fittings for conduits up to 2" and double screw indenter fittings for conduits 2" and larger.
- Die-cast or pressure cast fittings are not permitted.
- Connectors shall have insulated throat up to and including 1" size. For sizes 1-1/4" and larger, provide plastic insulating bushing.
- Provide conduit body types, shapes and sizes as required to suit application and NEC requirements. Provide matching gasket covers secured with corrosion-resistant screws.

## EXPANSION FITTINGS

- Provide expansion fittings with external grounding straps at building expansion joints.
- Minimum 4" movement in either direction.
- At expansion joints in concrete pours, provide deflection/expansion fittings capable of movement of  $\frac{3}{4}$ " in all directions from the normal.

## WATER PROOFING SEALS

- Provide watertight expanding link-type seals for installation between the conduit and the sleeve or core drilled hole.

## WIRE BASKET TRAY

- The wire basket tray shall be 12 – 13 gauge, straight sections shall be powder coated black with an average paint thickness of 1.2 mils (30 microns) to 3.0 mils (75 microns).
- Tray shall be designed in such a way as to be secured to the following, but not limited to: wall, ceiling every 1.2 metres.
- Splicing trays shall be accomplished by using a single manufacturer supplied UL classified connector bolt or splice plate.
- Depth: Tray depth shall be (unless otherwise shown on the drawings) 100mm (4 inches).
- Width: Tray width shall be (unless otherwise shown on the drawings) 300mm (12 inches).
- Turning Fences shall maintain approved bend radius and be constructed from sheet steel and plated in accordance with applicable standards.
- Intersections shall be made from high strength steel, welded and plated in accordance with applicable standards.
- Proper manufactured accessories and fittings such as elbows, reduces, crossovers, tees and riser shall be used for any change in direction, height or size of the cable basket tray.
- Support cable tray to suit loading and recommended support requirements in the Canadian Electrical Code Part II.
- Materials bolted or riveted to the cable tray shall be free of burrs and or sharp edges.

## VENTILATED CABLE TRAYS

- All cable tray systems shall be designed in accordance with the latest version of the ANSI/TIA-569-E Standard and BICSI TDMM which exceed the minimum requirements of Canadian Electrical Code. Cable tray systems that are designed only to the Canadian Electrical Code and do not include all requirements of the ANSI/TIA-569-E Standard and BICSI TDMM shall be considered substandard and removed until such time as they are in compliance.
- Consultant to confirm with both the facility and CoT-IT regarding the areas that are suitable for cable tray, if suitable, what material type given the impact of certain airborne chemicals (aka Chlorine) that corrode metals.
- The ventilated cable tray is preferred to be used for horizontal cable distribution.
- The ventilated cable tray shall include but not be limited to the following characteristics:
  - A prefabricated structure consisting of a ventilated bottom with integral longitudinal side rails with no openings exceeding 50mm or 2" in a longitudinal direction.
  - Shall be prefabricated from a pre-punched sheet to produce a one-piece ventilated tray.
  - Shall be available in Aluminum, pre-galvanized Steel, hot dip Galvanized Steel and Stainless Steel 316.
  - Shall be a minimum of 103mm or 4" in depth or as appropriately designed and approved by Project Consultant and CoT-IT.
  - Proper manufactured accessories and fittings such as elbows, reduces, crossovers, tees and riser shall be used for any change in direction, height or size of the cable tray.
  - Spine type cable tray is not acceptable.
  - Support cable tray to suit loading and recommended support requirements in the Canadian Electrical Code Part II.
  - The support shall be placed within a maximum of 610mm on either side of any connection to a fitting.
  - Materials bolted or riveted to the cable tray shall be free of burrs and or sharp edges.

## JUNCTION BOX

- All junction box applications shall be designed in accordance with the latest version of the ANSI/TIA-569-E Standard and BICSI TDMM which exceed the minimum requirements of Canadian Electrical Code. Application of junction boxes that are only designed to the Canadian Electrical Code and do not include all requirements of the ANSI/TIA-569-E Standard and BICSI TDMM shall be considered substandard and removed until such time as they are in compliance.
- Consultant to confirm with both the facility and CoT-IT regarding the areas that are suitable for junction box construction type given the impact of certain airborne chemicals (aka Chlorine) that corrode metals.
- For standard non chemically hazardous environments junction boxes shall be constructed of not less than 14-gauge galvanized steel with trim for flush or surface mounting in accordance with the location to be installed.
- Provide screw-on type cover boxes installed in damp or wet locations shall be of rain-tight construction with gasketed cover and threaded conduit hubs.
- Boxes shall be NEMA approved for the environmental condition of the location where they will be installed.

## POKE THROUGH FLOOR BOX

- Where office facilities exist but access for cable distribution from above is not possible it may be practical to serve the floor from the ceiling space below with a Poke Through.
- Aluminum modular fire rated poke-through floor boxes coverings.
- Installs in 4" (101.6mm) diameter core drilled hole through concrete.
- UL listed for use in 1-4 hour rated floors.
- Poke-through fitting and universal cover combination exceed UL514A scrub water exclusion requirements.
- Stationary fire barrier expands during fire conditions to provide upper fire seal with adjustable fire barrier that would accommodate concrete floor thickness from 2-1/4" to 7".
- Dual 1" E.M.T. conduit tubes feed from communications feed and one for the electrical (when needed).
- Furniture feed for both power and communication services to modular furniture systems.

- Poke-through to have dual panels, one to hold four (4) RJ45 CAT6/6A Data/Voice ports. The other panel will have a blank plate.
- One-piece dual style line Poke-Through aluminum finish.
- Aluminum modular fire rated poke-through floor boxes coverings.
- Installs in 4" (101.6mm) diameter core drilled hole through concrete.
- UL listed for use in 1-4 hour rated floors.
- Poke-through fitting and universal cover combination exceed UL514A scrub water exclusion requirements.
- Stationary fire barrier expands during fire conditions to provide upper fire seal with adjustable fire barrier that would accommodate concrete floor thickness from 2-1/4" to 7".

#### GROUNDING AND BONDING

- All bonding to ground systems shall be designed and installed in accordance with the latest version of the ANSI/TIA-607-D Standard and BICSI TDMM which exceed the minimum requirements of the Canadian Electrical Code. Grounding and Bonding for Communications that are designed only to the Canadian Electrical Code and do not include all requirements of the ANSI/TIA-607-D Standard and BICSI TDMM shall be considered substandard and removed until such time as they are in compliance.
- Consultant to confirm with both the facility and CoT-IT regarding the areas that are suitable bonding and grounding points given the impact of certain airborne chemicals (aka Chlorine) that corrode metals.

#### PRIMARY BONDING BUSBAR (PBB) / TELECOMMUNICATIONS MAIN GROUNDING BUSBAR (TMGB)

- An insulated predrilled copper busbar listed by NRTL, electro-tin plated with holes 8mm diameter for use with standard-sized lugs.
- Dimensions 6mm thick, 100mm wide, variable length as applicable.
- Shall be insulated from its support by a minimum of 50mm.

## SECONDARY BONDING BUSBAR (SBB) / TELECOMMUNICATIONS GROUNDING BUSBAR (TGB)

- Predrilled copper busbar listed by NRTL, electro tin plated with holes 8mm diameter for use with standard-sized lugs.
- Dimensions 6mm thick, 50mm wide, variable length as applicable.
- Shall be insulated from its support by a minimum of 50mm.

## TELECOMMUNICATIONS BONDING BACKBONE (TBB)

- Cable assemblies shall be UL Listed and CSA Certified and be a minimum of 6 AWG copper conductor, green insulated.
- Telecommunications Grounding and Bonding Conductor Label Kits shall be supplied and installed by the Electrical Contractor at every rack and cabinet as well as one for every Telecommunications Grounding Busbar.
- The bonding conductor size shall be as follows:

TBB Length in Linear metres Metres (feet)	TBB Size (AWG)
Less than 4 (13)	6
4-6 (14 – 20)	4
6-8 (21 – 26)	3
8 – 10 (34 – 41)	2
13 – 16 (42 – 52)	1/0
16 – 20 (53 – 66)	2/0
Greater than 20 (66)	3/0

**TELECOMMUNICATIONS BONDING CONDUCTOR (TBC)**

- Cable assemblies shall be UL Listed and CSA Certified and be a minimum, the same size as the largest TBB copper conductor.
- Shall be green insulated and marked in accordance with ANSI/TIA-607-D.

**WARNING LABELS**

- Non-metallic warning labels in English: TIA-607-D.
- Identify labels with wording "If this connector is loose, please call the building telecommunications manager or site / area supervisor".

**FIRE-STOPPING**

- A fire-stop system is comprised of the item or items penetrating the fire rated structure, the opening in the structure and the materials and assembly of the materials used to seal the penetrated structure. Firestop systems comprise an effective block for fire, smoke, heat, vapor and pressurized water stream.
- All penetrations through fire-rated building structures (walls and floors) shall be sealed with an appropriate fire-stop system (EZ-PATH). This requirement applies to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow fire rated structure). Any penetrating item i.e., riser slots and sleeves, cables, conduit, cable tray, and raceways, etc. shall be properly fire-stopped with EZ-PATH.
- Firestop systems shall be UL Classified to ASTM E814 (UL 1479) and shall be approved by a qualified Professional Engineer (PE), licensed (actual or reciprocal) in the state where the work is to be performed. A drawing showing the proposed fire-stop system, stamped/embossed by the Professional Engineer of Ontario (P.Eng.), shall be provided to the Owner's Technical Representative prior to installing the fire-stop system(s).
- EZ-PATH Part Numbers:
  - EZ-PATH Series 22, 33 and 44 (size based on cable quantities).

**END OF SECTION**



## SECTION – 3: EXECUTION

It is Consultant / Designer responsibility to check the latest version of this document from CoT-IT.

### GENERAL

- RCDD certified engineer shall perform the design and consulting work.
- Contractors / Technicians shall be certified with Belden and Fluke Networks to perform installations and testing / commissioning.
- Contractors must have an RCDD installation Team Lead / Project Manager.
- Technicians who have not completed the appropriate certification or training shall not pull, terminate or otherwise be involved in the installation of the telecommunications physical infrastructure with the exception of bonding to ground.
- Installers performing the testing (SAT, Acceptance, Commissioning, etc.) shall be Certified Cabling Test Technician on Fluke DSX / Versiv and Optifibre OTDR equipment.
- Following are the procedures to follow for successful project handing over:
  - Cable Acceptance Testing (CAT) – See Appendix for correct Sample Test Results and Compliance Sheet
  - Site Acceptance Testing (SAT) - See Appendix for Sample SAT Documents
  - As-built Drawings and Documents (ADD)
  - Consultant Review and Comments (CRC)
  - CoT-IT Approval of Satisfaction (AoS) – Signing off

### HORIZONTAL CABLE INSTALLATION

- All cables and components shall be installed as per the Belden's instruction sheets, ANSI/TIA standards and the BICSI Installation Methods Manual to complete the project.
- All testing of the Category 6/6A cabling system shall be with Fluke DSX-5000 / 8000 Versiv Cable Analyzers.

## FIBREOPTIC CABLE INSTALLATION

- All cables and components shall be installed as per Belden's instruction sheets, ANSI/TIA standards and the BICSI Installation Methods Manual to complete the project.
- All testing of the fibre optic installation shall be with test equipment from Fluke DSX-5000 / 8000 Versiv and if required (upon CoT-IT request) Optifibre OTDR.

## CABLE ACCEPTANCE TESTING

- This section specifies the acceptance testing requirements for backbone fibre optic as well as horizontal UTP cabling.
- Supply all of the test equipment required to conduct acceptance tests.
- Submit acceptance documentation as defined in this section.
- All of the installed cabling must be tested and successfully pass all test criteria.
- Standards referenced in this section include:
  - ANSI/TIA-568: Telecommunications Cabling Standard. All standards referenced within the TIA-568, where applicable, constitute standard provisions of this specification.
  - ANSI/TIA-526-14: Optical Power Loss Measurement, Multimode
  - ANSI/TIA-526-7: Optical Power Loss Measurement, Single-mode
  - ANSI/TIA-1152: Requirements for field test instruments and measurements for balanced twisted-pair cabling
- Visually inspect all cables, cable reels and shipping cartons to detect possible cable damage incurred during shipping and transport. Visibly damaged goods shall be returned to the supplier and replaced at no additional cost to the City.
- All cables and termination hardware shall be 100% tested for defects in installation and to verify cabling system performance under installed conditions according to the requirements of ANSI/TIA-568 standard. All pairs of each installed cable shall be verified prior to system acceptance. Any defect in the cabling system installation including but not limited to cable, connectors, feed through couplers, patch panels and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors in all cables installed without cost to the City.

## COPPER PERMANENT LINK TESTING – HORIZONTAL CABLING

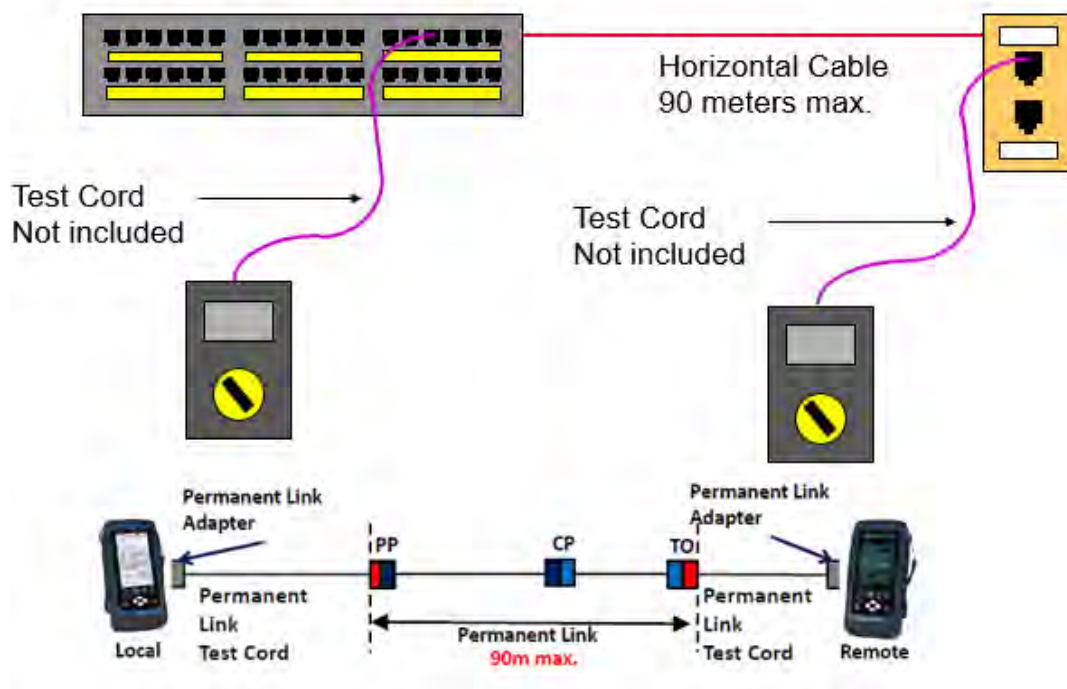
- All unshielded twisted-pair copper cable links shall be tested for continuity, pair reversals, shorts, opens and performance to Category 6/6A. Horizontal cabling shall be tested using a minimum level IIIe test unit for Category 6/6A performance compliance.
- Continuity - Each pair of installed cable shall be tested using a test unit that shows opens, shorts, polarity and pair-reversals, crossed pairs and split pairs. The test shall be recorded as pass/fail as indicated by the test unit and referenced to the appropriate cable identification number and circuit or pair number. Any faults in the wiring shall be corrected and the cable re-tested prior to final acceptance.
- Length - Each installed cable link shall be tested for installed length using a TDR type device. The cables shall be tested from patch panel to patch panel, block to block, patch panel to outlet or block to outlet as appropriate. The cable length shall conform to the maximum distances set forth in the ANSI/TIA-568.2 standard. Cable length shall be recorded, referencing the cable identification number and circuit or pair number. For multi-pair cable, the shortest pair length shall be recorded as the length for the cable.
- Horizontal twisted pair cable shall meet or exceed the permanent link, performance requirements specified in ANSI/TIA-568.2 for Category 6/6A, Unshielded Twisted Pair (U/UTP).
- All tests shall be conducted using permanent link configuration on the testing equipment.

## COPPER TEST EQUIPMENT

- Category 6/6A Test Equipment - Category 6/6A test equipment shall meet the following minimum criteria:
  - All test equipment of a given type shall be from the same manufacturer and have compatible electronic results output. Acceptable test equipment manufacturer is Fluke Networks. Unless the manufacturer specifies a more frequent calibration cycle, calibration date shall be not more than a year from cable test date. Recommended test equipment is a Fluke Networks DSX 5000 / 8000 Versiv Cable Analyzer.
  - Test adapters must be approved by the manufacturer of the test equipment. Adapters from other sources are not acceptable. For horizontal cabling, permanent link adapters shall be used.
  - Baseline accuracy of the test equipment must meet or exceed TIA Level IIIe, as indicated by independent laboratory testing.

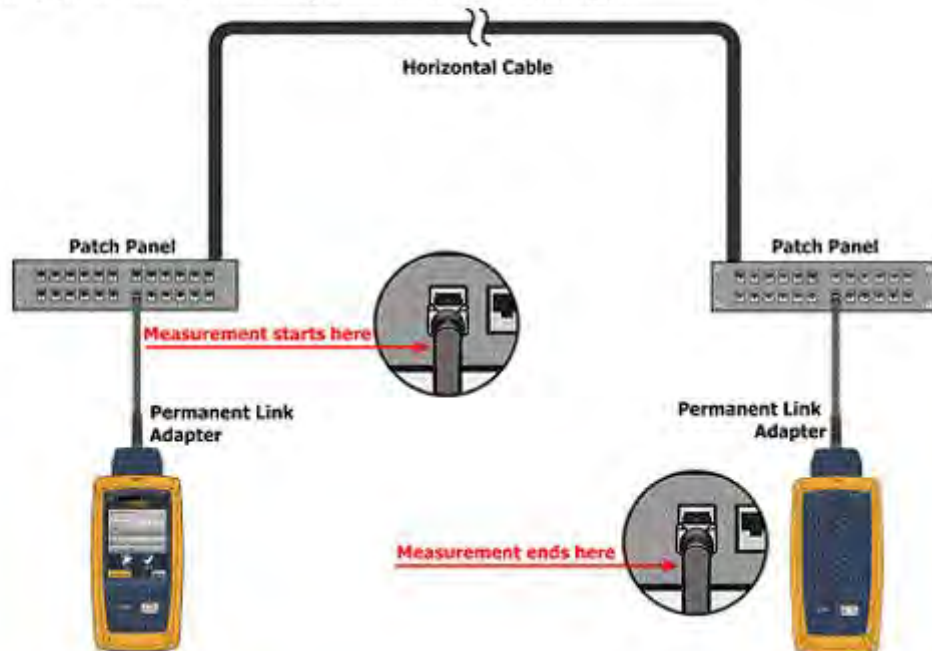
- Test equipment must be capable of certifying Category 6/6A to TIA-568.2 standard.
- Test equipment must have a dynamic range of at least 100 dB to minimize measurement uncertainty.
- Test equipment must be capable of storing full frequency sweep data for all tests.
- Test equipment must include S-Band time domain diagnostics for NEXT and return loss (TDNXT and TDRL) for accurate and efficient troubleshooting.
- Test equipment must be capable of running individual NEXT, return loss, etc., measurements in addition to auto tests. Individual tests increase productivity when diagnosing faults.
- Test equipment must make swept frequency measurements in compliance with ANSI/TIA-568.2 standard.
- The measurement reference plane of the test equipment shall start immediately at the output of the test equipment interface connector. There shall not be a time domain dead zone of any distance that excludes any part of the link from the measurement.
- The calibration of equipment shall be valid within one (1) year of the test date.

#### ■ Permanent Link in LAN



## ■ Permanent Link Test in DC

Data center two connector permanent link definition:



### HORIZONTAL CABLE TESTING DOCUMENTATION - COPPER

- Category 6/6A (UTP) Documentation - As a minimum, test reports shall include the following information for each U/UTP CAT6/6A cabling element tested:
  - Wiremap results that indicate the cabling has no shorts, opens, split, reversed, or crossed pairs and end-to-end connectivity is achieved.
  - Attenuation, NEXT, PSNEXT, Return Loss, ELFEXT and PSELFEXT data that indicate the worst-case result, the frequency at which it occurs, the limit at that point and the margin. These tests shall be performed in a swept frequency manner from 1 MHz to highest relevant frequency, using a swept frequency interval that is consistent with TIA and ISO requirements. Information shall be provided for all pairs or pair combinations and in both directions when required by the appropriate standards.
  - Length (in meters), propagation delay and delay skew relative to the limit.
  - Any individual test that fails the relevant performance specification shall be marked as a FAIL.

- Cable manufacturer, cable model number/type and NVP.
- Tester, manufacturer, model, serial number, hardware version and software version.
- Circuit ID number (Cable Tag Id) and Facility name.
- Test criteria used.
- Overall pass/fail indication.
- Date and time of test.

## BACKBONE FIBREOPTIC TESTING

- Backbone fibre optic cable shall meet or exceed the permanent link, performance requirements specified in ANSI/TIA-568.3 for multimode and singlemode fibre.
- Test link attenuation with an OLTS:
  - For multimode fibre, make reference measurements in accordance with TIA-526-14, Annex A – One cord reference method. Measure optical loss on each fibre at 850nm and 1300nm. It is required to measure loss on each fibre from each direction (bi-directional).
  - For singlemode fibre, make reference measurements in accordance with TIA-526-7, one cord reference method. Measure optical loss on each fibre at 1310nm and 1550nm. It is required to measure loss on each fibre from each direction (bi-directional).
- Measure link length optically or calculate using cable sheath length markings.
- Multimode backbone fibre optic cabling shall meet the following loss and length criteria:
  - Attenuation @ 850nm shall be less than or equal to: fibre length (km) x 3.0 dB/km + number connector pairs x 0.5 dB + number of splices x 0.3 dB.
  - Attenuation @ 1300nm shall be less than or equal to: fibre length (km) x 1.5 dB/km + number connector pairs x 0.5 dB + number of splices x 0.3 dB.
  - Length shall be less than or equal to 150 meters.
- VCSEL driver is preferred to be used for testing as the SFP active modules on the switch runs with VCSEL drivers up to 10Gbps.
- Singlemode backbone fibre optic cabling shall meet the following loss and length criteria:

- Attenuation @ 1310nm shall be less than or equal to: fibre length (km) x 0.4 dB/km + number connector pairs x 0.75 dB + number of splices x 0.3 dB.
- Attenuation @ 1550nm shall be less than or equal to: fibre length (km) x 0.4 dB/km + number connector pairs x 0.75 dB + number of splices x 0.3 dB.
- Length more than 150 metres and shall be less than or equal to 10000 meters.

## BACKBONE FIBREOPTICS TESTING DOCUMENTATION

- Fibreoptics Documentation: As a minimum, test reports shall include the following information for each fibreoptics cabling element (fibre) tested:
  - Actual measured attenuation, maximum allowable attenuation (loss) and the attenuation margin at the specified wavelengths. An individual test that fails the link criteria shall be marked as FAIL.
  - Reference method.
  - Number of mated connectors.
  - Actual length and maximum allowable length. Any individual test that fails the link length criteria shall be marked as FAIL.
  - Group refractive index (GRI) for the type of fibre tested, if length was optically measured.
  - Tester manufacturer, model, serial number and software version.
  - Circuit ID number (Cable Tag ID) and facility name.
  - Link criteria used.
  - Overall pass/fail indication.
  - Date and time of test.

## FIBREOPTIC TEST EQUIPMENT

- All test equipment of a given type shall be from the same manufacturer and have compatible electronic results output. Acceptable test equipment manufacturer is Fluke Networks. Unless the manufacturer specifies a more frequent calibration cycle, calibration date shall not be more than a year from cable test date. Recommended test equipment is a Fluke Networks DSX-5000 /

8000 Versiv Cable Analyzers using VCSEL fibre modules (preferred) for multimode testing and/or OptiFiber OTDR (if advised by CoT-IT).

- The calibration of equipment shall be valid within one (1) year of the test date.
- Fiberoptics test equipment shall meet the following minimum criteria:
  - Test equipment shall be capable of measuring relative or absolute optical power in accordance with TIA-526-14, "Optical Power Loss Measurement of Installed Multimode Fiber Cable Plant."
  - Test equipment shall be capable of measuring relative or absolute optical power in accordance with TIA-526-7, "Optical Power Loss Measurement of Installed Single-mode Fibre Cable Plant."
  - Test equipment shall not include the loss or length of the test jumpers in the cable plant measurements.
  - Multimode test equipment shall incorporate both 850nm and 1300nm VCSEL/LED sources.
  - Single-mode test equipment shall incorporate both 1310nm and 1550nm laser sources.
  - Sources and meters shall automatically synchronize wavelengths to prevent calibration-related errors.
  - Test equipment shall employ a communications port to facilitate uploading of saved information from tester to PC.
  - Test equipment capable of measuring a Tx/Rx fibre pair simultaneously is recommended to enhance productivity. It is recommended that test equipment utilizing dual function main and remote units be used for bi-directional testing, eliminating the need to swap optical source and power meter.

#### CABLE TEST RESULTS MANUAL

- Consulting Engineer shall first review and comment on the test report. CoT-IT shall only receive the report after the review and approved comments of the Consulting Engineer. CoT-IT will finally provide their final review comment.
- Submit test reports in both a hardcopy and electronic format (native file). Hand-written test reports are not acceptable. If test results cannot be converted to a PDF format then provide any necessary proprietary/native software to view the results at no cost to the City.



- Fibre optic backbone cable test results shall be incorporated in the City of Toronto, Network - Cable Test Results manual. Submit two (2) copies of the Cable Test Results manual for each facility. The manual consists of hardcopy test result reports placed into lockable 'D' ring binders with a cover and spine that clearly indicates the title of the manual. Put a CD with the electronic copies of test reports in a pocket in the Cable Test Results manual.
- The Contractor (RCDD) PM must sign hardcopy reports before submitting it to the Consultant.

### TEST COMPLIANCE SHEET

- A compliance sheet shall be prepared for every project of City of Toronto - IT. The criteria is summarized as below:

1	Test equipment with latest software version	8	Test results limits - TIA
2	Test equipment with latest test limit version	9	Test results based on VCSEL/LED Encircled Flux for OM4
3	Calibration of test equipment	10	Test results based on Laser for OS2
4	Test results submitted in native format and PDF format	11	MM testing at 850nm and 1300nm wavelength
5	Test result cable ID in compliance	12	SM testing at 1310nm and 1550nm wavelength
6	Permanent Link testing performed on copper (CAT6/6A)	13	Bi-directional testing
7	Test result cable type (copper and fibre) in compliance	14	Accurate quantity of adapters and splices

### SITE ACCEPTANCE TEST (SAT)

- A Site Acceptance Test (SAT) will NOT test functionality of the system or its components. Site Acceptance Tests will evaluate the workmanship and verify installation against the *Installation* and *Layout* drawings.
- The SAT plan shall be submitted to CoT-IT, two (2) weeks in advance of commencement.

- The SAT plan shall have a checklist and identify tests with a schedule for CoT-IT to review and coordinate staff. Submit to the Contract Administrator/Project Manager and Consultant, three weeks prior to the commencement of the test, for review. The Contractor shall conduct the test when directed by the Contract Administrator. As a minimum, the Contract Administrator/Project Manager, Consultant and CoT-IT shall witness the test.
- The plan shall be sealed by the Installation Project Manager RCDD, followed by the RCDD Consultant.
- Prior to SAT, the Consultant shall review and approve all copper and fibre cabling testing, bonding and grounding inspections and any other criteria as may be described in the project tender.
- The SAT shall evaluate workmanship and verify construction and components against the Layout Drawings and associated Component Schedules submitted to and reviewed by the Consultant.
- The SAT shall be completed only when all items in the checklist have been witnessed and installed by the Contract Administrator/Project Manager, Consultant and CoT-IT as being in conformance with the design as specified.
- SAT of Equipment Room / Telecom Room
  - Each facility shall have one or more equipment room / telecom room, which house the server and network core closets. Each equipment / telecom room shall undergo a witnessed SAT.
  - The Consultant is responsible for the equipment / telecom room UPS, lighting panel and any ER/TR modifications noted in the tender drawings and specifications. The extent of ER/TR modifications varies for each facility.
  - In addition to the above, the ER/TR SAT shall include the evaluation of the server and core closet installation, power supplies to each closet and external cable management (e.g. cable tray). For the purpose of the ER/TR SAT the server and core closets shall be empty except for the installation of duplex receptacles to receive the UPS.
- SAT of Telecom Enclosure
  - As a minimum, the complete Telecom Enclosure for the SAT shall include the installation of copper patch panels, fibre patch panel, power supplies, horizontal cable terminations, cable management and patch cords.
  - At each facility, the Contractor shall provide one complete telecom enclosure, associated accessories and horizontal cable for the SAT. Following acceptance, the Contractor will be directed to proceed with the installation of the remaining TEs and horizontal cabling. The Contractor is to note that the fibre optic backbone cable installation will be included in the core closet SAT.

- The City reserves the right to do a random inspection of the telecom enclosure and those that do not comply with the above shall be made compliant at no expense to the City.

## FIELD SUPPORT

- Provide 160 hours of on-site support for each facility beginning immediately after successful site acceptance test at that facility for a period of 24 months following Substantial Performance.
- Respond within 24 hours to a request for on-site support.
- The minimum site time per support call will be four (4) hours.
- The cost for the on-site field support shall be paid based on the rates quoted in the Schedule of Prices.

## MAINTENANCE

- For a period of twelve (12) months following Final Acceptance, the Contractor shall provide a qualified technician/electrician to assist in the resolution of network related problems. The Contractor shall be given twenty-four (24) hours notice as to their requirement on-site.
- The Contractor will be compensated at the per diem rate quoted by the Contractor in the Form of Tender. However, if the source of the problem is discovered to be a result of work or components supplied by the Contractor, the Contractor shall not be compensated.

## WARRANTY

- Testing and certification of the Building Network Distribution Cabling System shall be by the installer and shall include the provision of a Belden Warranty covering performance, products and installation.
- The Warranty shall cover the full repair and/or replacement of any component failing or failure to meet the design requirements within one (1) year.
- Warranty shall be delivered by the Contractor in coordination with Belden to the Client's Project Manager with the Testing and Certification documents. The project site shall receive manufacturer's plaque. All coordination regarding warranty and handing over of the manufacturer's plaque is the responsibility of the Contractor.

- The manufacturer shall warrant the project for twenty-five (25) years against application assurance and extended product manufacturing defects.
- The Contractor shall warrant installation against all product installation defects and that all approved cabling components meet or exceed the specified requirements for a period of twenty-five (25) years following acceptance.
- The Contractor shall warrant that all permanent fibre optic links meet or exceed the performance requirements of TIA-568.3 for multimode and singlemode fibre.
- The Contractor shall warrant that all permanent twisted pair links meet or exceed the performance requirement of TIA-568.2 for category 6/6A, unshielded twisted pair.
- Contractor must provide complete end to end mapping of all connectivity at the end in both hard and softcopy formats. This includes but not limited to horizontal data / voice cable number, copper and fibre backbone cable and active equipment ports.
- Within ten (10) days after testing, the cable installer shall provide the Project Manager with documentation, which shall include cable test results, a marked-up copy of the as-built cable network drawing and an electronic copy of the completed installation in Bentley Microstation Ver. 8 and AutoCAD or as per City's CAD guidelines.
- Contractor shall provide a manufacturer written certificate, plaque and warranty that the structured cabling platform is installed and fully operating in accordance with this standard and manufacturers specification.
- The warranty must guarantee that the design or installation negligence on the part of the Cabling Contractor shall not negate or void any portion of the certified system. The manufacturer must guarantee that all material, components and labour are covered in this circumstance for the full certification period of twenty-five (25) years. It must also guarantee that in the event a Cabling Contractor is no longer able to service the warranty, the full certification remains valid and is responsibility of the manufacturer.
- If a warranty issue arises for the cabling, the Warrantor must make arrangements to undertake the repair or replacement of warranty issues within 24 hours of notification. This may require the repair/replace of cabling components outside regular working hours at no additional cost.
- The warranty for the cabling must be such that the cable meets or exceeds the requirements of TIA-568 'Transmission Performance Specifications for 100 Ohm 4-pair Category 6/6A Cabling' including all Standards stated in this Contract.
- The Cabling Contractor shall forward the Structured Cabling Platform certification request form(s) to the proper authority and ensure that a Plaque and Certificate is issued to the Customer / Project Site along with the Structured Cabling Platform user manual. The successful bidder shall provide a certification number within two weeks of award of this project. Please

note that the Plaque/Certificate must have the Customer name/Project name on the Plaque/Certificate.

- The Cabling Contractor shall provide letter(s) of Certification within two weeks of substantial completion of the project to the Customer. This document will include the following: verification of the performance of the installed system, identification of the installation by location and project number and a copy of the warranty.
- Upon request and at no additional cost to the Customer the Cabling Contractor must provide a manufacturer's technical representative to conduct an on-site visit to ensure complete technical compliance.
- The Cabling Contractor must supply a copy of an unexecuted warranty statement (at the time of bidding) including all related terms and conditions. This copy shall be the Standard to which the warranty will be held. No changes shall be accepted unless it is deemed to benefit the Customer. Any proposed changes to the warranty must be submitted in writing to the Customer/their representative for review. The changes will then be accepted or declined by the Customer at their discretion. This is to remain valid for the entire warranty period.
- All cable Cabling Contractor technicians on site must be trained by the manufacturer of the Structured Cabling Platform being installed.
- Any defective or improperly installed products shall be replaced, or correctly reinstalled at no cost to the Customer.

## QUALIFICATIONS AND TRAINING

- An on-site training may be required for the Client to understand the system and installation.
- Contractors shall be certified with Belden and Fluke Networks to perform installations and testing.
- Contractors must have an RCDD installation Project Manager.
- Technicians who have not completed any certification program shall not pull, terminate or otherwise be involved in the installation of the telecommunications physical infrastructure with the exception of bonding to ground.
- Installers performing the testing (SAT, Acceptance, Commissioning, etc.) shall be certified CCTT on Fluke DSX and/or Optifibre OTDR.
- All Fluke credentials shall be submitted to the City during project award process for validation.
- The testing equipment shall be valid and calibrated within one (1) year as per manufacturer specifications.

- The cable installer shall have full working knowledge of cabling low voltage applications such as, but not limited to, Non-Secure Data/Voice communications cabling systems.
- Provide references of the type of installation provided for in this specification.
- Have knowledge of all applicable Telecommunication Standards such as but not limited to: CSA, TIA, IEEE and ANSI.
- Have experience in the installation of pathways and support for horizontal and backbone cabling.
- Be experienced in the installation and testing of telecommunication network cabling system, including the use of a light meter and OTDR.
- Provide proof of being a manufacturer certified installer for all cable network components being installed such as but not limited to cables, connectors and end termination equipment. The use of a non-manufacturer certified installer is not permitted.

#### AS-BUILT DRAWINGS

- The drawings shall include cable routes and outlet locations.
- Outlet locations shall be identified by their sequential number as defined elsewhere in this document.
- Numbering, icons and drawing conventions used shall be consistent throughout all documentation provided.
- For new infrastructure project, the Consultant shall provide the design drawings / tender drawings / floor plans in paper and electronic (Microstation) formats on which as-built construction information can be added.
- For an existing infrastructure upgrade, the Owner may provide floor plans in paper and electronic (Microstation) formats on which as-built construction information can be added.
- These documents shall be modified accordingly by the Telecommunications Contractor to denote as-built information as defined above and returned to the Owner.
- The Contractors shall annotate the base drawings and return a hard copy (same plot size as originals) and electronic (Microstation) form.

## FINAL ACCEPTANCE

- Once all work has been completed including all documentation submissions, the City will notify the satisfaction to the Consultant in writing of formal acceptance of the system.
- Consultant must warrant in writing that 100% of the installation meets the design requirements as specified.
- Contractor must warrant in writing that 100% of the installation meets the requirements specified in the tender documents.
- The CoT-IT reserves the right to conduct, using Contractor equipment and labour, a random re-test of up to five (5) percent of the cable plant to confirm documented results. Any failing cabling shall be re-tested and restored to a passing condition. In the event more than two (2) percent of the cable plant fails during re-test, the entire cable plant shall be re-tested and restored to a passing condition at no additional cost to the Owner.
- Acceptance shall be subject to completion of all work, successful post-installation testing which yields 100% PASS rating and receipt of full documentation as specified.
- The City may agree to allow certain cable runs to exceed acceptable standardized performance criteria. If required these cable runs will be exempt from meeting the specified standards. However, the Contractor will still be required to test these cable runs to validate component and installation performance.
- Documentation: The Contractor shall submit the following documentation for final acceptance:
  - City of Toronto - IT Network — Cable Test Results Manual.
  - Cable Acceptance Test (CAT) – Compliance Sheet
  - Site Acceptance Test (SAT)
  - As-built Drawings and Documents (ADD)
  - Consultant Review and Comments (CRC)
  - CoT-IT Approval of Satisfaction (AoS) – Signing off

## APPENDIX-A: SAMPLE OF CABLE ACCEPTANCE TEST (CAT)





## CITY OF TORONTO - CABLE TEST RESULTS COMPLIANCE SHEET

Project Name		Contract/Project Number	
Facility Name		Facility Address	
Location		Closet/Rack Number	
Consultant		Contractor	
Original Submission Date	Second Submission Date	Third Submission Date	Fourth Submission Date
City Reviewer	Date Issued	Status <input type="checkbox"/> Approved <input type="checkbox"/> Disapproved	

**General**

No.	GENERAL	Comply	Does Not Comply	Not Applicable
1	Cable test equipment DSX-5000 / 8000 with latest software version			
2	Cable test equipment DSX-5000 / 8000 with latest limit version			
3	Calibration certificate of the cable test equipment provided to the City			
4	Cable test results supplied to the City in PDF and Native format			
5	Test result specify the project name and / or contract number			
6	Test result specify site name or facility code			

**Copper Test Results**

No.	COPPER	Comply	Does Not Comply	Not Applicable
1	Permanent link testing performed			
2	Patch cord testing performed			
3	Test result cable identification in compliance with CoT-IT Standard			
4	Test result cable type in compliance with CoT-IT Standard – TIA-568 Horizontal			

**Fiberoptics Test Results**

No.	FIBRE	Comply	Does Not Comply	Not Applicable
1	Test results based on LED/VCSEL for OM4 50/125 um MM fibre cabling			
2	Test results based on FP Laser for OS2 9/125 um SM fibre cabling			
3	MM testing at 850nm and 1300nm modal bandwidth			
4	SM testing at 1310nm and 1550nm modal bandwidth			
5	Test result cable identification in compliance with City of Toronto-IT Standard			
6	Test result cable type in compliance with City of Toronto-IT Standard and TIA-568 Backbone MM/SM			
7	Test link attenuation in accordance with TIA-526-14 or TIA-526-7 makes reference measurements in accordance with METHOD-B (one jumper cable measurement for MM) or METHOD-A.1 (one jumper cable measurement for SM). Measure optical loss on each fibre at 850nm and 1300nm (for MM) or 1310nm and 1550nm (for SM).			
8	Measure loss on each fibre from each direction (bi-directionally) as per CoT-IT Standard			
9	Accurate quantity of adapter and splices			
10	Smart Remote mode used for testing dual-fibre strands			

**Cable ID: CCTV-MZ/02/01/020**

Test Limit: TIA Cat 6A Perm. Link

Limits Version: V7.6

Date / Time: 06/06/2022 04:38:25 PM

Operator:

Headroom: 3.3 dB (NEXT 3,6-7,8)

Cable Type: Cat 6A U/UTP

NVP: 68.2%

Main: Versiv

S/N: 2790064

Software Version: V6.6 Build 2

Calibration Date: 01/31/2022

Adapter: DSX-5000 (DSX-PLA004)

S/N: 4710039

**Test Summary: PASS**

Remote: Versiv

S/N: 2797296

Software Version: V6.6 Build 2

Calibration Date: 01/31/2022

Adapter: DSX-5000R (DSX-PLA004)

S/N: 4710040

Length (ft), Limit 295	[Pair 7,8]	189
Prop. Delay (ns), Limit 498	[Pair 4,5]	295
Delay Skew (ns), Limit 44	[Pair 4,5]	13
Resistance (ohms)	[Pair 4,5]	9.09
Insertion Loss Margin (dB)	[Pair 3,6]	17.4
Frequency (MHz)	[Pair 3,6]	497.0
Limit (dB)	[Pair 3,6]	43.6

Worst Case Margin Worst Case Value

<b>PASS</b>	<b>MAIN</b>	<b>SR</b>	<b>MAIN</b>	<b>SR</b>
Worst Pair	3,6-7,8	3,6-7,8	3,6-7,8	3,6-4,5
NEXT (dB)	3.3	6.1	3.3	6.4
Freq. (MHz)	410.0	406.0	410.0	497.0
Limit (dB)	29.5	29.6	29.5	26.7
Worst Pair	3,6	3,6	3,6	3,6
PS NEXT (dB)	4.6	5.5	6.4	7.0
Freq. (MHz)	410.0	424.0	500.0	497.0
Limit (dB)	26.7	26.2	23.8	23.8

<b>PASS</b>	<b>MAIN</b>	<b>SR</b>	<b>MAIN</b>	<b>SR</b>
Worst Pair	4,5-3,6	3,6-4,5	4,5-3,6	3,6-4,5
ACR-F (dB)	15.7	15.9	15.7	15.9
Freq. (MHz)	441.0	450.0	441.0	450.0
Limit (dB)	11.3	11.1	11.3	11.1
Worst Pair	3,6	3,6	3,6	3,6
PS ACR-F (dB)	16.9	16.4	18.4	17.8
Freq. (MHz)	1.1	1.3	463.0	453.0
Limit (dB)	60.2	59.3	7.9	8.1

<b>N/A</b>	<b>MAIN</b>	<b>SR</b>	<b>MAIN</b>	<b>SR</b>
Worst Pair	1,2-3,6	1,2-3,6	3,6-4,5	3,6-4,5
ACR-N (dB)	10.6	12.2	24.0	23.8
Freq. (MHz)	17.4	17.4	500.0	497.0
Limit (dB)	46.8	46.8	-17.1	-16.9
Worst Pair	3,6	1,2	3,6	3,6
PS ACR-N (dB)	11.8	13.7	24.1	24.3
Freq. (MHz)	19.3	17.3	500.0	497.0
Limit (dB)	43.3	44.4	-20.0	-19.7

<b>PASS</b>	<b>MAIN</b>	<b>SR</b>	<b>MAIN</b>	<b>SR</b>
Worst Pair	7,8	7,8	7,8	7,8
RL (dB)	1.9	3.5	2.0	5.0
Freq. (MHz)	146.5	274.0	357.0	481.0
Limit (dB)	12.3	9.6	8.5	8.0

Compliant Network Standards:

10GBASE-T 100BASE-TX

100BASE-T 2.5GBASE-T

10GBASE-T ATM-25

ATM-155 100VG-AnyLan

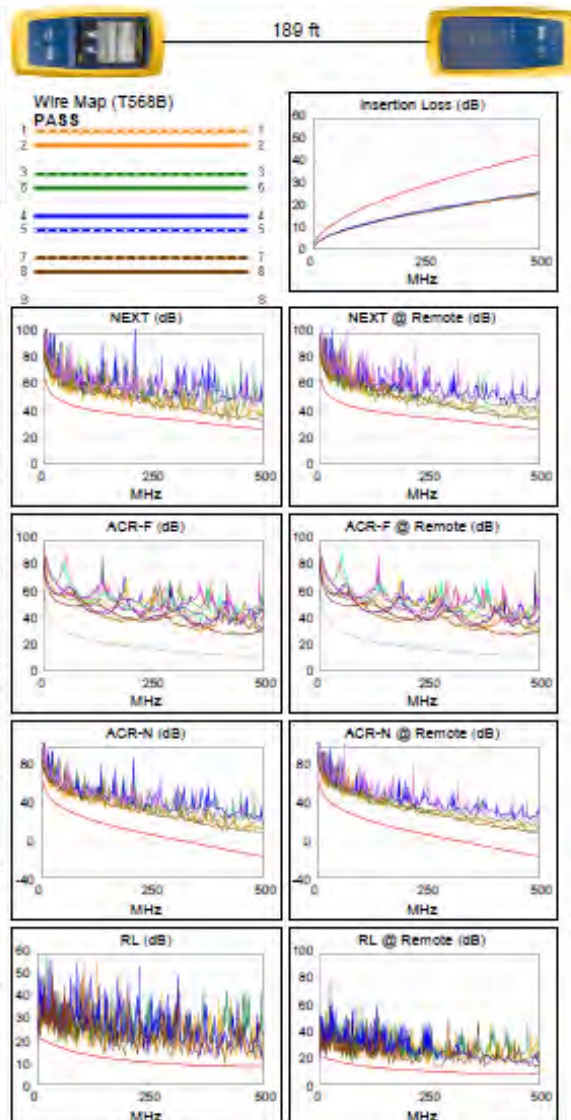
TR-16 Active TR-16 Passive

100BASE-T4

5GBASE-T

ATM-S1



TR-4



LinkWare™ PC Version 10.5

Project: New Project  
Test Results - 00048531.flw

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**Cable ID: 024**  
Date / Time: 02/15/2022 09:45:58 AM  
Cable Type: SMF G652D

**Test Summary: PASS**  
Backscatter Coefficient: -79.4dB (1310 nm)  
Backscatter Coefficient: -81.7dB (1550 nm)

**Loss (R->M)**  
**PASS**  
Test Limit: ISO/IEC 14763-3  
Limits Version: 7.6  
Date / Time: 02/15/2022 09:45:58 AM  
Operator: JOHN  
Main: Versiv  
S/N: 21123084  
Software Version: V5.7 Build 1  
Module: CertiFiber Pro (CFP-QUAD)  
S/N: 21212667  
Calibration Start Date: 08/12/2021  
Remote: Versiv  
S/N: 21120065  
Software Version: V5.7 Build 1  
Module: CertiFiber Pro Remote (CFP-QUAD)  
S/N: 21212670  
Calibration Start Date: 08/12/2021

	1310 nm	1550 nm
Propagation Delay (ns)	7887	
Length ft	5284	PASS
Limit 16404		
Result	PASS	PASS
Loss (dB)	0.78	0.52
Limit (dB)	3.21	3.21
Margin (dB)	2.43	2.69
Reference (dBm)	-4.04	-4.00

**Loss (M->R)**  
**PASS**  
Test Limit:  
Limits Version:  
Date / Time:

	1310 nm	1550 nm
Result	PASS	PASS
Loss (dB)	0.46	0.32
Limit (dB)	3.21	3.21
Margin (dB)	2.75	2.89
Reference (dBm)	-3.07	-3.05


Compliant Network Standards:

100GBASE-LX	100GBASE-ER4	100GBASE-LR4
10GBASE-E	10GBASE-L	10GBASE-LX4
40GBASE-ER4	40GBASE-LR4	Fibre Channel 100-SM-LC-L
Fibre Channel 1200-SM-LC-L	Fibre Channel 1600-SM-LC-L	Fibre Channel 200-SM-LC-L
Fibre Channel 400-SM-LC-L	Fibre Channel 400-SM-LC-M	Fibre Channel 800-SM-LC-L

LinkWare PC, Version: 10.5

Project:  
Test Results - 00045277.flw

Page 3



## APPENDIX-B: SAMPLE OF SITE ACCEPTANCE TEST (SAT) DOCUMENTS



## Checklist of Telecom Enclosure (TE) / Network / Core Closet Site Acceptance Test (SAT)

<b>Facility:</b>	<b>Project Name:</b>
<b>Contract No.:</b>	<b>Telecom Enclosure / Network / Core Closet Tag:</b>
<b>Building:</b>	<b>Sub-Location:</b>
<b>Consultant:</b>	<b>Contractor:</b>
<b>Date:</b>	<b>CoT-IT Staff:</b>

**TELECOM ENCLOSURE (TE) / NETWORK / CORE CLOSET LAYOUT AND AS-BUILT DRAWINGS****Procedure:**

- Verify that the as-built drawings are present.
- Verify the Telecom Enclosure components match the bill of materials.
- Verify equipment layout is as shown in the as-built drawings.
- Verify all components are tagged and wiring is labeled as per the drawings. (Enclosure, Patch Panels, Copper Patch Panel(s) Work Area Outlets, Cables, Power Distribution Components, etc.)
- Verify the horizontal and backbone fibre cable terminations and labeling.

If any comments are necessary, enter a note number in the test form column and record the comment in the comments form at the end of this document.

**Acceptance Criteria:**

Telecom Enclosure construction and labeling shall match the as-built drawings.

As Built Drawings Verification			
Item No.	Description	Pass/Fail	Notes
1	As built drawings present		
2	Bill of materials in compliance		
3	Layout / arrangement of components in compliance		
4	All components tagged as per as-built drawings. (Enclosure, Patch Panels, Copper Patch Panel(s) Work Area Outlets, Power Distribution Components, etc.)		
5	All wiring labeled as per as-built drawings		

**Power and Fusing Verification****Procedure:**

Verify that the indicated circuit breakers or fuses are installed and labeled with the indicated rating and source and destination distribution panel, breaker position ID. Refer to as built Telecom Enclosure wiring diagrams for the required circuit protection and rating. Record the installed protection device rating.

If the indicated installed circuit protection device matches the required rating enter PASS in the test form column.

If any comments are necessary, enter a note number in the test form column and record the comment in the comments form at the end of this document.

**Acceptance Criteria:**

Installed fuses and circuit breakers shall match the required specifications and labeled accordingly. The correct equipment is powered by the fuse and/or circuit breaker as shown on the as-built electrical drawings.

TE AC Power, Fusing and Tagging/Labeling Verification						
Circuit Breaker / Fuse ID	Description	Required Rating	Installed Rating	Pass / Fail	Source / Destination ID	Notes
120V AC UPS Power Supplementary Protectors						
SP02	UPS Receptacle and UPS Pilot Light (if applicable)	15A				
120V AC Hydro Power Supplementary Protectors						
SP01	Surge Suppressor and Utility Pilot Light (if applicable)	15A				
SP03	Panel Light	5A				
SP04	Utility Receptacle	15A				

**Grounding & Bonding Verification****Procedure:**

Verify that the indicated component is properly connected to the ground.

- Switch off system power.
- Verify the installation of the ground connection between the grounding bus or common ground terminal and the indicated component.
- Measure the DC resistance between the grounding bus or common ground terminal and the indicated component.
- Record the measured DC resistance between the ground connection and the component.

If the indicated grounding connection is installed and meets the maximum DC resistance specification enter a PASS in the test form column. If any comments are necessary, enter a note number in the test form column and record the comment in the comments form at the end of this document.

**Acceptance Criteria:**

The grounding or bonding conductor is installed and the DC resistance measurement must be less than or equal to 0.2  $\Omega$  between termination points.

Telecom Enclosure (TE) Grounding & Bonding Verification				
Grounding / Termination Point	Ground Conductor Visual Inspection	Resistance $\Omega$ Measured	Pass / Fail	Notes
Surge Suppressor		$\Omega$		
UPS Receptacle / Isolated Ground		$\Omega$		
Utility Receptacle		$\Omega$		
Enclosure Door		$\Omega$		
APC Power Bar		$\Omega$		
Rack Mount Ground Bus		$\Omega$		



**Spare Parts, Loose Shipped Components, TE - Bill of Material Verification****Procedure:**

Verify all spare parts and loose shipped components as required in the as-built drawings and bill of material are present. Typical items may be Fiber Optic Patch Cables, Copper Patch Cables, etc.

Enter PASS in the test form column if parts are present. If any comments are necessary, enter a note number in the test form column and record the comment in the comments form at the end of this document.

**Acceptance Criteria:**

Spare parts and loose shipped components are present as required.

Spare Parts and Loose Shipped Items			
Item No.	Description	Pass / Fail	Notes
1	Drawings		
2	Fiber Optic Patch Cords		
3	Copper Patch Cords		
4			
5			
6			
7			
8			
9			
10			

SAT NOTES / COMMENTS

Notes Ref. No.	Notes / Comments

**Approvals / Sign Off****Site Acceptance Test****City**

Name : \_\_\_\_\_ Company: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Consultant**

Name : \_\_\_\_\_ Company: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

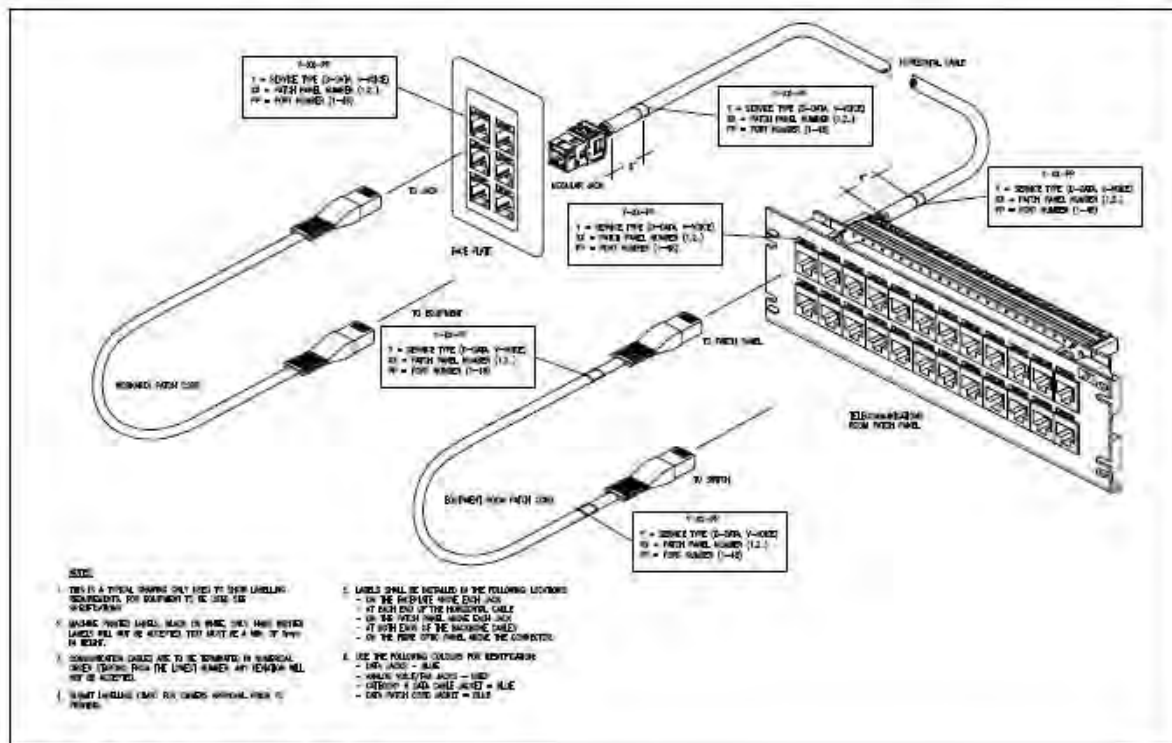
**Contractor**

Name : \_\_\_\_\_ Company: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

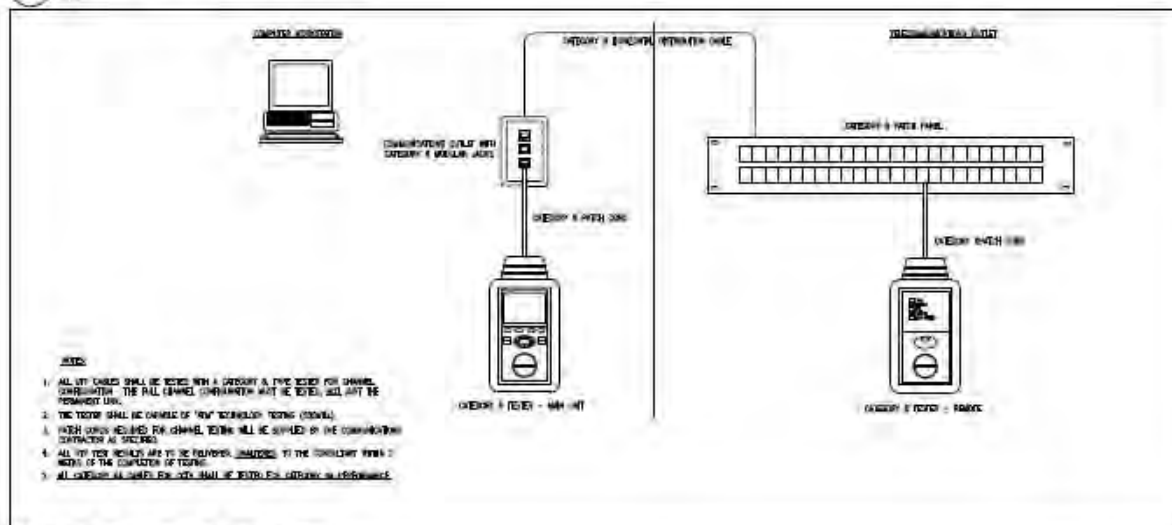
## APPENDIX-C: SAMPLE OF TELECOM WIRING DIAGRAMS | DRAWINGS | PHOTOGRAPHS





## 1. COMMUNICATIONS HORIZONTAL CABLE LABELLING

N.T.C.



## 2. CATEGORY 6 UTP CABLE TESTING - TYPICAL

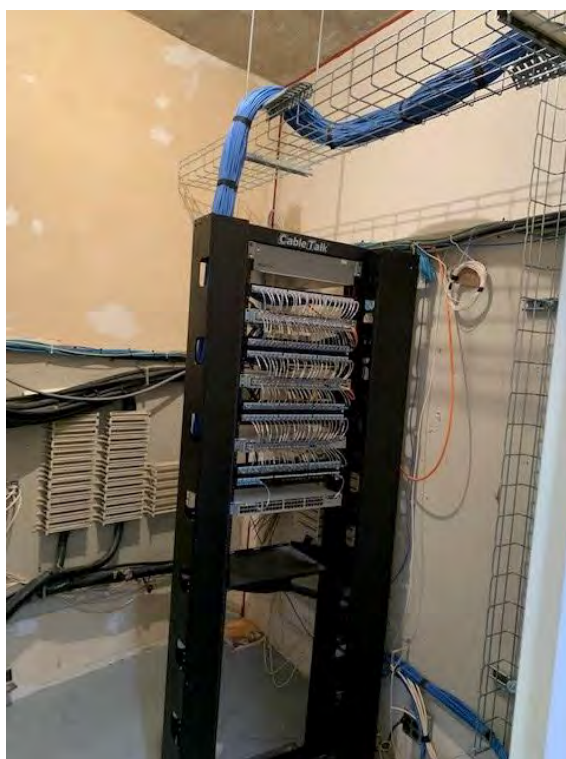
N.T.C.

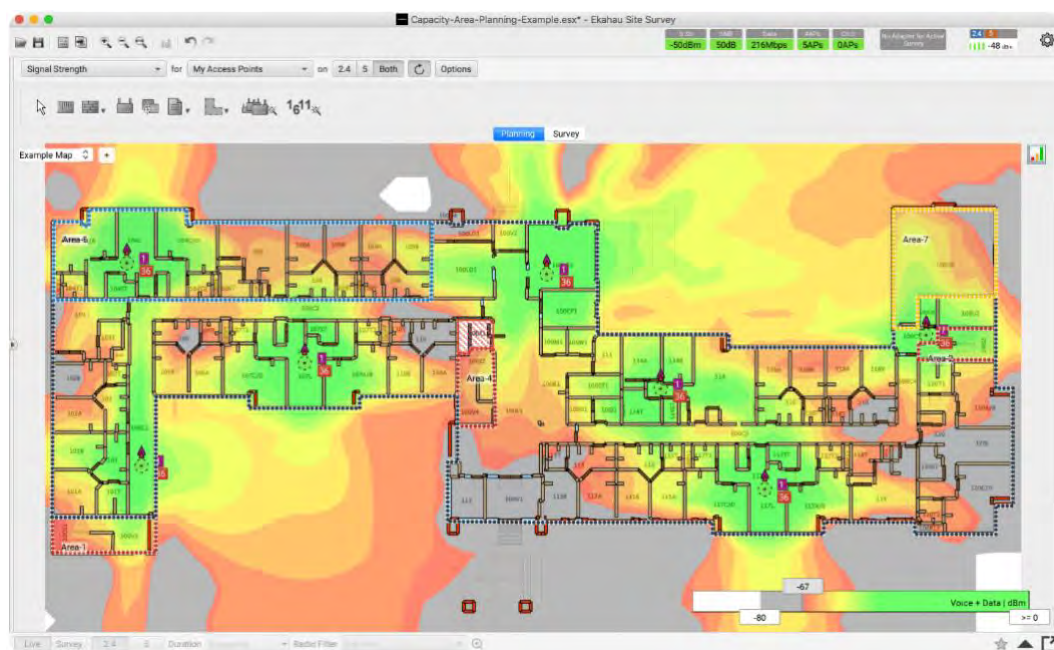










**WI-FI COVERAGE HEATMAP – EXAMPLE (EKAHAU)****END OF DOCUMENT**

**END OF APPENDIX A**

## **APPENDIX B**

### **CITY OF TORONTO CORPORATE SECURITY ACCESS CONTROL SYSTEM AND SYSTEM REQUIREMENTS**

## 1.0 Scope of Work and Associated Deliverables

- 1.1 The Successful Bidder shall provide Project Management, design and coordination of all Work on the systems within this contract, and maintain all required communications between various City of Toronto divisions and third party service providers.
- 1.2 The Successful Bidder shall be the single point of contact and shall be responsible for all coordination of Work that pertains to the Systems, along with all required coordination and communications between Personnel and the City.
- 1.3 The Successful Bidder shall be in good standing with all manufacturers referenced in this RFQ (including but not limited to American Dynamics, Dedicated Micros, Milestones and Axis) and must have and maintain all up to date certifications.

## 2.0 Literature

Bidders, where applicable, should submit complete literature on all products being included in their quotation including, but not limited to, standard manufacturer's warranty, model numbers, part numbers and other relevant documentation as part of their Quotation.

## 3.0 Bidder Qualifications

- 3.1 Bidders must be authorized sellers or resellers for the Products listed section 33.0 Manufactures List and must hold title to any equipment that will be installed or removed. If requested by the City, Bidders must submit written verification of current and valid authorization, satisfactory to the City, prior to Award. Failure to submit written verification of authorization, satisfactory to the City within a time frame specified by the City will result in the Quotation being declared Non-Compliant.
- 3.2 Prior to award, if requested by the City, the Bidder must submit written verification that their technicians are certified and authorized to undertake the installation and delivery services described in this RFQ. Failure to submit written verification of certification/authorization satisfactory to the City within a timeframe specified by the City will result in the Quotation being declared Non-Compliant.  
  
Bidders must provide within five (5) business days of such a request, a copy of each person's resume and certifications for proof of meeting the requirements listed in each Mandatory Criteria. Failure to provide this information within the timeframe specified, will result in non-compliance and the Bidder's Quotation will not be considered further.
- 3.3 All Certificates must be valid at the time of submission and throughout the duration of this contract.

### 3.4 Mandatory Criteria 1:

- Bidders must maintain personnel with the minimum years' experience Personnel as indicated that meet the mandatory criteria in Table 1 below:

**Table 1**

Item Number	Years of Experience	Certification and or Training on the following systems
<b>CCTV</b>		
1.1	3	Milestone Certified Design Engineer
1.2	3	Milestone Certified Integration Technician
1.3	3	BriefCam
	3	Victor and VideoEdge Advance Installer
<b>DSC</b>		
1.4	3	Power Series 1864 System
1.5	3	DSC Power Neo Alarm Panels
<b>ACS</b>		
1.6	3	Visonic – PowerMaster 10/30
1.7	3	Key Tracer
1.8	3	Software House - CCURE 9000 Level 2

- During the Term of the Contract, the Successful Bidder may substitute Personnel due to staff changes with Personnel of equal or greater qualifications and experience. Any change of Personnel shall be approved by the City prior to the substitution taking place.

#### 3.4.0 All systems components and installation shall conform to the following standards and codes where appropriate:

- Manufacturing: ISO 9003
- Design: MIL 275E
- Communications: IEEE RS232C and RS485
- EMI emissions: FCC part 15
- Electrostatic immunity: IEC 801.2 level 4
- AC transients UL 964
- National Building Code
- Ontario Fire Code
- Electrical Standards Authority
- Process Control System Implementation Manual
- NFPA 730 & 731
- ULC 319/S304
- UL 1981 Central Station Automation System
- UL 681 Installation and Classification of Burglar and Hold up Alarm Systems
- UL1635 Digital Alarm Communicator System Units



## 4.0 Security Clearance Requirements

- 4.1 A Clearance Letter from Toronto Police Service is a formal document produced on secure paper indicating that the subject of the inquiry has no criminal convictions in the National Repository of Criminal Records, which is maintained by the RCMP. The Successful Bidder shall provide within fifteen (15) business days after contract award to the Project Manager, a Police "Clearance Letter", obtained within the past three (3) months for each person (including Subcontractors), that may be expected and/or will be performing Work under this contract.
- 4.2 The Successful Bidder's employees (including Subcontractors) that may be expected and/or will be performing Work under this contract shall not pose a foreseeable security concern or hazard to the City as it relates to the protection of its assets.
- 4.3 Unless authorized in writing by the Project Manager, only Personnel that provided a Clearance Letter to the Project Manager shall be permitted to Work under this contract.
- 4.4 The Successful Bidder shall provide an original recent (obtained within the past 3 months) Clearance Letter only. No copies will be accepted.
- 4.5 The cost for each of the Clearance Letters shall be the complete responsibility of the Successful Bidder.
- 4.6 Refer to the Supplementary Forms and Policies section

## 5.0 Specifications

### 5.1 Meeting

- 5.1.0 A kick-off meeting will be scheduled by the Project Manager with the Successful Bidder upon award to review the roles and responsibilities of the City and the Successful Bidder.
- 5.1.1 The Successful Bidder and their qualified Personnel (including Subcontractors) assigned to this contract shall attend the kick-off meeting if requested by the Project Manager.
- 5.1.2 The Successful Bidder's Project Coordinator (or designate) shall be responsible to coordinate, plan and schedule as many subsequent meetings as necessary throughout the Term of the contract to ensure effective project stakeholder communication.
- 5.1.3 All meetings shall be held within the City of Toronto. The Successful Bidder is responsible for all costs for consultation and project/subsequent meetings.



- 5.1.4 The City reserves the right to request subsequent meetings on-demand or on short notice and may change or cancel meetings at the discretion of the Project Manager and at no cost to the City.

## 5.2 Resource Commitments

- 5.2.0 The Successful Bidder is the Design/Builder on Record and must continue to meet all of the requirements of Systems certifications and qualifications with respect to training and staffing competency, at the sole expense of the Successful Bidder, throughout the Term of the Contract, for all of the systems and components installed and in use at the facilities.
- 5.2.1 The Successful Bidder must continue to meet all of the mandatory conditions of the Warranty throughout the Term of the contract and Warranty periods.
- 5.2.2 The Successful Bidder must be able to provide the necessary materials, tools, machinery and supplies to carry out all approved Work. These resources must be available at the sole responsibility of the Successful Bidder on a dedicated basis throughout the term of the contract, to coordinate and carry out all approved Work with due care, skill and efficiency. The City may request removal and replacement within five (5) calendar days of any Contract Leads at any time throughout the duration of the contract.
- 5.2.3 The Successful Bidder must guarantee to the City that their Services and performance, including those of the Subcontractor, shall be provided in a professional, good, workmanlike manner and comply with, but not be limited to the City's City-Wide Security Policy, Workplace Violence Policy and the City of Toronto's Security Video Surveillance Policy. Those deemed not complying, at the discretion of the City, will be removed from the site and all future projects for the duration of this contract. The Successful Bidder will be provided three (3) notices of non-compliance and then be in breach of this contract, which may include contract termination as per the City of Toronto policy and guidelines.
- 5.2.4 Only Personnel listed and registered with the City will be permitted to access and Work on City of Toronto sites.

## 5.3 Cleaning

- 5.3.0 The Successful Bidder must maintain the worksite, grounds, and building free from accumulations of waste material and rubbish, and provide on-site containers for collection of waste materials and rubbish as required. On site storage areas must be coordinated through and arranged by the City. Cleaning and disposal operations must comply with local ordinances and anti-pollution laws.

- 5.3.1 The Successful Bidder must clean dust and water residue from core drilling, cutting and patching of masonry, and drywall to satisfaction of the City. Furnishings, floors and finishes must be protected prior to the commencement of Work.
- 5.3.2 Promptly as Work proceeds, and upon completion, the Successful Bidder and each of its Subcontractors shall clean up and remove from the premises all rubbish, dirt, dust, debris and surplus materials resulting from the Work.
- 5.3.3 The Successful Bidder must at all times be considerate of site security and ensure all worksites are maintained accordingly.

#### 5.4 Cosmetics, Protection, and Finishes

- 5.4.0 The same tamper proof screws and fasteners shall be used on all equipment, enclosures, cabinets and materials in public areas. Corporate Security shall be provided two sets of tools (at no charge) which are required to service security equipment that have tamper proof screws and fasteners.
- 5.4.1 Finishes and graphics for all equipment in public areas shall be submitted to, and approved by the City.
- 5.4.2 The Successful Bidder shall be responsible for all cutting, core drilling, and patching required for the installation of this Work. Where alterations occur or new and existing Work is required, the Successful Bidder shall join, cut, remove, patch, repair, or finish the adjacent surfaces as required to meet same or better quality at no extra costs to the City.
- 5.4.3 Any Work likely to alter or detract from the original appearance must not commence without the City's written consent. Changes or alterations, completed without the City's consent, may be subject to restoration by the Successful Bidder. Any additional repairs required, due to unapproved Work, may be billed to the Successful Bidder for payment.
- 5.4.4 The Successful Bidder shall protect existing furnishings by providing and maintaining adequate temporary protective coverings.
- 5.4.5 The Successful Bidder shall provide and maintain adequate fire safety in accordance with applicable fire code and Regulations.
- 5.4.6 The Successful Bidder shall be responsible for any damage to existing structure or contents arising from a lack of adequate protection.
- 5.4.7 All Work shall be performed by a qualified and skilled trade's people as defined by the Occupational Health and Safety Act, Regulation 213/91 and all finishing shall be of the highest

quality. Construction and finishing techniques must preserve the original appearance of the affected areas.

- 5.4.8 Unless authorized in writing by the City, the Successful Bidder shall not post/affix any stickers, labels, signs, logos, or any kind of promotional or advertising material on any equipment or instruments, nor at any City of Toronto site. This includes decals warning of systems in use or Services provided.
- 5.4.9 All materials, accessories, special equipment, services, personnel, test equipment and tools required for installation of the equipment shall be provided by the Successful Bidder.

## 5.5 Codes, Permits, Fees and Inspection

- 5.5.0 All system components shall be installed according to manufacturer's instructions and in a professional manner. Workmanship and care must encompass all aspects of the task being performed so the full intent of the project may be realized.
- 5.5.1 All Work shall be performed in compliance with all applicable Regulations, Building Codes and Local By-laws.
- 5.5.2 The Successful Bidder shall be responsible for all work and material including, but not limited to surveying, scanning, soil sampling, stamped engineered drawings, cutting, core drilling, patching, trenching, excavating, temporary storage of material, laying of conduits and backfilling for the installation of assigned Work.
- 5.5.3 The Successful Bidder shall arrange for inspection of all Work by the authorities having jurisdiction over the Work. The Successful Bidder shall comply with the requirements of the authorities, federal, provincial and municipal Codes, and all other authorities having jurisdiction. These Codes and Regulations constitute an integral part of these specifications. In case of conflict, the applicable Code takes precedence over the RFQ document.
- 5.5.4 All Work shall be executed to the approval of the City. When the Work is reported to be complete, an inspection shall be made by the City, and all deficiencies found shall be corrected by the Successful Bidder within 30 calendar days of reporting the deficiency, and before the final payment is made.
- 5.5.5 The City may appoint and pay for an independent consultant to inspect the Work or to carry out specific tests as the Work progresses. The Successful Bidder shall notify the City and the consultant at least three calendar days prior to starting the Work, and shall provide any assistance that the consultant may require to carry out his/her inspections or tests at no additional cost to the City.

- 5.5.6 The consultant, if any, shall act on behalf of the City to ensure that the performance of the Work is carried out according to the specification, drawings and acceptable standard practice. The Successful Bidder shall co-operate with the consultant and shall comply with his/her directions in making good all deficiencies and defects, and in ensuring the proper execution of the Work.
- 5.5.7 The verification or acceptance of the Work by the consultant or the City does not relieve the Successful Bidder of his/her responsibility to comply with the specifications. Any Work subsequently discovered, which does not comply with the specifications shall be rectified by the Successful Bidder at no cost to the City.

## 5.6 Daily Check In/Out

- 5.6.0 Before Work commences, the Successful Bidder shall have already incorporated all site and facility constraints as it relates to on site access time and Work performance limitations.
- 5.6.1 Before commencing Work and prior to completion of any Work, the Successful Bidder's Personnel must check-in and out daily with the City of Toronto Security Control Centre at 416-397-0000, and if available with on-site Security.
- 5.6.2 Upon check-in and check-out, the Successful Bidder's Personnel shall clearly explain what effects their Work will have on current security systems or VSS that are being monitored, and they shall identify any anticipated alarm signals, as well as any system functional limitations.

## 5.7 Disruptions to City Operations

- 5.7.0 Careful consideration must be given at all times to the function of the facility and the persons contained. The Successful Bidder must make all attempts to cause as little disruption in service as possible when providing installation services. Work that may cause any type of major disruption to building operations and/or building occupants must first be cleared by the City, and may have to be completed after hours.
- 5.7.1 The Successful Bidder shall co-ordinate all Work with the City's representative to ensure minimum disruption of service.
- 5.7.2 Work shall be executed to minimize the impact or the disruption of the existing operational systems and City of Toronto facility operations. At any time during the performance of the Work, if the existing, operational systems are affected beyond the expectation approved through the Implementation Plan or there is an imminent danger to be affected beyond the approved expectation, the Successful Bidder shall stop Work and minimize the impact on the operational systems. The Successful Bidder shall immediately inform a City of Toronto Corporate Security representative. The Successful Bidder shall perform all Work to implement a temporary solution to enable 100% functionality for operational systems. The Successful Bidder is to

proceed with permanent Work only after a solution is approved by City of Toronto Corporate Security.

## 5.8 Impact on City of Toronto Operations

- 5.8.0 Operational restrictions may affect the scheduling of Work and may require some activities to be scheduled at night, during weekends, or during periods when facilities are not inservice.
- 5.8.1 The Successful Bidder shall perform the Work in a manner to prevent disruption of normal City of Toronto operations. Any task that may cause disruption of operations shall be approved in advance by City of Toronto Corporate Security.

## 5.9 Inspection of Work

- 5.9.0 City of Toronto Corporate Security reserves the right to inspect any and all Work and reserves the right to be present during the performance of any Work under this Contract.
- 5.9.1 City of Toronto Corporate Security will perform periodical and statistical inspections of the Work. The Successful Bidder shall provide and facilitate access to Work for inspection.
- 5.9.2 The Successful Bidder shall correct within a maximum of one week (7 calendar days) any Work deemed not satisfactory by the City of Toronto.
- 5.9.3 In the event that the Successful Bidder does not correct the Work within the time frame specified, the City reserves the right to have the Work completed by another qualified firm at the Successful Bidders expense.

## 5.10 Occupancy Before Completion

The City may use portions of the Work although the same may not be entirely complete without claim of any kind by the Successful Bidder so doing, nor shall any such use relieve the Successful bidder from his/her obligation under this contract until the termination of the guarantee/Warranty period.

## 5.11 Monitoring/Programming

Many of the inspected devices require confirmation of device annunciation on the monitoring screen. Personnel must arrange/coordinate with the Corporate Security Lead to change a given device's armed, controlled or online status. Personnel must ensure the previous state is restored upon completion of the inspection testing.

## 5.12 Equipment, Placement, Relocation, Removal, or Expansion

- 5.12.0 Some existing hardware may require removal or relocation for installation of new devices. In each instance, the Successful Bidder must advise Corporate Security, and the Successful Bidder must receive written approval prior to the removal or relocation. All costs associated with the removal or relocation are the sole responsibility of the Successful Bidder.
- 5.12.1 All placements of security devices are subject to approval by Corporate Security before final acceptance is granted.
- 5.12.2 All equipment and devices, removed by the Successful Bidder for replacement or placement of a new security device, shall remain the property of the City and shall be submitted to the City upon device removal.

## 5.13 Design and Installation

- 5.13.0 The Successful Bidder is responsible to provide a fully functional system meeting the City's standards as required by this RFQ.
- 5.13.1 The Successful Bidder shall be the design builder required to supply and/or install fully functional integrated, Security System for the City of Toronto. The Successful Bidder shall be solely responsible for its design errors or omissions. Including, but not limited to situations where all the necessary materials to deliver a fully functional integrated CCTV and AV system have been missed. This clause shall not apply where the City requests a change to the original design request. The Successful Bidder shall be solely responsible for detailed design, project management, coordination, equipment procurement, installation, component wiring, terminations, connections, labelling, programming, integration, testing, commissioning and as-built drawings of all Systems.
- 5.13.2 The Successful Bidder shall supply and/or install all required Systems electronic equipment, hardware, software, licenses and connections, to allow for City required functionality under this RFQ.
- 5.13.3 The systems shall consist of field, infrastructure, and monitoring devices integrated to the access control and intercom systems necessary to provide a fully automated system to control authorized traffic in and out of controlled areas of City facilities.
- 5.13.4 The system shall be designed on a distributed processing architecture employing remote DGPs (Data Gathering Points) and operator workstations connected through TCP/IP and/or serial communication protocols, where applicable.

- 5.13.5 As part of this RFQ the Successful Bidder shall connect all devices to centrally located patch Panels and/or equipment located in communication rooms and /or DGP as detailed in the specification drawings and standards.
- 5.13.6 Connectivity from the IP equipment shall be based on Ethernet IP based protocols over a City supplied network, which shall connect and be programmed to servers and remote client workstations.
- 5.13.7 The Successful Bidder shall provide all programming data required to achieve the specified functionality (this includes situations where existing technology is being replaced with new technology). Such programming shall include (but is not limited to) programming of all alarms, events, triggers, timers, objects transmitting and receiving signals and interfaces as well as programming of signal receiving centre equipment to provide 100% full functionality.
- 5.13.8 Any required expansion boards/nodes and ancillary equipment needed for a full operation of the system are the responsibility of the Successful Bidder.
- 5.13.9 The Successful Bidder shall provide power supplies with battery back-up to meet NFPA 731 standards for all Systems. Failure to meet the standard will result in the Successful Bidder providing all supplies necessary at no additional cost to the City.
- 5.13.10 The Successful Bidder shall be required to populate all items such as parts and equipment from supply and install projects into a City supplied Microsoft Office database file. Upon review and approval by the City, these database files will be imported into the City central physical asset and material management database.
- 5.13.11 The Successful Bidder is responsible for all final wiring and terminations of all Systems.
- 5.13.12 The Successful Bidder shall be responsible for ensuring all structured cabling and electrical including back boxes, cabling, conduit, troughs and raceways meet equipment electrical and wiring requirements throughout all phases of the project.
- 5.13.13 The Successful Bidder shall inspect conduit, cabling, back boxes, junction boxes associated with the Systems during installation and shall notify the City Project Manager of any issues found.
- 5.13.14 The Successful Bidder shall maintain integration to existing security systems to the maximum level supported by the systems manufacturers.
- 5.13.15 Test and commission according to the 32.0 Compliance with Standards.
- 5.13.16 The Successful Bidder shall review the current site conditions and existing system configurations.

- 5.13.17 The Successful Bidder shall provide at all times sufficient competent labour, materials, and equipment to properly carry on its Work and ensure completion of each part in accordance with the Work schedule and within the contractual time period.
- 5.13.18 All installation materials, accessories and special equipment, Services, Personnel, test equipment and tools required for installation of the equipment shall be provided by the Successful Bidder.
- 5.13.19 Equipment shall be installed as per the manufacturer's recommendations, programmed and integrated to City Standards and the City Project Manager.
- 5.13.20 The Successful Bidder shall secure and be responsible for the safe keeping and protection of the system equipment until the system is fully accepted by the City of Toronto after the commissioning process.
- 5.13.21 The Successful Bidder shall coordinate all network provisioning with City of Toronto ITServices.
- 5.13.22 The Successful Bidder shall start to warrant the Systems, warranty start date, when all deliverables such as as-builts of the project have been accepted by the City and deficiencies corrected.
- 5.13.23 The Successful Bidder shall maintain the System in compliance with manufacturer's specified Preventative Maintenance schedule during the project installation period.
- 5.13.24 The Successful Bidder is responsible for all System decommissioning and removal of equipment in this RFQ, at no additional cost to the City. Including all cable removal as per ESA requirements.
- 5.13.25 The Successful Bidder shall be responsible to investigate, design and integrate to new and existing Systems.
- 5.13.26 It is the responsibility of Successful Bidder to design and finalize the System wiring diagrams, drawings, documentation and schedules in order to meet site specific conditions and provide a fully functional system.
- 5.13.27 Integration and Analytic programming for items not listed in the contract are to be shown as separate line items in quote indicating the type of integration and/or analytic to be achieved and used for the remainder of the contract term.

## 7.0 Supply and Installation Project Submission Requirements



- 7.1 The Successful Bidder shall (at no additional charge) submit to the Project Manager one (1) set of electronic copies of the following: project quotation, detailed project schedule, shop drawings, as-builts, warranty, and any other related supporting documents as detailed in this RFQ.
- 7.2 All electronic documents submitted to COT must be named by purchase order, site name, document type, date, and Service Request Portal Number.
- 7.3 As directed by Toronto City Council in 2005 under the City's Waste Diversion Plan, where feasible and appropriate, all hardcopy prints will be double sided. Therefore the Successful Bidder will be required to comply with this plan as it relates to all hardcopy print contract documents.

## 8.0 Detailed Project Schedule

- 8.1 Detailed Project Schedules are to be free from error and submitted.
- 8.2 The detailed project schedule shall include, but not be limited to the following information:
  - Commencement date for each major activity;
  - The duration of each activity;
  - The proposed sequence of activities;
  - Dependencies between internal activities and milestone;
  - Dependencies between external activities and milestone; and,
- 8.3 The schedule shall be progressively updated as the project progresses, which enables the Project Manager to readily identify activities by location and resources.
- 8.4 The schedule information shall be sufficiently detailed to enable integration of all interface activities by the Project Manager.
- 8.5 The schedule shall be presented in daily segments and shall include the following at a minimum:
  - Site surveys (as required);
  - Service Request Portal Number;
  - Submission and approval of Shop drawings;
  - Shipping confirmation date;
  - Material delivery and installation;
  - Conduit and wire pulls completed;
  - Progress photographs (only of concealed work);
  - Panels and power supplies installed and programmed;
  - Field equipment terminated, mounted and tested;
  - Security testing complete;
  - Acceptance testing complete;
  - As-built documents;

- Equipment integration and dry-run;
- Monitoring period (minimum one week);
- Commissioning and hand-over.

8.6 The schedule shall be clearly identified with the following:

- Site name, if applicable and address;
- CRO number;
- Start date of the project with time;
- Project Coordinator name with detailed contact information; and,
- Subcontractor name; and
- Project completion date.

8.7 Distribute copies of any revised schedule to:

- Project Manager; and,
- Security Project Lead
- Other Stakeholders as indicated by the Project Manager.

8.8 The Successful Bidder shall be responsible for any delay in the progress of the Work, and it being understood that no such delay shall be an "Excusable Delay" for the purposes of extending the time for performance for the Work or entitling the Successful Bidder to additional compensation. The Successful Bidder shall take all necessary steps to avoid delay in the final completion of the Work without additional cost to the City of Toronto. The City shall not be responsible for any expense or liability resulting from any such delay.

## 9.0 Shop Drawings

9.1 Shop drawings prepared are to be free from error and submitted in electronic format. Shop drawings are to include all items quoted with no substitutions without the prior consent of the City Project Manager. All documents produced shall be the property of the City of Toronto and the Successful Bidder shall have no rights over the entire documentation package or any parts of the documentation package.

9.2 Shop Drawings shall include:

- Date and revision number;
- Project title and number;
- Service Request Portal Number;
- Contract Drawing / Specification Reference;
- Name and address of:
  - Subcontractor;

- Supplier, Manufacturer; and,
- Wiring diagrams for each location (including distances);
- Details of types of wire and conduit type and sizes;
- Particular model number of hardware;
- Dedicated circuit in electrical panel to be used (for new installations);
- Progress photographs (only of areas with concealed work);
- Panels and power supplies (location to be installed);
- Field equipment (location of mounting);
- All device programming names;
- Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.

9.3 The Project Manager may change any drawing to remove, add or relocate any device. The Successful Bidder shall make any changes in the shop drawings, which the Project Manager may require consistent with the Contract Documents and resubmit unless otherwise directed by the Project Manager. The Successful Bidder shall notify the Project Manager in writing of any revisions other than those requested by the Project Manager and are subject to approval by the City Project Manager.

## 10.0 Project Commencement

10.1 Prior to the commencement of installation the successful bidder will submit the following:

10.1.0 The Security Contractor shall submit to the Corporate Security Lead the required Active and Passive network equipment specifications for all locations in scope

10.1.1 The specifications and active network equipment shall be in compliance with the City Networking standard and based on Cisco active networking equipment.

10.1.2 The Security Contractor shall submit a network communication and bandwidth flow chart for the proposed system this shall include communication steps between the various VSS components operating in normal and failover modes and their respective estimated network bandwidth requirements

10.2 Near project closeout and before project site acceptance testing the security contractor shall submit the following draft documentation in electronic form to the COT Project Manager:

- Draft test results of device and components installed
- Draft test result of cable inspection, testing and verification
- Draft schedule of all installed and/or configured devices listing as a minimum the following (Network configuration, Switch & port connectivity, location, Name/labeling, Serial Number, Warranty Start & Expiry date, Device Username/Passwords, Device IP and MAC Address, Function, etc....) in editable MS Excel format

## 11.0 As-Built Documentation

- 11.1 Upon successful completion and acceptance of each security project, the Successful Bidder shall submit one (1) electronic set of record documentation and drawings to City of Toronto Corporate Security within ten (10) calendar days from the date of acceptance.
- 11.2 As-built shall include drawings and shall be in the FORM of black line set, record drawings on AutoCAD 2005, as well as a .pdf version, and are to be provided on a clean CD-ROM, DVD, or via e-mail.
- 11.3 Drawings shall include:
- Shop drawing submittals;
  - Wiring diagrams for each location (include distances);
  - Details of types of wire and conduit (include type and size);
  - Particular model number of hardware (to match Summary of Security Devices Table to be provided by COT);
  - Approval of drawing submittals;
  - Beneficial occupancy date;
  - Project Completion date;
  - Equipment manufactures;
  - Factory Acceptance Tests;
  - Installation procedure;
  - O&M manuals; and,
  - Manufacturer's specification sheet.
- 11.4 Architectural: site plans, building plans, and floor plans showing all locations for every security device both new as well as any effected existing device.
- 11.5 All security devices depicted in the drawings must be individually labelled according to the programming on the security system to ensure tagging consistency.
- 11.6 All security device symbols depicted must be in conformance to the Security Industry Association Architectural Graphic Standards for Security System Layout SIA/IAPSC AG-01-1995.12(R2000.03).
- 11.7 A Summary of Security Devices Table, as installed in Excel format. The table shall include the following for each security device: Security Device CAD Symbol, Make, Model, Serial number, IP Address, MAC address, Device Type/Function, Install Date, Installing Company, network configuration, Switch & port connectivity, VLAN, location, Name/labeling, Serial Number, Warranty Start & Expiry date and a photograph of each installed device. A template will be provided by the COT.
- 11.8 Wiring diagrams and/or schedules for each system defining the interconnection of all inputs and outputs for all equipment/security devices/electrical connections including description of location and/or name of each device.

## 11.9 Construction Typical for all security applications.

11.9.0 As-built shall include all information required in the prefabrication submittals revised to reflect "as installed" conditions.

11.9.1 As-built shall also include one (1) sets of complete and current operation and Maintenance manuals for all devices and equipment.

11.9.2 The Successful Bidder is solely responsible to include engineered stamped drawings when required by the City.

11.9.3 As-builts may not have any written notes on them all entries must be electronic.

## 12.0 Installation Standards and Requirements

12.1 All direction for scope of work must be provided by the COT Project Manager. Any work completed without approval of the COT Project Manager may have to be altered at the COT request and without additional cost to the COT.

12.2 The Successful Bidder must deliver the specified Products and/or Services as per their Quotation without substitution or deviation.

12.3 The Successful Bidder shall be solely responsible for detailed design, project management, coordination, equipment procurement, installation, component wiring, terminations, connections, labelling, programming, integration, testing, commissioning and issuing of required documentation of City systems.

12.4 The Successful Bidder shall restore all property temporarily removed, damaged, or destroyed during the supply, delivery, and installation, of Products to the satisfaction of the City and at no cost to the City. The Successful Bidder, before final payment, shall remove all surplus materials and any debris of every nature resulting from its operation and put the site(s) in a neat, orderly condition; thoroughly clean. If the Successful Bidder fails to clean up at the completion of the supply, delivery, and installation of the Products, then the City may do so and charge the Successful Bidder for the costs thereof, or deduct said costs from any monies still owing to the Successful Bidder.

12.5 The Successful Bidder shall furnish all labour, materials, services, special equipment, supplies, tools, equipment, testing equipment, apparatus, trade tools, transportation, facilities and incidentals required and perform all operations necessary to accomplish the complete installation of the Product(s).

12.6 The Successful Bidder is responsible for all final wiring, integration and terminations of all systems.

12.7 Testing and commissioning is to be performance according to City and NFPA standards. Specific documentation to achieve this will be developed with the successful bidder and final template approved by City of Toronto (COT).

- 12.8 Unless authorised by the Project Manager, the Successful Bidder must flush mount all devices. Back boxes / junction boxes, all devices, equipment and components installed must be equipped with tamper resistant screws/fasteners.
- 12.9 Any back boxes / junction boxes must be installed on secure side (if applicable).
- 12.10 The Successful Bidder must ensure the electronic door operators are integrated with the access control system, and only activate when a valid card is presented. If not included during the quotation process, all associated costs will be at the Successful Bidders expense.
- 12.11 The Successful Bidder will ensure programming for any CCure systems is completed to Standard and report to maintenance mode Journal for a minimum of one week after successful site testing and deficiency correction. After one week, should no deficiencies exist, the Successful Bidder will remove the system from Journal and fully activate at the request of the City Corporate Security Lead.
- 12.12 All card readers must be ordered and programmed to City Standard/format and as directed by the City Corporate Security Lead.
- 12.13 All exit buttons are to be green in colour and embossed with the label "EXIT", no other type will be accepted even if quoted. Any errors will result in replacement by the Successful Bidder at no additional cost to the City.
- 12.14 All intercoms are to have a red button with red led status indicator that is used to communicate, no other type will be accepted even if quoted. Any errors will result in replacement by the Successful Bidder at no additional cost to the City.
- 12.15 Each facility covered under this contract shall be handed over to the City by the Successful Bidder as a turnkey operation.
- 12.16 Any power supplies, or other parts that are required shall be supplied by the Successful Bidder and shall be included in the quoted price. Power supplies must operate all connected hardware in all conditions.
- 12.17 The Successful Bidder shall be responsible for provisions of power, if it should not be present at a location. Dedicated power circuits shall be installed for each new device that will be installed as part of this project.
- 12.18 Any required expansion boards, ancillary equipment, needed for a full operation of the system are the responsibility of the Successful Bidder and must be included in the quote. Should they not be included but be required to operate the system then it will be the successful bidders responsibility to provide without cost to the City.
- 12.19 All device conditions and alarms shall be individually enunciated on the relevant system, as required for each specific project scope.

- 12.20 The Successful Bidder shall be responsible for the installation of all the equipment, units, and sub-systems, at all sites in order to meet all requirements specified in this document, as per all applicable standards, and as per manufacturer's intent.
- 12.21 All installation materials, accessories and special equipment, Services, Personnel, test equipment and tools required for installation of the equipment shall be provided by the Successful Bidder.
- 12.22 The Successful Bidder shall be responsible for all required trenching, civil work, and any associated costs.
- 12.23 The Successful Bidder shall provide all programming data required to achieve the specified functionality for each effected system (this includes situations where existing technology is being replaced with new technology). Such programming shall include (but is not limited to) programming of all alarms, events, triggers, timers, objects transmitting and receiving signals, networking, bandwidth settings, frame rates, images per second, permissions, integration between systems, and interfaces as well as programming of signal receiving centre equipment to provide 100% full functionality.
- 12.24 It is required that disruptions be minimized keeping the existing intrusion detection systems or video surveillance systems operational during the process of upgrading to the new systems until all devices from the new system are functional and ready to be used by the end user. Consideration for the critical nature of all facilities operations and occupants is crucial to the success of the project.
- 12.25 Any new materials used by the Successful Bidder to commission the existing devices to the new system shall be covered by the warranty under this contract.
- 12.26 All existing devices that will be re-used by the Successful Bidder shall be commissioned to the new systems as defined by the COT.
- 12.27 All existing devices that will be replaced with new devices under the scope of work of any specific project shall be removed by the Successful Bidder. The removal of existing equipment or parts which will not be used with the new installations shall be completed by the Successful Bidder. Parts in working order are to be returned to address noted below. Other parts to be disposed by bidder.

**Scarborough Civic Centre,  
Lower Level, Security Storage Room  
150 Borough Drive  
Toronto, Ontario, Canada  
M1P 4N6**

Working parts under 5 years old to be return are as follows:

- Electric Strike
- DVRs, NVRs
- Servers
- Security Network Switches
- Cameras
- Camera Mounts
- Encoders

- UPS
- Request to Exit Buttons
- Intercoms
- Wall mounted duress buttons
- Sirens
- Communication Boards/Panels
- Long Range Motion Sensors
- Maglocks

- 12.28 Where this section applies, the Successful Bidder must provide the City a minimum of 24-hours' notice of delivery of old functioning electronic security hardware, electro-mechanical security hardware, and mechanical hardware. All other equipment not required to be delivered to the City shall be disposed of at the Bidder's expense.
- 12.29 All costs and expenses associated with returning old equipment shall be the responsibility of the Successful Bidder.
- 12.30 The Successful Bidder shall reuse existing conduit runs whenever feasible and run new cabling in the existing conduit runs. Where existing conduit is used the new and existing cables must not experience any negative performance indications. Any deficiencies found after installation must be corrected by the successful bidder at no cost to the COT.
- 12.31 The Successful Bidder shall be responsible for patching up holes left by existing equipment and making good all repairs where new equipment is being installed in the same place.
- 12.32 All installed equipment shall be fully functional and shall be capable to be monitored at each individual site as well as the Corporate Security Control Centre located at 703 Don Mills Road.
- 12.33 Devices such as communication boards or input/output boards shall not be installed on door of panels. Additional panels shall be installed by the Successful Bidder to accommodate the installation of such devices.
- 12.34 Upon completion of the installation of the equipment at each location, the Successful Bidder shall provide to the Project Manager the serial numbers and model numbers of all newly installed equipment, these are to be included in the Summary of Security Devices Table referenced in section "As-Built Documentation 11.7".
- 12.35 The Successful Bidder shall install plywood backboards for mounting of all infrastructure equipment which require such backing to be able to be safely mounted to a wall such as electronic key cabinets, panels, and power supplies, etc.
- 12.36 Connect equipment to the closest approved available panel/switch/computer with available inputs and outputs.
- 12.37 Any new and existing cables for all devices which are exposed on the surface of a wall or ceiling or any other accessible surface shall be placed in conduit or wire moulding by the Successful Bidder as directed



by the COT. This conduit/moulding shall be sized to allow for additional 25% increase in cable and include a cable pull string for future use. Type of conduit/moulding to be confirmed on specific project site meetings with COT. Plenum rated cable must be used in any spaces requiring plenum rated cabling as per building and/or electrical code. All cabling, conduit, and installation methods utilized must meet COT IT Cabling Standards, manufacturer recommendations, and both the Electrical and Building Codes.

- 12.38 All infrastructure equipment including power supplies, transformers, communication devices, controllers, recording devices, etc. must be installed in secure cabinets. The Successful Bidder shall provide and install such cabinets and mount all of the equipment inside the cabinets. All costs for such cabinets shall be included in the quoted price.
- 12.39 Video Surveillance installation and camera field of view shall be in compliance with applicable local privacy laws, the City video surveillance privacy policy and shall be approved by the Corporate Security Lead.
- 12.40 All IP enabled devices such as IP Cameras, Encoders, iStar's, NVR's, card readers, controllers, etc. shall be tagged with an appropriate device name in coordination with the Corporate Security Lead.
- 12.41 Typical naming conventions are as follows however final naming convention shall be coordinated with and approved by the Corporate Security Lead prior to the commencement of any device setup or installation:
- Site Address-NVR/Controller Number/Name
  - NVR's shall be numbered sequentially as added
  - Device numbers shall match port number on attached switch or controller
  - Ex: 1008YNG-NVR9-CAM3
- 12.42 All IP Cameras and Encoded Cameras shall be programmed on the VSS to display a short form naming. This Naming shall be coordinated with and approved by the Corporate Security Lead prior to configuring the VSS.
- Typical Camera/device short FORM name on Milestone system would be:  
1008YNG-F3-NW STAIR-3
- 12.43 The Security Contractor shall carry the cost of all required access hatches where required and shall patch and paint to match existing paint; all locations for access hatches shall be pre-approved by the Corporate Security Lead in writing before working on these access hatches.

## 13.0 VSS Design Criteria

- 13.1 The VMS architecture shall permit centralized administration and management for the IP VSS and its distributed components across the City's local and wide area corporate networks. This administration

shall be redundant providing seamless failover capabilities and continuous operation in the event of failure of one of the main IP VMS services.

- 13.2 The VMS shall allow for continuous system management and operation through resilient server clusters on the City provided domain, between 55 John Street and 703 Don Mills. This resiliency shall span the Management, SQL Database and Event servers providing continued operation at the primary and/or the secondary site depending on failure cause and location of components, infrastructure and/or related services.
- 13.3 The VMS shall allow for administering and managing the complete VSS system from any workstation having the Milestone XProtect® management client application installed and connected to the Corporate Security Lead's Corporate Network.
- 13.4 The VMS shall keep all (Audit, Event, and Rule and System logs) for duration of 60 days. Any storage or other specifications required from the Corporate Security Lead provided equipment shall be included and provided by the security contractor to the Corporate Security Lead as part of the server Specifications required.
- 13.5 The following will be supplied by the City of Toronto:
- Microsoft SQL Software and Licenses
  - Physical Servers required for Milestone VMS Management Services including Microsoft Windows Server 2008/2012 Licenses:
    - Management Server
    - Event Server
    - SQL Server
    - Mobile Server
  - Client (user) Workstations
  - VSS Core Network Switches (Cisco Switches)
  - VSS Access Layer Switches (Cisco Switches)
  - SAN Network Switches (Cisco Switches)
  - Ethernet Cat6A Patch Panels
  - Fiber Patch Panels in VSS Racks
  - Fiber connectivity between existing telecom rooms, entrance facilities and equipment rooms.
- 13.6 The Security Contractor shall specify the required Cisco switch models, and configuration required for the VSS, and the SAN to operate fully (including interface modules, IOS software, ports, Supervisor Engine, Backplane BW, POE Power/port, QOS Groups & Types, etc....). It is the responsibility of the Security Contractor to ensure specified network infrastructure is adequate for the complete system operation in normal and failover modes. The Security Contractor is responsible to coordinate and provide all detailed server specifications required for the system full operation to the Corporate Security Lead IT departments. Should the switch be determined to not be functionally appropriate by the COT, it shall be replaced by the successful bidder with an appropriate device at no additional cost to the COT.

- 13.6.0 Provide all VSS components and accessories required for achieving the full required functionality including but not limited to IP cameras, power supplies (Where Applicable), transmission media converters and extenders, modules, Video Encoders, mounts, enclosures, cables, plenum rated back boxes/enclosures/kits and IR Illuminators etc....
- 13.6.1 The only acceptable video compression (digital encoding) method shall be non-proprietary H.264 encoding (Baseline and/or Main Profile)
- 13.6.2 The VMS shall transmit and communicate over Corporate Security Lead IP network LAN/WAN, Fibre cables, Ethernet cables, Coaxial cables and Elevator installed coaxial cable infrastructure.
- 13.6.3 The Security Contractor shall warranty and ensure network bandwidth transmission performance, display, compression and network latency, PC client workstation, NVR's, SAN's and VMS server performance is designed and engineered to be sufficient, functional and in accordance with Milestone Systems VMS equipment and VSS hardware manufacturer.
- 13.6.4 The Security Contractor shall be sensitive to network bandwidth requirements and communicate all requirements to the Corporate Security Lead. It will be the sole responsibility of the Security Contractor to design and engineer all network transmission paths under the performance conditions of this specification and the requested deliverables.
- 13.6.5 All VSS Servers and workstations will have corporate antivirus agents installed by the Corporate Security Lead's IT Team prior to the installation. The additional travel time incurred by the successful bidder for deliveries to required sites for programming shall be at no charge to the COT.

## 14.0 Video Recording

All video must be stored for 37 days. The local NVR disks must be capable of recording for the full thirty seven (37) days, at full system capacity.

### 14.1 Network Video Recorders

Minimum requirements include:

- 14.1.0 RAID1 OS Volume array (2 x 240GB SSD)
- 14.1.1 RAID controller with minimum 512MB Battery backed cache
- 14.1.2 Enterprise Remote management capabilities, with virtual media and console access capabilities c/w out-of-band interface
- 14.1.3 RAID 1 Volume array for recording live video (15K RPM or better).

- 14.1.4 RAID 5 Volume array for archived video (7.2K RPM or better).
- 14.1.5 At least one global hot spare
- 14.1.6 All hard drives shall be Enterprise / Data centre grade
- 14.1.7 All DISK I/O's should run at no more than 80% of the maximum System capacity under normal operating conditions including Antivirus software, Encrypting Video and other required system services. 20% overhead shall remain free.
- 14.1.8 NVR's shall be equipped with Enterprise server network cards
- 14.1.9 Each NVR shall be equipped with two network ports for live viewing and two separate ports for recording video. All camera recording streams shall be on a separate VLAN.
- 14.1.10 Each NVR shall have a redundant and resilient connection to the SAN (where applicable) through a dedicated network
- 14.1.11 NVR Hardware shall be off-the shelf HP or DELL Servers
- 14.1.12 The NVR solution and design shall be certified and approved by Milestone Systems to meet the performance requirements of the VMS solution.
- 14.1.13 All Recorders to be configured and connected to COT centralized Milestone management system

## 14.2 Class A Recorder

Recording 16 or less local IP Video or Camera streams each streaming H.264 compressed video at a resolution of 1920x1080p, frame rate of 15fps, stream bandwidth of 2400Kbps/Stream, with 100% estimated scene motion, and continuously recording for 24hrs for a total of thirty seven [37] days retention period without any altering or compression to original recorded streams (i.e.: reducing P frames, or other compression techniques)

Allow for thirty-seven [37] days continuous recording on the local NVR RAID5 Storage Array with hot spare disk.

The following is an example of the required NVR. Equivalents, or others, approved by Milestone to be presented to City Of Toronto for an approval.

Primary/Redundant NVR Specifications	
Requirements	
Processor/Chipset	1 x Intel Xeon E5-2620 v3 2.4GHz or COT approved equivalent
Operating System	Microsoft Windows Server 2012 x64 Standard
Monitor	Refer to TR Typical for NVR requirements
System Memory	Minimum 32GB 1600MHz DDR3 Memory
Hard Drives/OS	2 x 240GB Solid State SATA drives, 6Gbps 2.5in Hot-plug Drive, 3.5in (Raid 1)
Hard Drives/Live video	2 x 600GB 15K RPM SAS 2.5in Hot-plug Hard Drive, 3.5in (Raid 1)
Hard Drives/Archive	5 x 8TB 7.2K RPM SATA 6Gbps 512e 3.5in Hot-plug Hard Drive (Raid 5 + Hot spare)
RAID Controller	Enterprise Class Raid Controller with minimum 1GB Cache, supporting required disks and RAID levels with battery backup and write-back cache support.
Graphics	On board
Network	Broadcom 5720 QP 1Gb Network Daughter Card
I/O Ports	USB 2.0 or USB 3.0
Chassis Type	Rack mount, c/w pull out rails (tool-less mounting with square holes) Chassis with up to 12, 3".5" Hard drives + 2, 2.5" Flex Bay Hard Drives
Expansion Slots	Minimum 3x PCIe (2x16 Bandwidth, x8 Bandwidth)
Security	Chassis Intrusion Switch Setup/BIOS Password, lockable bezel
Remote Management	Enterprise remote virtual media and console access capabilities c/w out-of-band interface (Ex: iDRAC7 Enterprise or COT approved equivalent)
Power	Dual, Hot-plug, Redundant Power Supply (1+1), 750W
Support	4-Hour 7x24 On-Site Service with Emergency Dispatch, 3 Year

### 14.3 Class B Recorder

Recording 32 or less local IP Video or Camera streams each streaming H.264 compressed video at a resolution of 1920x1080p, frame rate of 15fps, stream bandwidth of 2400Kbps/Stream, with 100% estimated scene motion, and continuously recording for 24hrs for a total of thirty seven [37] days retention period without any altering or compression to original recorded streams (i.e.: reducing P frames, or other compression techniques)

Allow for thirty-seven [37] days continuous recording on the local NVR RAID5 Storage Array with hot spare disk.

The following is an example of the required NVR. Equivalents, or others, approved by Milestone to be presented to City Of Toronto for an approval.

Primary/Redundant NVR Specifications	
Requirements	
Processor/Chipset	1 x Intel Xeon E5-2620 v3 2.4GHz (or COT approved equivalent)
Operating System	Microsoft Windows Server 2012 x64 Standard
Monitor	Refer to TR Typical for KVM requirements
System Memory	Minimum 32GB 1600MHZ DDR3 Memory
Hard Drives/OS	2 x 240GB Solid State SATA drives, 6Gbps 2.5in Hot-plug Drive, 3.5in (Raid 1)
Hard Drives/Live video	2 x 900GB 15K RPM SAS 2.5in Hot-plug Hard Drive, 3.5in (Raid 1)
Hard Drives/Archive	8 x 8TB 7.2K RPM SATA 6Gbps 512e 3.5in Hot-plug Hard Drive (Raid 5 + Hot spare)
RAID Controller	Enterprise Class Raid Controller with minimum 1GB Cache, supporting required disks and RAID levels with battery backup and write-back cache support.
Graphics	On board
Network	Broadcom 5720 QP 1Gb Network Daughter Card
I/O Ports	USB 2.0 or USB 3.0
Chassis Type	Rack mount, c/w pull out rails (toolless mounting with square holes) Chassis with up to 12, 3".5" Hard drives + 2, 2.5" Flex Bay Hard Drives
Expansion Slots	Minimum 3x PCIe (2x16 Bandwidth, x8 Bandwidth)
Security	Chassis Intrusion Switch Setup/BIOS Password, lockable bezel
Remote Management	Enterprise remote virtual media and console access capabilities c/w out-of-band interface (Ex: iDRAC7 Enterprise or COT approved equivalent)
Power	Dual, Hot-plug, Redundant Power Supply (1+1), 750W
Support	4-Hour 7x24 On-Site Service with Emergency Dispatch, 3 Year

## 14.4 Class C Recorder

Recording 64-128 local IP Video or Camera streams each streaming H.264 compressed video at a resolution of 1920x1080p, frame rate of 15fps, stream bandwidth of 2400Kbps/Stream, with 100% estimated scene motion, and continuously recording for 24hrs for a total of thirty seven [37] days retention period without any altering or compression to original recorded streams (i.e.: reducing P frames, or other compression techniques)

Allow for thirty-seven [37] days continuous recording on the local NVR RAID5 Storage Array with hot spare disk.

The following is an example of the required NVR. Equivalents, or others, approved by Milestone to be presented to City Of Toronto for an approval.

Primary/Redundant NVR Specifications	
Requirements	
Processor/Chipset	2 x Intel Xeon E5-2660 v4 2.0GHz (or COT approved equivalent)
Operating System	Microsoft Windows Server 2012 x64 Standard
Monitor	Refer to TR Typical for KVM requirements
System Memory	Minimum 64GB 1600MHZ DDR3 Memory
Hard Drives/OS	2 x 250GB Solid State SATA drives, 6Gbps 2.5in Hot-plug Drive, 3.5in (Raid 1)
Hard Drives/Live video	2 x 900GB 15K RPM SAS 2.5in Hot-plug Hard Drive, 3.5in (Raid 1)
Hard Drives/Archive	10 x 10TB 7.2K RPM SATA 6Gbps 512e 3.5in Hot-plug Hard Drive (Raid 5 + Hot spare)
RAID Controller	Enterprise Class Raid Controller with minimum 1GB Cache, supporting required disks and RAID levels with battery backup and write-back cache support
Graphics	On board
Network	2 x Broadcom 5720 QP 1Gb Network Daughter Card
I/O Ports	USB 2.0 or USB 3.0
Chassis Type	Rack mount, c/w pull out rails (tool-less mounting with square holes) Chassis with up to 12 3" 5" Hard drives + 2 2.5" Flex Bay Hard Drives
Expansion Slots	Minimum 3x PCIe (2x16 Bandwidth, x8 Bandwidth)
Security	Chassis-Intrusion Switch Setup/BIOS Password, lockable bezel
Remote Management	Enterprise remote virtual media and console access capabilities c/w out-of-band interface (Ex: iDRAC7 Enterprise or COT approved equivalent)
Power	Dual, Hot-plug, Redundant Power Supply (1+1), 750W
Support	4-Hour 7x24 On-Site Service with Emergency Dispatch, 3 Year

## 14.5 Using Ionodes as a mini-Dell Server

### 14.5.1. Steps for CoT Client IT

- Configure the unit to be in the same domain as the Milestone Management servers, recording servers as per their policy
- Configure one of the NIC cards of the unit to have IP address configuration that can reach the Milestone Management server
- Configure the other NIC card of the unit to be in the local IP subnet of the site IP cameras/encoders
- Provide the IP address/domain name of the milestone management server to the Met-Scan install crew
- Provide the required network connectivity from a site to reach the management server:
  - a. Ports to be opened similar to what is being done in induction of new DELL servers to the management server
  - b. Would need IT assistance when the unit is having difficulty to reach the network with this regard instances such as:
    - i. in the network layer level using command prompt

- ii. difficulties in opening the management server download web page
- iii. Difficulties in reaching the management server in the handshake process that happens when installing the Milestone recording server application.
- Add the milestone device licenses to the management server.

#### 14.5.2. Steps for Vendor:

- Configure the storage to store video.
  - a. A recording folder will be created for the one-day live storage
  - b. 2<sup>nd</sup> folder will be created for the archive in the drive allotted to data.
- Download the recording server application into the unit from the Milestone management server download page using the IP address/domain name of the management server provided by IT
- Install the recording server app in the unit that requires assistance from IT if there is a difficulty in the handshake process with the management server due to network/ports issues
- Add the cameras to the recording server and adjust settings as per COT requirements
- Use the same install procedure that is used for DELL server classes, and we install:
  - I. Recording server application.
  - II. Device pack
  - III. Management Client and Smart Client apps
- Two drives in the unit are configured as a spanned array to be one volume as per directions from IONODE, as shown in the image below. The one volume is formatted with 64K block size/Indexing off, keeping with Milestone requirements that contains two folders, one for Live and one for Recordings.
  - I. Maximum storage capacity available with IONODES is 20 TB (nominal)
  - II. Considering a 10% overhead for storage housekeeping, which brings down the usable capacity to 18 TB.
  - III. This usable capacity (18 TB) will allow about 16 streams at a 2.4 kbps bit rate (12 streams plus 25% capacity for future growth).

## 15.0 VSS Storage Area Network (SAN)

### 15.1 The SAN shall have the following minimum requirements:

- Equipped with redundant and hot-swappable power supplies and cooling Fans
- Support hot-swappable drives, each configured RAID 5 volume should be configured to have a hot spare disk available
- Support both iSCSI (1GB, 10GB), FCoE (10GB), FC (4-16GB) with Hot Swappable controllers
- Provide a minimum effective (Usable) total storage capacity of RAID5 configured arrays to allow for the required video storage retention of 30 days from each of the NVR's connected to it
- Expandable to allow for additional 30% effective storage capacity and the connectivity of additional two [2] NVRs
- Support redundant and load balancing SAN connectivity to each NVR Server.
- Support multiple RAID levels on connected storage within an array



- Enough processing power and backplane bandwidth to support the total IOPS required for recording and retrieval of the video to and from the storage array.
- Enough memory bandwidth to support the buffering and queuing of system I/O's and transferred data.
- Equipped with battery backed cache for all array controllers (minimum 512MB)
- Intuitive enterprise level management and monitoring interface that can scale across the multiple SAN's
- Preference for remote monitoring and support features

15.2 The SAN shall be connected on its own dedicated local network; the security contractor shall provide the Cisco Network switches specifications and Media interface types required and coordinate these requirements with the Corporate Security Lead Networking Team. SAN network traffic shall not interfere with the any other network traffic.

15.3 All Patch Cables, labeling and connectivity between the SAN, Servers and SAN Network shall be the responsibility of the Security Contractor.

15.4 The management interface of the SAN shall be connected to the Corporate Security Lead's corporate network to allow for remote management and control.

15.5 The SAN solution and design shall be certified and approved by Milestone Systems to meet the performance requirements of the VMS solution.

15.6 Dell products are preferred, however alternatives approved by Milestone and which meet the above specifications will be considered.

DAS devices can be used instead of SAN where approved by the COT. The specified DAS must be approved by Milestone, achieve the desired recording duration, and allow for 25% video surveillance system growth. Dell and HP products are preferred, alternatives would have to be approved by the COT.

The below are the minimum DAS requirements. Equivalents, or others, approved by Milestone will be considered.

Minimum Specifications
<b>Hardware</b>
Minimum 8GB RAM
Dual Controller Array configuration
RAID Array Controller w/I GB Battery Backed Cache

DUAL Hot Swappable 10/100/1000 Ethernet Controllers with 4 ports each
<b>Disk Configuration</b>
SATA 7.2k RPM or better disks (Size or Disks Varies with required Storage, min 4TB disks rated for Enterprise DAS Storage and Video streaming applications)
Storage Volume to be configured as a RAID 10 Array

## 16.0 Cameras

- 16.0.1 Install dome cameras in flush surface or drop ceiling with concealed cabling
- 16.0.2 Configure cameras internal access with a new Username/Password credentials and **remove default logins**
- 16.0.3 Configure cameras with secure access protocols, VLANs, QOS and other network settings in coordination with the Corporate Security Lead. Cameras shall be totally secured to authorized access before being connected to the Corporate Security Lead's Network
- 16.0.4 All Cameras include elevator cab cameras shall be named in coordination with the Corporate Security Lead naming scheme and configured to sync with the Corporate Security Lead's local NTP server/VMS system
- 16.0.5 Configure each camera stream settings including but not limited to frame rate, bitrate, compression, stream name, day night setting, and other related configuration in coordination with the Corporate Security Lead. All configurations shall be approved by the Corporate Security Lead before setting and configuring the devices
- 16.0.6 Configure and calibrate cameras for the lighting conditions at each camera location including setting shutter speeds, AWB, Exposure levels, Day/Night mode, WDR, AGC, and other related settings to produce optimal video pictures under all operating conditions
- 16.0.7 Ensure Cameras are operating the latest firmware version or as recommended by the manufacturer at time of installation.
- 16.0.8 Backup all camera settings/configurations in addition to the VMS configurations to a CD/DVD and submit to Corporate Security Lead.
- 16.0.9 Ensure outdoor cameras and their heater are properly powered to operate normally in all environmental conditions referenced in this section

16.0.10 All cameras with analytics capabilities shall be setup and calibrated for the supported alarms. Typical alarms to be configured by default for all cameras include:

- Motion in full or designated field of view zones
- Video Masking
- Video Loss/Gain
- Network Loss
- Device I/O's

16.0.11 Configure logging and network troubleshooting capabilities on each IP cameras in coordination with the Corporate Security Lead.

16.0.12 Configure Network Security features and settings on each camera in coordination with the Corporate Security Lead.

16.0.13 For PTZ cameras configure Masks, home position, pre-sets, control sensitivity, image mode and other related settings in coordination with the Corporate Security Lead.

16.0.14 All camera installations and field of view setup shall meet the VSS primary functions identified by the Corporate Security Lead. The following minimum resolution requirements are required for each of the VSS functions below:

- General Observation: >20ppf on farthestmost desired target
- Forensic Review (General Identification) : >40ppf on farthestmost desired target
- Recognition including Facial, vehicle license plate, color, pattern, and cross-line recognition: > 80ppf on farthestmost desired target
- All camera views, resolution and image color and quality, shall pass the approval of the Corporate Security Lead.

## 16.1 IR Illuminators

All IR illuminators specified for specific camera installation projects are to be:

- Mounted and calibrated not to over expose the image quality during night time operation.
- All IR accessories shall be POE Powered unless otherwise approved by the Corporate Security Lead.
- All IR shall be IP66, Vandal resistant and mounted securely or be built-in to the camera. .4 IR 850nm wavelength, equipped with a Photocell and configured to activate on environmental lighting conditions.

## 17.0 Video Encoders

17.1 The following are the minimum performance specifications for Video Encoders to be specified by the successful bidder:

- 17.1.0 Rack mounted
- 17.1.1 Flexible and Expandable allowing for hot swappable blades (applies to encoders for 1 channels or more)
- 17.1.2 Equipped with redundant hot swappable power supply and fans (applies to encoders where more than 8 channels are required)
- 17.1.3 Each encoder channel shall support H.264 video compression, a minimum of two simultaneous streams at 720 (horizontal) × 486 (vertical) NTSC analogue video resolution and 30fps.
- 17.1.4 Each encoder channel shall have a minimum of one [1] configurable input/output .6 Security Contractor shall ensure the encoders support the PTZ protocols and control connectivity (RS-485, RS-422) for connected PTZ analogue cameras
- 17.1.5 Each encoder shall support the following analytics for each video channel and shall trigger an alarm on Milestone Systems XProtect Corporate® VMS:
  - i. Camera repositioning
  - ii. Camera lens is masked, sprayed, covered or blocked
  - iii. Motion detection in defined zones of the camera view, minimum five [5] zones
- 17.1.6 Each Encoder shall support the following alarms and shall be annunciated on the Milestone monitoring interface:
  - i. .1 Video Signal loss /gained per channel
  - ii. .2 Network loss/gained
- 17.1.7 Encoder shall be ONVIF compliant and supports (Profile S)
- 17.1.8 Encoder shall support the following protocols: IPv4/v6, HTTPS, SSL/TLS, QoS Layer 3, FTP, CIFS/SMB, SNMPv1/v2c/v3 (MIB-II), DNS, NTP, RTSP, RTP, TCP, UDP, IGMP, RTCP, ICMP,DHCP.
- 17.1.9 Shall support remote firmware upgrade.
- 17.2 All Encoders shall be rack mounted in a proper cabinet.
- 17.3 Configure each encoder interface and chassis (where applicable) with secure access protocols, VLANs, QOS and other network settings in coordination with the Corporate Security Lead. Cameras shall be totally secured to authorized access before being connectedto the Corporate Security Lead’s Network

- 17.4 Each encoder channel shall be named in coordination with the Corporate Security Lead naming scheme and configured to sync with the Corporate Security Lead's local VSS NTP server/VMS system
- 17.5 Configure each channel stream settings including but not limited to frame rate, bitrate, compression, stream name, day night setting, and other related configuration in coordination with the Corporate Security Lead. All configurations shall be approved by the Corporate Security Lead before setting and configuring the devices
- 17.6 Ensure Encoders are operating the latest firmware version
- 17.7 Backup all Encoders settings/configurations in addition to the VMS configurations to a CD/DVD and submit to Corporate Security Lead.
- 17.8 Ensure Encoder chassis is powered through a UPS and backup power to operate normally in all environmental conditions referenced in this section
- 17.9 All encoder channels with analytics capabilities shall be setup and calibrated for the supported alarms. Typical alarms to be configured by default for all cameras include:
  - i. Motion in full or designated field of view zones
  - ii. Video Masking
  - iii. Video Loss/Gain
  - iv. Network Loss
  - v. Device I/O's
- 17.10 Configure logging and network troubleshooting capabilities on each channel and encoder chassis in coordination with the Corporate Security Lead.
- 17.11 Connect and configure PTZ Data control protocols and settings on channels that are connected to analogue PTZ.

## 18.0 Ethernet Media Extenders

The following are the minimum performance specifications for Ethernet Media Extenders to be specified by the successful bidder in the event that the required product is not listed in the Price Form:

1. Any camera that exceeds the standard 100BASE-TX connectivity distance limitation requires: 100Mbps Ethernet extenders to extend transmission with POE pass-through over standard 75Ω coaxial cables
2. Extended Pass-through POE: meets the IEEE 802.3af standard for Power over Ethernet
3. Supports Jumbo Frame Transmission
4. Extends up to a minimum of a minimum of 548m at 100BaseT with POE pass-through .5 Suitable for high bandwidth requirements of Mega-pixel cameras
5. Aluminum Enclosure

## 6. Meets NEMA TS-1/TS-2 environmental requirements

### 18.1 POWER AND ETHERNET OVER COAX

The following are the minimum performance specifications for Power and Ethernet over Coax devices that are to be specified by the successful bidder:

#### 18.1.0 Proposed IP and PoE/PoE+ over Coax solution shall, as a minimum, meet the following requirements:

- a. Provide enough PoE or PoE+ (IEEE 802.3af/802.3at) to Power the IP devices in all conditions and up to 50W (ex: When built-in heater is activated, PTZ, blower where applicable)
- b. Provide adequate output power to power the devices and provide Ethernet transmission over the various types, lengths and quality of wiring existing at the locations in scope
- c. Has minimal end-to-end Latency of  $\leq 3\text{ms}$  that shall not affect the Video/Ethernet transmission over Coax
- d. Transceiver unit close to the edge device shall operate normally in outdoor environmental conditions as mentioned under paragraph (2.3.2.1.2 Outdoor) and shall not require an extra power source to operate.
- e. Provide transient overvoltage and electrostatic discharge protection and immunity to a minimum of:  $5\text{x}20\mu\text{S}$  3,000A 6,000V; ESD protection for 200pF 20KV.
- f. Provide an encrypted Coax link with a minimum of 128Bit AES encryption.
- g. Head-end transceivers shall be rack mounted in standard 19" rack cabinets, for single channel transceivers a rack mounting kit shall be used to securely and neatly mount a single transceiver to the rack (placing unit on trays or loosely in the cabinet is not acceptable).

### 18.2 VSS POWER COMPONENT

The following are the minimum performance specifications of VSS Power Components that are to be specified by the successful bidder.

- 18.2.0 All VSS system components including but not limited to (POE Switches, Camera power Supplies, NVR Servers, VMS Servers, Encoders, Media converters, KVM Switches, Environmental and Cabinet Sensors, SAN etc....) shall be powered from a UPS backed by emergency power (where available) allowing for continuous, un-interrupted, operation of the complete VSS system for duration specified by COT during project quote phase. COT will require proof of MSRP from UPS manufacturer with MSRP discount applied as provided in the Price Form. The UPS system shall protect connected equipment from brownouts, overvoltage and other power irregularities.

- 18.2.1 All UPS equipment shall be securely rack mounted in cabinets. UPS equipment shall not be placed on shelves, installed on the ground or placed inside cabinets without proper rack rails or rack mounting kits unless approved by the Corporate Security Lead.
- 18.2.2 The complete IP VSS system and its distributed components shall be connected to a UPS for continued operation (provisioned at maximum power usage) where a backup circuit is available. The required power backup operation window shall include the provisioning for future expansion.
- 18.2.3 In addition to the above requirement the following shall apply for UPS selection and sizing:
- Securely rack mounted in a secure lockable cabinet
  - Sized to allow for a minimum of 40% extra power for future expansion
  - cUL listed and meets the following standards: UL 1449, UL 1778, CAN/CSA-C22.2 NO. 60950-1-07 (R2012)
  - Provides surge protection and filtering
  - Supports USB management, c/w windows software and management application to allow for server controlled shutdown upon reaching a set low battery threshold or internal Web based management interface
  - Alarms when on battery and c/w status LED indicators for normal operating mode, alerts and battery backup mode
  - Maintenance-free, sealed, user-replaceable and leak proof Lead-Acid Battery w/c automatic self-testing circuitry detecting and ensuring proactive alerts for battery replacement and/or faults
  - Resettable circuit breaker and automated recovery, ensures protection of connected loads from surges, spikes, lightning and other power disturbances
  - Medium & Large TR's to be equipped with expandable and upgradable rack mounted UPS units including sliding rack rails allowing for ease of maintenance, upgrades and serviceability
- 18.2.4 All new VSS IP Cameras shall be powered by PoE or PoE+ from respective PoE capable switches or Ethernet with PoE/PoE+ pass through media extenders. No exceptions are accepted unless for special purpose cameras requiring external power where applicable. This exception shall be approved in writing by the Corporate Security Lead.
- 18.2.5 IP and PoE/PoE+ over Coax solution shall be used to power IP cameras in analogue to IP cameras retrofit scenario. All new IP cameras shall be powered by PoE/PoE+ and shall not be connected to existing power supplies that are not connected to a UPS System.
- 18.2.6 PoE power provisioning shall be communicated and coordinated with the Corporate Security Lead and Corporate Security Lead's Networking Team and specified as part of the Cisco Network equipment. No assumptions of PoE/PoE+ power availability shall be made on any Corporate Security Lead provided network access switches unless previously coordinated and requested in writing from the Corporate Security Lead.

## 19.0 Equipment Cabinets/Racks

The Security Contractor shall be sensitive of the equipment room's space availability at the various locations in scope for rack installations. High density and low profile equipment should be considered in the proposed equipment design to reduce space requirements. The security contractor shall advise the Owner of any space required for additional rack quantities beyond what is provided and specified in the project scope. Corporate Security requires a dedicated secured rack for all security installations.

The following are the minimum performance specifications of various cabinets and enclosures that are to be specified by the successful bidder:

### 19.1 NEMA 12 – Rack Cabinets W/ Self-Contained Cooling Unit

- Pre-assembled before delivery
- Fully gasketed openings including gland plate in base
- Closed loop air-conditioning system, adequately sized to match equipment heat dissipation and cooling requirements (shall not require any piping, wiring or drainage) and shall also allow for 25% increase in heat generation of specified equipment. .4 Internal evaporator to eliminate condensation
- M6 Rail Type
- Plexi or Solid Doors
- Key Lockable secure doors and side panels
- Include casters and levelers
- Compatible vertical mounted PDU's
- Include cable management (vertical and horizontal lacing bars, front to back cable managers, bottom brush grommet kit, filler panels etc....) required for a neat cable and equipment installation
- Include grounding kit and ground appropriately
- Cabinet Size and Cooling Requirements shall be approved by Corporate Security Lead

### 19.2 NEMA 12 - Wall Mount Cabinets

- Pre-assembled
- Double hinged allowing access to the front and back side of cabinet



- NEMA 12 Fan Assembly
- Independent Key lockable from and back side
- Lifetime Warranty
- M6 Rail type
- Include cable management (vertical and horizontal lacing bars, front to back cable managers, bottom brush grommet kit, filler panels etc....) required for a neat cable and equipment installation
- Cable management trays, and arms
- Include grounding kit and ground appropriately

### 19.3 Standard Rack Cabinets

- 42 U, Pre-assembled before delivery
- Vented Side Panels, with key locks
- Casters and levelers
- M6 Rails
- Split doors back and front side, with key locks
- 6 x 4" fans top panel
- Include grounding kit and ground appropriately
- Include Vertical PDUs
- Include cable management (vertical and horizontal lacing bars, front to back cable managers, bottom brush grommet kit, filler panels etc....) required for a neat cable and equipment installation
- Cable management trays, and arms

## 20.0 Real-Time Environmental Monitoring Component

- Provide real-time, Ethernet (IP) based environmental monitoring solution at each in of the existing and new VSS designated racks.

- The monitoring unit shall be rack mounted
- Shall have a dual temperature/humidity sensor, intelligent water temperature sensor and door contact sensors for each cabinet door
- The monitoring component shall be connected to the City corporate network
- Capable to notify the Owner of any changes or detections by the sensors in a variety of ways including e-mail and SNMP
- Supports SNMP v1, v2, v3
- Manageable through an intuitive web interface

## 20.1 RACK KVM TRAY

The following are the minimum performance specifications of Rack KVM Trays that are to be specified by the successful bidder.

- Integral KVM Switch with keyboard, LCD monitor, and touch pad in 1U FORM .2 Allows remote network user access through KVMoIP over WAN & LAN
- Full Sized 105-Key keyboard
- Ergonomic hand rest
- Includes Universal Rear Rail Kit
- CE, RoHS approved
- Flip Open Monitor Minimum 19" TFT LCD monitor, 1280 x 1024 @ 60 Hz .8 Dual Rail Flip Open Monitor when Keyboard and Mouse are closed
- Control via on-screen display (OSD) menu, push buttons Selection Buttons on monitor bezel, hotkeys, or mouse.
- Connects to servers through CATx patch cables and required server access modules
- 16-Port CATx KVM
- Provide BIOS Level Access

## 21.0 Labelling

- 21.1 All cables shall be tagged, with a unique number, in common at both ends using a permanent method. Labelling shall agree with record drawings and point allocation tables and to indicate source and destination information.
- 21.2 All terminals shall be permanently tagged and shall agree with record drawings.
- 21.3 All system power supplies shall be labelled with their feed source and breaker number.
- 21.4 All connectors shall be marked with common designations for mating connectors. The connector designations shall be indicated on the record drawings.
- 21.5 All visible panel and control labels shall be silk-screened, engraved and filled, or engraved plastic laminate. Labels shall be permanently attached.
- 21.6 Labelled Doors and Frames in no instance shall any labelled fire door or frame be cut, penetrated, drilled or modified in any way.
- 21.8 Any labelled door or frame which shall require modification to meet the system specifications shall immediately be brought to the attention and written approval of the Project Manager.

## 22.0 Conformity of Work with Plans and Specifications

- 22.1 The Successful Bidder shall perform all Work and furnish all materials and complete the whole of the Work in conformance with the requirements.
- 22.2 Any Work or material not herein specified but which may be fairly implied as indicated in the Contract or obviously necessary for the proper delivery of a fully functional system, shall be done or furnished by the Successful Bidder as if such Work or material had been specified.
- 22.3 The Successful Bidder shall at all times have on the Work site, competent Personnel capable of reading and thoroughly understanding the plans and specifications, and thoroughly experienced in the type of Work being performed. Such Personnel shall include the supervision and direction of all Subcontractors, if any are used. The designated Personnel shall have available at all times the lists/floor plans required.
- 22.4 Upon request, the Successful Bidder shall provide the City of Toronto Corporate Security a list of all Personnel's duties, responsibilities, and obligations for the Work required.

## 23.0 Supply and Install Project Procedures

- 23.0.0 The City of Toronto Corporate Security and the Successful Bidder shall follow the procedures set-out in General Contract Terms and Conditions for all supply and install Work. The standard Security Project Work Package which will be provided to the Successful Bidder has been created to ensure consistent implementation/execution of the individual projects regardless of the projects size and scope.
- 23.0.1 Prior to the execution of any supply and install projects the Successful Bidder shall familiarize and comply with the project procedures set-out in General Contract Terms and Conditions, Supply and Install Procedures Package.

### 23.1 General Specifications

- 23.1.0 The Deliverables being supplied in this RFQ must be new and certified by the Vendor, and free of encumbrance. Refurbished, rebuilt, or used Products will not be acceptable.
- 23.1.1 All specifications are minimum requirements that must be met or exceeded. Bids containing one or more items that do not meet or exceed the minimum general specifications will be declared Non-Compliant.

## 24.0 IT Coordination

- 24.1 Coordinate with the Corporate Security Lead team for all equipment programming. Upon approval, connect, test all equipment and ensure there are fully and properly operating
- 24.2 All security equipment configurations shall be performed by the Corporate Security Lead IT Team in coordination, and support from the Security Contractor
- 24.3 All IP enabled devices with Username/Password parameters shall be configured with a designated temporary credentials and provided to the Corporate Security Lead. Default credentials shall be immediately removed upon initial power up and configuration of the device.
- 24.4 All typical configurations shall be coordinated and approved by the Corporate Security Lead IT Team before configuring the devices. The additional travel time incurred by the successful bidder for deliveries to required sites for programming shall be at no charge to the COT.

## 25.0 Licensing

- 25.1 The City prefers any net new licenses required to be a onetime purchase. Support and maintenance agreements should be independent of the software license.
- 25.2 The Vendor should be able to provide to the City at no additional cost at least one (1) copy of the Documentation for each copy of a licensed software.
- 25.3 The Vendor should be able to grant to the City a perpetual, non-exclusive, irrevocable, transferable, fully paid-up, royalty-free right and license to install, use, and copy (on storage units or media for backup or other contingency purposes), all or any portion of each licensed software, together with all associated Documentation, in accordance with the Terms of the resulting Contract and:
- i. the Vendor should provide to the City at least one (1) copy of each licensed software in installable FORM unless it has specified a greater number of copies;
  - ii. if the City is licensed to use any licensed software on any computer or computer complex, the City may transfer the licensed software to any different computer or computer complex without any fee or other charges being due to the Licensor;
  - iii. if the City is licensed to use any licensed software in conjunction with any operating system, the City may use the licensed software in conjunction with any other operating system without any fee or other charge being due to the Vendor if the licensed software is certified to operate on that other operating system when that use commences, regardless of whether the operating system was in existence or not in existence at the time the licensed software was originally licensed by the City;
- 25.4 If a CPU based license is provided, the CPU based license should be a perpetual license to use the licensed software on one physical CPU and such perpetual CPU license should not be conditional on any Terms and conditions not set out expressly in the Contract. The City may transfer the licensed software from one physical CPU to another physical CPU at any time or times without notice to the Vendor and without any fee or other charges being due to the Vendor. A CPU license for a physical CPU is not limited in any way by the use of multithreading, hyper-threading, or any quantity of logical CPU.
- 25.5 If concurrent user licenses are provided, then the concurrent user license should be a perpetual license to permit the use of the licensed software on a concurrent basis (limited to the number of simultaneous users of the licensed software) and such concurrent user license should not be conditional upon any Terms and conditions not set out expressly in the Contract. The Vendor should provide in the licensed software a utility to manage the list of users who are sharing the concurrent user license(s) and provide a mechanism within the licensed software to ensure that the contracted number of concurrent user license(s) is made available for users. The City may add to the number of users who can share the concurrent user license(s) at any time without notice to the Vendor and without any fee or other charges being due to the Vendor.

- 25.6 If named user licenses are provided, then the named user license should be a perpetual license to permit one (1) individual to use the licensed software and such named user license should not be conditional upon any Terms and conditions not set out expressly in the Contract. The City may transfer the named user license from one (1) individual to another individual at any time or times without notice to the Vendor and without any fee or other charges being due to the Vendor;
- 25.7 The Vendor should have the exclusive title to the licensed software and Documentation or otherwise have the right to grant to the City each license and every right under to each licensed software and the Documentation as contemplated by the Contract without violating any third party Intellectual Property Rights;
- 25.8 Each licensed software and the Documentation should be free from all encumbrances, should not, and will not contain any Disabling Code;
- 25.9 The Documentation should be well written, readily understood, and contain clear and concise instructions for users and system administrators of the licensed software and should include meaningful instructions to enable users and systems administrators to take full advantage of all of the capabilities of the licensed software including installation and system administration documentation to enable a system administrator to allow proper control, configuration and management of the licensed software;
- 25.10 For the duration of the Warranty Period, the licensed software will perform in accordance with the specifications and descriptions contained in the Contract, in the Vendor's published Documentation and specifications, and in the Documentation for the version of the software in use by the City;
- 25.11 The licensed software should be compatible with future releases of the operating system on which it was originally installed within one hundred and twenty (120) calendar days of general availability of the operating system and shall be subsequently maintained to remain so compatible;
- 25.12 The Vendor shall provide to the City, without additional charge, copies of the licensed software and Documentation revised to reflect any enhancements made by the Vendor and such enhancements will be deemed to include all Versions, Releases and other modifications to the licensed software which correct errors, increase the speed, efficiency, capacity or ease of operation of the licensed software, or add additional capabilities or functions to or otherwise improve the capabilities and functions of the licensed software; and
- 25.13 The Warranty Period of licensed software shall commence on the Initial Install Date of such licensed software.
- 25.14 Each software license granted pursuant to the Agreement should survive any expiry or termination of the Agreement.

## 26.0 Software Updates

The Successful Bidder shall provide all software updates and revisions to the City during the length of this contract term warranty period without cost to the City. The Successful Bidder must register and maintain all applicable Formal technical support agreements with manufacturers including but not limited to American Dynamics and Dedicated Micros, Milestones, BriefCam, Software House, CCURE9000, Key Tracer. Registration of the technical support agreements.

The Successful Bidder is responsible to maintain 100% functionality of the CCTV and AV Systems prior to and after scheduled updates are performed.

Where there is integration between City systems, the Successful Bidder must maintain integration compatibility and advise the City if software updates may impact the current integration performance and functionality.

## 27.0 Upgrades and Updates

Throughout the Contract Term and its Warranty period, the Successful Bidder shall provide notice to the Project Manager within 24-hours of all manufacturers' or software developer's release of a version, firmware, and/or patch upgrade and/or update for all security systems owned or operated by the City that pertains to this Contract.

The Successful Bidder shall include; without any additional costs to the City, all manufacturer and/or City of Toronto recommended application and operating system upgrades and updates including licenses, versions, firmware, hot fixes and patches to ensure continuous performance and continuity of City CCTV and AV Systems.

The Successful Bidder shall provide the City with all software upgrades and updates, in original packaging (where available), with original manuals/documentation, and original copies (compact discs, floppies, etc.).

## 28.0 Future System Expansion

The City reserves the right to have other qualified firms expand and/or add to the systems at any time.

The City reserves the right to make changes, alterations, additions, or deletions to any of the City's equipment.

## 29.0 Delivery and Installation

The Vendor must deliver the specified Deliverables as per their Quotation without substitution or deviation. All items shall be delivered F.O.B. Destination.

The Successful Bidder must deliver the specified Products and/or Services as per their Quotation without substitution or deviation.

The Successful Bidder shall provide staff who are qualified to undertake the installation Services required under the Terms of this RFQ. The staff must be certified to install and set-up the Products produced by the manufactures that are listed in the 33.0 Manufactures List.

The Successful Bidder shall restore all property temporarily removed, damaged, or destroyed during the supply, delivery, and installation, of Products to the satisfaction of the City and at no cost to the City. The Successful Bidder, before final payment, shall remove all surplus materials and any debris of every nature resulting from its operation and put the site(s) in a neat, orderly condition; thoroughly clean. If the Successful Bidder fails to clean up at the completion of the supply, delivery, and installation of the Products, then the City may do so and charge the Successful Bidder for the costs thereof, or deduct said costs from any monies still owing to the Successful Bidder.

The Successful Bidder shall furnish all labour, materials, Services, supplies, tools, equipment, apparatus, transportation, facilities and incidentals required and perform all operations necessary to accomplish the complete installation of the Product(s).

## 29.1 Return of Products

29.1.0 Should the Product fail to work upon arrival, or within thirty (30) days of arrival, the Product will be returned for a complete exchange of new working Product (same make and model), at no cost to the City. The Product must be exchanged within five (5) business days of notification. The Warranty Period of the replaced Product will be deemed to date from the day of replacement.

29.1.1 If the Product(s) do not function as warranted and the problem cannot be resolved to the satisfaction of the City, then the Product(s) may, at the sole discretion of the City, be returned for a full refund.

29.1.2 In the event an item has been discontinued by the manufacturer/supplier, the supplier must provide documentation to confirm the product is no longer available and provide a viable substitute that meets or exceed the current specifications at the same price.

The Vendor will be responsible for all costs associated with the return and replacement of any products which have been discontinued. This will include all freight, packaging and handling costs.

The City will not accept any changes related to the discontinued product. The City will not be responsible for any restocking charges associated with returns.

29.1.3 Bidders must not substitute contract approved product(s), commodity(s) or service(s) without prior written approval from City of Toronto Purchasing and Materials Management staff, on either City of Toronto letter head or City of Toronto originating email. Any approved substitution must meet or exceed the approved good, approved commodity or approved service to be substituted, at no additional cost to the City of Toronto.



## 30.0 Warranty

- 30.1 The Successful Bidder shall include a two (2) year Warranty for all parts and labour as per the Warranty conditions of this RFQ.
- 30.2 Warranty shall include all Preventive Maintenance for two (2) full year periods. This entails two site visits per warranty year.
- 30.3 If, within two (2) years after the date of final acceptance of the Work as determined by the Corporate Security Lead, or designated portion thereof, or within two (2) years after acceptance by the Corporate Security Lead of designated equipment, or within such longer period of time as may be prescribed by law, or by the Terms of any applicable special Warranty required by the contract, or applicable codes, any of the Work found to be defective or not in accordance with the contract, the Successful Bidder shall correct it after receipt of a written notice from the City to do so unless the City has previously given the Successful Bidder a written acceptance of such condition. This obligation shall survive termination of the contract. The City shall give such notice promptly after discovery of the condition.
- 30.4 All installed equipment, shall be subjected to its own Preventative Maintenance schedule; the schedule is to be submitted after final acceptance of equipment installation with the submitted as-builts. The Preventative Maintenance must be performed in accordance to NFPA 731 throughout the Warranty period, or a minimum of two times a warranty period whichever is greater, at no further cost to the City.
- 30.5 Nothing contained in the contract shall be construed to establish a period of limitation with respect to any other obligation that the Successful Bidder might have under the contract.
- 30.6 The establishment of the time period of two (2) years after the date of final acceptance, or such longer period of time as may be prescribed by law, or by the Terms of any Warranty required by the contract relates only to the specific obligation of the Successful Bidder to correct the Work, and has no relationship to the time within which its obligation to comply with the contract documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Successful Bidder's liability with respect to his obligations other than specifically to correct the Work.
- 30.7 If this contract in its specifications requires that specific deliverables must perform as a system, this representation and Warranty shall apply to the deliverables, individually, in combination with each other, and as a system. Where the Successful Bidder will be providing any component of a deliverable from or through a Subcontractor, the Successful Bidder shall cause its Subcontractor to comply with this representation and Warranty with respect to the component to be provided by such Subcontractor.
- 30.8 Where the deliverable being provided by the Successful Bidder has an interface with any other product and such interface is necessary for the functionality, operation or performance of its deliverable, the Successful Bidder shall ensure that such product complies with this representation and Warranty and such interface does not in any way impair the ability of its deliverable to comply with this representation and Warranty.

- 30.9 At the Corporate Security Lead's request made in writing at any time before or within 90 calendar days (or such other time period as designated by the City in writing) of its acceptance of the deliverable, the Successful Bidder will, at no charge to the City, demonstrate the compliance techniques and test procedures to be followed by the Successful Bidder or the City or its authorized agent to confirm that the deliverable complies with this representation and Warranty.
- 30.10 Where the Successful Bidder advises the City that its deliverable is not able to comply with this representation and Warranty at this time but will be able to do so by a specified date, the City may at its sole discretion accept the deliverable on the condition that there is compliance by the specified date; however, the City is not obligated or liable to make payment for the deliverable until such condition is satisfied.
- 30.11 In the event of any breach of this Warranty and representation, the remedies available to the City shall include but not be limited to:
- The Successful Bidder restoring the deliverable to the same level of performance as represented and warranted herein;
  - The Successful Bidder repairing or replacing the deliverable with a deliverable conforming with this representation and Warranty;
  - The Successful Bidder granting or securing for the City or its authorized agent permission to make any modifications necessary to make the deliverable compliant with this representation and Warranty and arranging for any necessary waivers of moral rights or other intellectual property rights to make such modifications; and
  - The Successful Bidder granting the City or its authorized agent access to the source code for the information technology used in the deliverable in order to make any modifications necessary to make the deliverable compliant with this representation and Warranty or securing for the City the necessary permission for such access and arranging for any necessary waivers of moral rights or other intellectual property rights to make such modifications, in each case, so as to minimize interruption to the City's ongoing business processes, with time being of the essence, and to be done at the Successful Bidder's sole expense.
- 30.12 The Successful Bidder represents and warrants that any restoration, repair or replacement made will not corrupt any data of the City or introduce any viruses into the City's system. The Successful Bidder agrees that any modification made pursuant to subparagraph 30.5 or 30.6, above, is the property of the City, including all copyright and other intellectual property rights pertaining thereto.
- 30.13 This Warranty shall survive cancellation or other termination of this contract.
- 30.14 Nothing in this representation and Warranty shall be construed to limit any rights or remedies (including indemnities) otherwise available to the City under this contract or at law or equity; and nothing in the contract shall limit the scope of this representation and Warranty and any rights or remedies set out herein, and, in particular, no waiver or disclaimer set out in such agreement (or made otherwise) shall operate to limit the Successful Bidder's liability under this representation and Warranty.

- 30.15 In the event that the Successful Bidder fails to make good such defects within a stipulated time, the City reserves the right to have the Work performed by other qualified suppliers. All costs incurred by the City are to be paid by the Successful Bidder.
- 30.16 The Successful Bidder after the date of final acceptance of all work/orders as determined by the City, or designated portion thereof, provide, in addition to the Warranty Certification a preventative Maintenance schedule for the duration of the Warranty period.
- 30.17 The Successful Bidder shall complete all manufacturer Warranty registration for applicable Products as per the Warranty Terms purchased and provide proof of registration to the City within 30 calendar days of installation.

## 31.0 Warranty Service

- 31.0.1 The Successful Bidder shall provide and maintain its call center telephone number(s) and call placement procedures to City of Toronto Corporate Security and the SCC for dispatching Personnel for warranty services. The telephone number(s) must be a local (Toronto) 10 digit number. The City will not accept any number that results in long distance charges for the City when placing a call from the City of Toronto.
- 31.0.2 The Successful Bidder's Call Centre telephone number(s) must be answered by a live operator and available during Daytime hours (06:00-18:00hrs, Monday through Friday), excluding statutory holidays.
- 1.0.3 The Successful Bidder must also maintain an email address for warranty service requests. Automated email responses are not acceptable.
- 6.0.4 The Successful Bidder shall provide contact lists (one list for during daytime hours and a separate list for afterhours) to ensure the required warranty service resolution times are met.

## 32.0 Service Calls

- 32.1.0 The technician must report to the work site, diagnose the issue and provide a corrective maintenance solution of the initial call for corrective maintenance services. The Vendor must obtain a work order from the City Designated that details the products and number of labour hours required prior to ordering Products and performing any warranty services resulting from the service call.
- 32.1.1 Upon arrival at the location, the technician must notify the Corporate Security Control Centre by phone at 416-397-0000;

32.1.2 Upon departure of the location, the technician must notify the Corporate Security Control Centre by phone at the end of each day, by email to [SecSysSD@toronto.ca](mailto:SecSysSD@toronto.ca), and provide a required, future steps to be taken.

## 32.2 Service Call Resolution Times

Warranty Service Call Priority	Resolution Time
(1) Urgent	48 HOURS
(2) High	Five (5) Business Days

## 33.0 Pass-Through Warranties.

- 33.1 The Successful Bidder will, to the extent permissible, agrees to pass through to the City of Toronto any warranties given by its third party vendors in connection with hardware, software or other products or services used by the Successful Bidder to provide the Services to the extent permitted by the terms and conditions of such warranties and pass through to the City of Toronto all available warranties and provide all available (including extended) applicable original equipment manufacturer and additional warranties for third party Equipment used to provide the Services. The Successful Bidder will obtain and pass through to the City of Toronto any warranties required by the specifications for Equipment procured on behalf of the City of Toronto. The Successful Bidder will, to the extent permissible, pass through to the City of Toronto all available warranties and provide all available (including extended) applicable original equipment manufacturer and additional warranties for Equipment owned by the City of Toronto.
- 33.2 The Successful Bidder shall secure from the applicable Equipment or third party Software manufacturers, and assign and pass through to the City of Toronto, at no additional cost to the City of Toronto, such warranties as may be available with respect to such Equipment and Software. Such assignment shall not, however, relieve the Successful Bidder of any of the warranty obligations contained herein. In the event such warranties are not assignable to the City of Toronto, the Successful Bidder shall enforce, as necessary, such warranties on behalf of the City of Toronto.
- 33.3 In the event that Contractor purchases Goods or Materials in its own name for incorporation in the Work delivered to the City of Toronto, and the Successful Bidder receives a warranty from the vendor of such Goods or Materials, the Successful Bidder shall ensure that such warranty is passed through to, and is enforceable by, the City of Toronto.

## 34.0 Compliance with Standards

The Successful Bidder shall maintain a high level of workmanship and comply with the following codes, standards and procedures. Bidders that have completed and submitted the Confidentiality Agreement will be provided with copies of the City of Toronto standards listed below at the Mandatory Site Meeting.

1. City of Toronto Corporate Cabling Standards
2. City of Toronto Corporate IT Standards
3. City of Toronto Corporate Security Standards
4. City of Toronto Video Security Surveillance Policy
5. City of Toronto Corporate Security Intellex DVR Installation, Configuration, Programming and Naming Standard
6. City of Toronto Corporate Security CCTV and AV Systems Installation Standards
7. City of Toronto Corporate Security CCTV and AV Maintenance Standards
8. City's Workplace Violence Policy
9. City of Toronto Corporate Security Access Control Systems Installation Standards
10. City of Toronto Corporate Security Intercom System Installation Standards
11. City of Toronto Corporate Security Access Control and Intercom System Maintenance Standards
12. City of Toronto Corporate Security – Security Schedules – Drawing Typicals
13. City of Toronto Corporate Security Structured Cabling Standards
14. City of Toronto, Toronto Water Plant Structured Cabling System Standard
15. City of Toronto Acceptable Use Policy
16. City of Toronto CityNet Acceptable Use Agreement
17. Transport Canada Reference Manual for Using Closed Circuit Television in Counter-Terrorism Activities.
18. AC transients UL 964
19. Access Control equipment manufacturer's specifications, latest issue
20. American Society for Testing Materials (ASTM)

21. ANSI/EIA-310 and its addendum
22. ANSI/TIA/EIA-568-B.1 and its addendum
23. ANSI/TIA/EIA-568-B.3 and its addendum
24. Applicable local Building Codes
25. Association Architectural Graphic Standards for Security System Layout SIA/APSC AG-01-1995.12 (R2000.03)
26. BICSI Information Transport Systems Installation Manual – Most current Edition
27. BICSI Network Design Reference Manual – Most current Edition
28. BICSI Telecommunications Distribution Methods Manual – Most current Edition
29. Communications: IEEE RS232C and RS485
30. Canadian Standards Association (CSA International)
  - CSA C22.1-[98], Canadian Electrical Code, Part 1 (18th edition) Safety Standard for Electrical Installations.
  - CAN/CSA-C22.3 No.1-[M87 (R1997)], Overhead Systems.
31. Design: MIL 275E
32. Electrical Standards Authority
33. Electrostatic immunity: IEC 801.2 level 4
34. EMI emissions: FCC part 15
35. Institute of Electrical and Electronic Engineers (IEEE)
36. Intercom equipment manufacturer's specifications, latest issue
37. Manufacturing: ISO 9003
38. National Fire Protection Association (NFPA®)
  - NFPA® pamphlet 51B
  - NFPA® 70, National Electric Code.

- NFPA® 730, Guide for Premises Security 2008 or latest edition
- NFPA® 731, Standard for the Installation of Electronic Premises Security Systems, 2008 or latest edition

39. Ontario Building Code

40. Ontario Fire Code

41. Parks Canada - Standards and Guidelines for the Conservation of Historic Places in Canada

42. Process Control System Implementation Manual

43. Underwriters' Laboratories

- CAN/ULC-S302-M91 - Standard for Installation and Classification of Burglar Alarm Systems for Financial and Commercial Premises, safes and Vaults
- CAN/ULC-S304-06, Signal Receiving Centre and Premise Burglar Alarm Control Units.
- CAN/ULC-S317-[1996], Installation and Classification of Closed Circuit Video Equipment (CCVE) Systems for Institutional and Commercial Security Systems.
- CAN/ULC-S319-05 Electronic Access Control Systems
- CAN/ULC-S3-1-M88 Standard for Central and Monitoring Station Burglar Alarm systems.
- CAN/ULC-S524-06 – Installation of Fire Alarm Systems
- CAN/ULC-S559-04 – Equipment for Fire Signal Receiving Centres and Systems
- CAN/ULC-S561-03 – Installation and Services for Fire Receiving Centres and Systems
- UL 1076-[1995], Standard for Safety for Proprietary Burglar Alarm Units and Systems.
- UL 1635 Digital Alarm Communicator System Units
- UL 1981 Central Station Automation Systems
- UL 294-[1999], Standard for Safety for Access Control System Units.
- UL 681 Installation and Classification of Burglar and Holdup Alarm Systems
- UL Testing Bulletin
- Underwriters Laboratories (UL) Cable Certification and Follow Up Program

## 35.0 Manufactures List

- Aegis
- ADI
- ADT Canada
- Aiphone Corporation
- Alarm Saf
- Altronix Corporation
- Alpha Technologies
- American Dynamics
- Amseco
- Ameta International Co. Ltd.
- APC by Schneider Electric
- Arecont Vision
- Asterix Security Hardware International Inc.
- Anixer
- ASSA ABLOY Canada
- AutoGate Inc.
- Automatic Systems America Inc.
- Avigilon
- AWID
- Axis Communications, Inc.
- Berk-Tek
- Black Box Network Services
- Boon Edam, Inc.
- Bogen Communication, Inc.
- Bosch Security Systems
- Camden Door Controls
- Cansec Systems Ltd.
- CCTV Direct
- CDVI Americas Ltd.
- CDW
- Cisco Systems
- Commend Inc.
- Computar
- D-Link Canada Inc.
- Dahua Technology
- Dedicated Micros
- Detex
- Digital Watchdog
- DIRAK Inc.
- DITEK Corporation
- DoorKing Inc.



- DSC
- DWG Distribution
- Eyesonic Enterprises Inc.
- FLIR Fibre Technologies
- GAI-Tronics
- RBH Access Technologies Inc.
- RBtec Inc.
- Rofu Security International Group
- Rutherford Controls Int'l. Corp.
- Safety Technology International Inc. (STI)
- Samsung Techwin America
- Santeri Industries
- Schlage
- Schneider Electric
- Senstar Corporation
- Sentrol Inc
- Sennetech Inc.
- Sentry Security Systems
- Smart Vision Direct Inc.
- Software House
- Sony of Canada Ltd.
- Southern Folger
- Southwest Microwave, Inc.
- SPECO Technologies
- Spectris Canada Inc.
- Systech Corporation
- Talk-A-Phone
- TOA Canada Corporation
- Toppan
- Tri-Ed, an Anixter Company
- Tri Tech
- Turnstile Security Systems Inc.
- Tyco Security Products
- Ultratech
- United Security Products
- Visonic
- Von Duprin
- WatchNET Inc.
- Weiser
- Winbo International Ltd.
- Zebra

## 36.0 Supplementary Forms & Policies

- 1 FORM 1 – Confidentiality and Non-Disclosure Declaration
- 2 FORM 2 – Programming and Installation Standards
- 3 FORM 3 - Security Typical
- 4 FORM 4 - IP CCTV Network Cabling Guideline for City Facilities
- 5 Declaration of Compliance with Anti-Harassment/Discrimination Legislation & City Policy / Workplace Violence
- 6 Statutory Declaration (Occupational Health & Safety)
- 7 IT Acceptable Usage Policy

## FORM

### CONFIDENTIALITY AND NON-DISCLOSURE DECLARATION

**THIS ACKNOWLEDGEMENT AND DECLARATION** is given to the City of Toronto (the "City") as of the \_\_\_\_ day of \_\_\_\_\_, 20\_\_ by \_\_\_\_\_ (the "Firm").

**WHEREAS** the Firm has elected to attend, the Mandatory Pre-bid Meeting held in connection with the City's Request for Quotations No. XXXXXX for Security Systems and services. The scope of work consists of on-demand services and the Supply/Install of City of Toronto Security Systems for various locations throughout the City of Toronto, all in accordance with the City of Toronto's Purchasing Policies and the City of Toronto Fair Wage Policy and Labour Trades Contractual Obligations in the Construction Industry.

**NOW THEREFORE**, in consideration of the above, the sufficiency thereof is hereby acknowledged, the Firm agrees and declares as follows:

That all information provided at the Mandatory Site Meeting is confidential and is being provided to the Firm only for the purpose of submitting a Quotation in response to the RFQ and, if successful, for the purpose of providing the services under a contract arising out of the RFQ; and

That all correspondence, documentation and information provided by the City to the Firm in connection with, or arising out of the RFQ:

- a) Is and shall remain the property of the City;
- b) Shall be treated by the Firm as confidential;
- c) Shall not be disclosed, in whole or in part, to any third party;
- d) Shall not be used for any purpose other than for replying to the RFQ, and for fulfillment of any subsequent contract arising out of the RFP.

IN WITNESS WHEREOF the Firm executes this Declaration through the signature of its duly authorized signatory.

ON BEHALF OF \_\_\_\_\_  
(Name of Firm)

Signature: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

I have the authority to bind the Firm.

## FORM

**City of Toronto Programming and Installation Standards – released to successful bidder after Form 1 –  
CONFIDENTIALITY AND NON-DISCLOSURE DECLARATION submitted**

## FORM

**City of Toronto Security Typical – released to successful bidder after FORM 1 – CONFIDENTIALITY AND NON-DISCLOSURE DECLARATION**

## FORM

**IP CCTV Network Cabling Guideline for City Facilities – released to successful bidder after FORM 1 –  
CONFIDENTIALITY AND NON-DISCLOSURE DECLARATION**



## Declaration of Compliance with Anti-Harassment/Discrimination Legislation & City Policy

Organizations/individuals in Ontario, including the City of Toronto, have obligations under the Ontario Human Rights Code, the Occupational Health and Safety Act, the Employment Standards Act, the Accessibility for Ontarians with Disabilities Act, the Criminal Code of Canada and the Charter of Rights and Freedoms. In addition, the City of Toronto also has policies that prohibit discrimination on the additional grounds of political affiliation or level of literacy, subject to the requirements of the Charter. Organizations are required to have and post policies, programs, information, instruction, plans and/or other supports, and an **appropriate** internal process available to their employees and service recipients to prevent, address and remedy discrimination, racism, harassment, hate and inaccessibility complaints under the applicable legislation and including the additional grounds of discrimination prohibited under City policy. Individuals are obliged to refrain from harassment/hate activity.

The City of Toronto requires all organizations and individuals that contract with the City to sign the following Declaration of Compliance with Anti-Harassment/Discrimination Legislation & City Policy. This Declaration must be signed by your organization and submitted with the contract or Letter of Understanding. The name of your organization and the fact that you have signed this declaration may be included in a public report to City Council.

### Declaration:

**I/we uphold our obligations under the above provincial and federal legislation. In addition, I/we uphold our obligations under City policies which prohibit harassment/discrimination on a number of grounds including political affiliation and level of literacy.**

**WHERE LEGALLY MANDATED I/we have in place the necessary policies, programs, information, instruction, plans and/or other supports that are consistent with our obligations, and I/we have an internal process available to my/our employees and service recipients to prevent, address and remedy discrimination, racism, harassment, hate and inaccessibility complaints. I/we agree that I/we shall, upon the request of the City, provide evidence of the policies, programs, information, instruction, plans and other supports and an appropriate internal complaint resolution process required under this Declaration which is sufficient to allow the City to determine compliance. I/we acknowledge that failure to demonstrate compliance with this declaration to the satisfaction of the operating Division, in consultation with the City Solicitor, may result in the termination of the contract.**

Multilingual Services: 311 and TTY 416-338-0889. For further information, consult the [Equality, Diversity and Human Rights web page](http://www.toronto.ca/diversity) at <http://www.toronto.ca/diversity>

### Applicant Information (Organization or Individual)

Organization Name		Position Title	
Organization Representative or Individual First Name		Organization Representative or Individual Last Name	
<input type="checkbox"/> Check this box if First Name and Last Name do not apply to you because you have either a registered Birth Certificate or Change of Name Certificate bearing a Single Name. Provide your name below.			
Single Name			
Street Number	Street Name		Suite/Unit Number
City/Town	Province	Postal Code	Telephone Number
Organization Representative or Individual Signature			Date (yyyy-mm-dd)

## Human Resources Policies

### Workplace Violence (2019)



Category: Health and Safety

Sub-Category: General

#### Policy Statement

The City of Toronto is committed to working with its employees to provide a safe work environment. The City will not tolerate any acts of violence and will take all reasonable and practical measures to prevent violence and protect employees from acts of violence. Appropriate remedial, disciplinary, and/or legal action will be taken according to the circumstances.

#### Purpose of Workplace Violence Policy

This policy is supported by the Guidelines for Implementing the Workplace Violence Policy, a Workplace Violence and Threat Report form, a Supervisor Checklist for Workplace Violence, and an information sheet. The policy and its supporting guidelines are intended to:

1. Maintain a work environment free from workplace violence
2. Provide a definition of workplace violence
3. Identify the responsibilities of the workplace parties to maintain a workplace free of actual, attempted or threatened violence
4. Establish measures and procedures for summoning immediate assistance when workplace violence occurs or is likely to occur
5. Establish measures and procedures for workers to report incidents of workplace violence and for the City to investigate and deal with incidents or complaints immediately
6. Provide guidance to divisions on establishing their Workplace Violence program

#### Application

*The Workplace Violence policy applies under any circumstances in which City employees experience workplace violence, as defined below. It applies to all employees, contractors of the City, volunteers, students, clients of City services, any person engaged in business with the City, and visitors to City properties.*

*The City's Human Rights and Anti-Harassment Policy should be consulted regarding issues of personal harassment and harassment related to discrimination and inequitable work practices.*

#### Definitions

For the purpose of this policy, violence includes:

- the exercise of physical force by a person against a worker, in a workplace, that causes or could cause physical injury to the worker
- the exercise of physical force by a person against another person, in a workplace, that causes or could cause physical injury to the worker
- an attempt to exercise physical force against a worker that could cause physical injury to the worker
- a statement or behaviour that it is reasonable for a worker to interpret as a threat to exercise physical force against the worker, in a workplace, that could cause physical injury to the worker

*The City's Human Rights and Anti-Harassment Policy addresses harassment or intimidation (e.g., behaviours that demean, embarrass, or humiliate and are known or would be expected to be unwelcome).*

#### Responsibilities

All employees are responsible for preventing and reporting acts of violence that threaten or perceive to threaten a safe work environment.



**Divisional senior management will ensure that:**

- A divisional workplace violence program is established
- Reasonable preventative measures are undertaken to protect employees and others in City workplaces from workplace violence
- Take reasonable preventative measures to protect employees and others in City workplaces from workplace violence
- Ensure that a process for centralized tracking and review of workplace violence incidents is established and implemented
- Ensure that workplace violence risk assessments are completed, reviewed, revised when needed and reported
- Post this policy in a conspicuous location in each workplace
- Establish and maintain a process for reporting and responding to incidents of violence
- Ensure that the process for reporting and responding to incidents of violence is communicated, maintained and followed
- Ensure that this policy is reviewed at least annually

**Managers/supervisors will:**

- Understand and uphold the principles of this policy
- Communicate this policy and its guidelines to all employees
- Conduct workplace violence risk assessments to determine whether the nature of the workplace, the type of work or conditions of work may place employees at risk of violence
- Consult with Joint Health & Safety Committees (JHSCs)/OHS Representatives, assigned People, Equity & Human Rights (PEHR) /divisional health & safety staff, and where appropriate, Corporate Security, in conducting risk assessments, and develop practical measures and procedures to control identified risks
- Take all reasonable and practical measures to minimize or eliminate risks identified through the risk assessment process, workplace inspections, or the occurrence of a workplace violence incident
- Review risk assessments at least annually, as well as when there are changes to the nature of the workplace, the type of work or the conditions of work. Revise the assessment, as needed
- Conduct further risk assessments when an increase in the number or severity of workplace violence incidents is noted to ensure that appropriate measures are in place to minimize or eliminate risks
- Communicate the results of workplace violence risk assessments and measures to minimize or eliminate risks to staff.
- Provide results of risk assessments (initial and updated) to joint health and safety committees/health and safety representatives
- Maintain and follow the process in the *City's Investigation and Reporting of Work-Related Injuries and Incidents policy* for reporting, investigating, documenting, and debriefing incidents of violence
- Respond promptly when an employee reports being subjected to, witnessing, having knowledge of workplace violence or having reason to believe that workplace violence may occur and take appropriate action.
- Address immediately all incidents of workplace violence, and not condone or permit any behaviour contrary to this policy. Exceptions to this must be clearly defined in the divisional procedures, describing specific behaviours that are unacceptable (e.g., unacceptable behaviours among a specific client group such as young children or clients with developmental, cognitive, or psychiatric disabilities). This exception must be communicated to staff but must not

- condone behaviours contrary to this policy.
- Ensure that all known incidents of workplace violence are investigated. To the extent appropriate based on the nature of each incident and the actual or potential threat it posed to worker safety:
  - consult with other parties (e.g., Corporate Security, Health & Safety staff, JHSCs/OHS Representatives, Employee Health and Rehabilitation, Employee Assistance Program, Human Rights Office, Toronto Police Services)
  - take all reasonable and practical measures to minimize or address risks identified by the incident
  - document the incident, its investigation, and corrective action taken
  - promptly share the results of the investigation and corrective actions taken with the joint health and safety committee/health and safety representative and the workers involved in the incident
- Ensure workers are made aware of their rights to:
  - have workplace violence incidents investigated when they are reported
  - report incidents of physical assault or threats of physical assault to the police
  - support from management when reporting incidents of physical assault or threats of physical assault to the police (e.g. time for interactions with the police and making accessible to the police information in the employer's possession with respect to the incident)
- Take all reasonable and practical measures to protect workers, acting in good faith, who report workplace violence or act as witnesses, from reprisal or further violence
- Take every precaution reasonable in the circumstances for worker protection if they become aware, or ought reasonably to be aware, that domestic violence that would likely expose a worker to physical injury may occur in the workplace
- Review annually, in conjunction with review of risk assessments, the effectiveness of actions taken to minimize or eliminate workplace violence and make improvements to divisional procedures, as required
- Provide information to workers, including appropriate personal information, related to a risk of workplace violence from a person with a history of violent behaviour
- Provide workers with information and instruction appropriate for the worker on the City's workplace violence policy and program

**People, Equity & Human Rights (PEHR)/ Divisional Occupational Health and Safety staff will:**

- Assist management to implement this policy, develop divisional procedures, and initiate the annual review of the policy and guidelines

**Joint Health and Safety Committees/OHS Representatives will:**

- Review the Workplace Violence Risk Assessment results and provide recommendations to management to reduce or eliminate the risk of violence
- Review all reports forwarded to the JHSC regarding workplace violence and other incident reports as appropriate pertaining to incidents of workplace violence that result in personal injury or threat of personal injury, property damage, or police involvement
- Participate in the investigation of critical injuries (e.g., incidents that place life in jeopardy, result in substantial blood loss, fracture of leg or arm, etc.)

- Recommend corrective measures for the improvement of the health and safety of workers
- Respond to employee concerns related to workplace violence and communicate these to management
- Participate in the review of the policy and guidelines for continuous improvement

In addition, JHSCs/OHS Representatives may participate in the investigation of reported incidents that result in personal injury or have the potential to result in injury.

**The Occupational Health and Safety Coordinating Committee will:**

- Review annually the effectiveness of the policy and guidelines and make changes as required by consulting with management staff and employee representatives

**All employees will:**

- Maintain a safe work environment, whenever possible
- Not engage in or ignore violent, threatening, intimidating or other disruptive behaviours
- Report promptly and provide details to their supervisor (or the appropriate alternative listed in the attached guidelines) any incident where the employee is subjected to, witnesses, or has knowledge of workplace violence, or has reason to believe that workplace violence may occur

**Reprisal**

This policy prohibits reprisals against individuals, acting in good faith, who report incidents of workplace violence or act as witnesses. Management will take all reasonable and practical measures to prevent reprisals, threats of reprisal, or further violence. Reprisal is defined as any act of retaliation, either direct or indirect.

**Authorities**

*Occupational Health and Safety Act of Ontario (current)*  
*Criminal Code of Canada (current)*  
*City of Toronto Corporate Occupational Health and Safety Policy (reviewed annually)*

**Previous Versions**

February 18, 2002  
 March 25, 2010  
 February 28, 2012  
 December 5, 2012  
 September 16, 2014  
 February 10, 2016  
 December 6, 2016  
 September 27, 2017  
 OHSCC-endorsed and City Manager-approved

**Endorsed by:**

Occupational Health and Safety Coordinating Committee (OHSCC), October 30, 2001  
 Reviewed and re-endorsed by OHSCC, December 12, 2018

**Guidelines**

*Guidelines for Implementing the Workplace Violence Policy*

**Effective**

January 1, 2019 - December 31, 2019

Approved by	City Manager
Date Approved	February 4, 2013
Reviewed and re-approved by OHSCC	December 12, 2018
Related information	<a href="#">Human Rights and Anti-Harassment/Discrimination Policy</a> <a href="#">City of Toronto Corporate Occupational Health and Safety Policy</a> <a href="#">Investigation and Reporting of Work-Related Injuries and Incidents Policy</a> <a href="#">Guidelines for Implementing the Workplace Violence Policy</a>
Related links - external	<a href="#">The Occupational Health and Safety Act of Ontario</a> <a href="#">Criminal Code of Canada</a>



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RFQ «QuotationRequestNumber»

**STATUTORY DECLARATION**  
(Occupational Health & Safety)

PROVINCE OF ONTARIO )  
JUDICIAL DISTRICT OF YORK )

IN THE MATTER OF RFQ NO. \_\_\_\_\_ AND ANY ENSUING CONTRACT  
BETWEEN

\_\_\_\_\_  
(Company Name)

- AND -

City of Toronto

I, \_\_\_\_\_ of the City/Town/Village of \_\_\_\_\_ in the  
Province  
(Name)

of \_\_\_\_\_ do solemnly declare the following:  
(Name of Province)

1. I am the \_\_\_\_\_ of the \_\_\_\_\_ and as such  
(Insert Title) (Insert Company Name)

have knowledge of the matters herein stated.

2. \_\_\_\_\_ is a sole proprietorship/partnership/corporation with its head office  
(Company Name)  
located at \_\_\_\_\_ and has carried on business as  
a \_\_\_\_\_ (contractor/state other type of  
business)  
since on or about \_\_\_\_\_  
(Insert Date)

3. \_\_\_\_\_ since \_\_\_\_\_ had in place a Health and Safety  
Policy  
(Company Name) (Insert Date)

under Section 25(2) (j) of the *Occupational Health and Safety Act*, R.S.O. 1990, c. 0.1 as amended, (the "Act")  
and

has/have developed and maintain(s) on an annual basis a program to implement the written Occupational Health  
and Safety

Policy. A copy of the policy and program for \_\_\_\_\_ (Insert Company Name) will be  
delivered to the

City of Toronto upon request by the City and will be available for inspection at the City of Toronto, solely for the  
purposes of



4. \_\_\_\_\_ since \_\_\_\_\_ had in place a Workplace Violence and a  
(Company Name) (Insert Date)

- (a) are qualified because of knowledge, training and experience to organize the Work and its performance;
- (b) are familiar with the Act and the regulations made thereunder that apply to the Work; and
- (c) have knowledge of any potential or actual danger to health and safety associated with the Work.

(Insert name of supervisors)

7. The supervisors employed by \_\_\_\_\_ (Insert Company Name) has successfully completed the necessary health and safety courses to be considered a competent person to undertake the Work described in the Contract.

A Commissioner etc.

\_\_\_\_\_  
Signing Officer for Company

## City of Toronto

### Acceptable Use of Information Technology Assets Policy

#### 1. Policy Statement

- 1.1 The City of Toronto provides Authorized Users with access to the City's Information Technology Assets to be used for the purpose of conducting legitimate business activities and advancing the goals and objectives of the City of Toronto.
- 1.2 This Policy establishes principles and requirements for the acceptable use of the City's Information Technology Assets.

#### 2. Definitions

- 2.1 **Accountability Officer(s)** refers to the Auditor General, Integrity Commissioner, Lobbyist Registrar and the Ombudsman at the City of Toronto.
- 2.2 **Authorized Users** are all individuals who have been granted access to the City's Information Technology Assets. This includes, but is not limited to, employees, consultants, contractors, subcontractors, individuals on secondment to the City, students and volunteers at the City of Toronto and Accountability Officers and anyone working or volunteering for or in their Offices subject to Section 3-10 F(5), Chapter 3, Accountability Officers, of the Toronto Municipal Code.
- 2.3 **Confidential Information** includes, but is not limited to, privileged information, draft by-laws or staff reports, third party information, personal information, technical or financial or scientific information and any other information collected, obtained or derived for or from City records that must or may be kept confidential under the *Municipal Freedom of Information or Privacy Act*, the *Personal Health Information Protection Act, 2004* or the *City of Toronto Act, 2006*.
- 2.4 **Information Technology Assets** are any system, service, hardware, and network assets that are owned by or supplied to Authorized Users by the City. This includes, but is not limited to, desktop computers, monitors, printers, notebooks, mobile devices, digital projectors, scanners, storage devices, networks and network devices, software, internet access, email, communication and business applications, telephones and voice mail, facsimile machines, and photocopiers.
- 2.5 **Systems Monitoring** refers to monitoring the City's Information Technology Assets used by Authorized Users for the collection and review of aggregate,

broad-based, or statistical data to assess, maintain, update or ensure reliability, security, confidentiality and integrity of City's Information Technology Assets. Systems monitoring is not directed at an identifiable individual(s).

- 2.6 **User Monitoring** refers to recording, accessing and reviewing or analyzing one or more identified Authorized User's activity on, or use of, the City's Information Technology Assets.

### **3. Application**

- 3.1 This Policy applies to all Authorized Users with access to any of the City's Information Technology Assets.
- 3.2 Accountability Officers are responsible for the application of and compliance with this Policy in their Offices, including user monitoring where required, pursuant to Chapter 3, Accountability Officers, of the Toronto Municipal Code.
- 3.3 Exceptions
  - 3.3.1 This Policy does not apply to Members of Council or anyone working or volunteering for or in their offices. Council Members are governed by the Code of Conduct for Members of Council, the Human Resources Management and Ethical Framework for Members' Staff, and applicable City policies and protocols.

### **4. Principles**

- 4.1 The City's Information Technology Assets are corporate resources and are to be used in accordance with this Policy and other applicable City of Toronto by-laws, policies and relevant federal and provincial legislation.
- 4.2 Authorized Users shall exercise good judgment and responsibility when using the City's Information Technology Assets.
- 4.3 The City's Information Technology Assets shall be used in an ethical and professional manner.
- 4.4 The City's Information Technology Assets will be used in a manner that safeguards the integrity, privacy and confidentiality of the City's assets, information, and data.
- 4.5 Authorized Users are responsible for their use of the City's Information Technology Assets at all times, including non-business hours.



- 4.6 Authorized Users shall not expect absolute privacy when using the City's Information Technology Assets, including such limited personal use as permitted in accordance with Section 7 of this Policy.
- 4.7 Authorized Users shall not have any expectation that any use of City's Information Technology Assets, including limited personal use, is exempt from Systems Monitoring and/or User Monitoring in accordance with this Policy.
- 4.8 Each Authorized User's Manager or Supervisor shall ensure that the Authorized User is aware of and understands their role and responsibility under this Policy and related City by-laws, policies and relevant provincial and federal legislation.

## **5. User Accountability and Responsibility**

### **5.1 Security**

- 5.1.1 Authorized Users are to exercise good judgment and reasonable care in protecting Information Technology Assets from theft, damage or illegal access and against systems designed to disrupt, damage or place excessive load on the assets.
- 5.1.2 Authorized Users are responsible for safeguarding, protecting, and not sharing password(s) used to access the City's Information Technology Assets.
- 5.1.3 Any breach to the security of City's information technology systems or damage to or loss of Information Technology Assets will be immediately reported by the Authorized User to the I&T Service Desk and their Supervisor/Manager.

### **5.2 Information Management**

- 5.2.1 All Authorized Users are responsible for the proper management of information in accordance with related provincial and federal legislation, and City of Toronto by-laws and policies referenced in Section 11 of this Policy.
- 5.2.2 Authorized Users must protect confidential information that belongs to the City, its service users, residents, partners or vendors, in accordance with the requirements of relevant provincial, and federal legislation, contractual restrictions, and related City of Toronto by-laws, and policies.

- 5.2.3 When conducting City business, Authorized Users are responsible for maintaining an accessible record and information in accordance with City by-laws, policies and relevant provincial and federal legislation.
- 5.2.4 All information, records and data related to City business and created or legally acquired using the City's Information Technology Assets must be stored on the City's network server or on an Information Technology Asset owned or under contract to the City.
- 5.2.5 Authorized Users are encouraged not to use system, service, hardware, and network assets not owned by or supplied by the City for the performance of the Authorized User's duties and responsibilities. Authorized Users shall not, under any circumstances, use any system, service, hardware, and network assets not owned by or supplied by the City for the performance of the Authorized User's duties and responsibilities where such use:
  - 5.2.5.1 compromises the security of the City's Information Technology Assets;
  - 5.2.5.2 results in a breach of provincial or federal legislation, or of the City of Toronto by-laws and policies referenced in Section 11 of this Policy;
  - 5.2.5.3 results in the release of confidential information that belongs to the City, its service users, residents, partners or vendors, contrary to the requirements of relevant provincial and federal legislation contractual restrictions, or related City of Toronto by-laws and policies; and/or
  - 5.2.5.4 results in the City incurring any unauthorized costs associated with Authorized Users accessing the City's network remotely.
- 5.2.6 Authorized Users who elect to use system, service, hardware, and network assets not owned by or supplied by the City for the performance of the Authorized User's duties and responsibilities may, through such use, make the system, service, hardware, and network assets used for this purpose subject to provincial and federal access to information legislation contractual restrictions, and related City of Toronto by-laws and policies, and shall cooperate with the City in fulfilling any resultant obligations that arise from such use.
- 5.2.7 Authorized Users who elect to use system, service, hardware, and network assets not owned by or supplied by the City for the performance

of the Authorized User's duties and responsibilities shall ensure that information, records, and data created, accessed, acquired, managed, or reviewed through such use is moved to and stored on the City's Information Technology Assets at the first available opportunity, following which it is deleted from the system, service, hardware, and network assets not owned by or supplied by the City.

### 5.3 Remote Access

- 5.3.1 Authorized Users with remote access to the City's network must connect using authorized methods and systems and ensure that the Information Technology Asset or the system, service, hardware, and network assets not owned by or supplied by the City is safe to use and will not negatively impact the City's network.
- 5.3.2 Authorized Users must maintain the privacy, confidentiality and integrity of corporate business information accessed through remote access.
- 5.3.3 All corporate information produced, accessed, or altered through remote access must be stored on the City's network or on an Information Technology Asset owned or under contract to the City.
- 5.3.4 The City will not incur any unauthorized costs associated with Authorized Users accessing the City's network remotely.
- 5.3.5 The City retains the right to terminate Authorized Users' remote access at any time.

## 6. Ownership

### 6.1 Assets

- 6.1.1 The City's Information Technology Assets are the sole property of the City of Toronto.
- 6.1.2 All Authorized Users must provide, when requested by management or delegated staff, any Information Technology Asset.

### 6.2 Information and Records

- 6.2.1 All information and records created or legally acquired using the City's Information Technology Assets are the sole property of the City of Toronto with the exception of records which arise from the permitted



personal use of Information Technology Assets in accordance with Section 7.

## **7. Personal Use**

- 7.1 Reasonable and limited personal use of Information Technology Assets is permitted, provided that it:
  - 7.1.1 Does not interfere with the Authorized User's duties and responsibilities.
  - 7.1.2 Is lawful and in compliance with applicable City of Toronto by-laws and policies, and relevant federal or provincial legislation.
  - 7.1.3 Does not compromise the security of the City's Information Technology Assets.
  - 7.1.4 Is not used for private gain, whether monetary or non-monetary, or advancement or the expectation of private gain.
  - 7.1.5 Does not result in the City incurring an expense unless it is incurred in accordance with the Business Expense Policy.
- 7.2 Authorized Users are responsible for properly managing personal files. The City is not liable nor will it incur any expense to protect or back-up personal files.
- 7.3 Authorized Users are encouraged to not store their own personal information or personal files on the City's Information Technology Assets. Users that elect to store their own personal information or personal files acknowledge that they are doing so at their own risk.

## **8. Unacceptable Use of Information Technology Assets**

- 8.1 Unacceptable use of the City's Information Technology Assets includes, but is not limited to:
  - 8.1.1 Using the City's Information Technology Assets to access or carry out any activities that are obscene, lewd, or pornographic.
  - 8.1.2 Using the City's Information Technology Assets to carry out any activities that are harassing, embarrassing, discriminatory or defamatory to another individual, employee, or group, or that are in breach of the employee's duty of fidelity to the City of Toronto.

- 8.1.3 Using Information Technology Assets to carry out any activities that contravene federal, provincial legislation and City of Toronto by-laws and policies.
- 8.1.4 Activities that will interfere with the normal operations of the City's Information Technology Assets, including intercepting or altering information transmitted.
- 8.1.5 Violating terms of applicable software licensing agreements or intellectual property laws, including installing software without a license.
- 8.1.6 Disclosing or distributing confidential information without authorization or contrary to City policies and by-laws and relevant federal or provincial legislation.
- 8.1.7 Circumventing the City's security schemes and protection.
- 8.1.8 Unauthorized use, infringement, theft, reconfiguration, movement, or relocation of City's Information Technology Assets and/or data, information or records located on the City's Information Technology Assets.

## **9. Monitoring**

### **9.1 Systems Monitoring**

- 9.1.1 The City of Toronto has the right to conduct Systems Monitoring at any time, at will and in its sole discretion, including the right to filter and quarantine both inbound and outbound content, as may be necessary to protect the integrity, security, confidentiality, or reliability of the City's Information Technology Assets.
- 9.1.2 As part of System Monitoring, the City of Toronto may recover deleted files and data stored or accessed using the City's Information Technology Assets.

### **9.2 User Monitoring**

- 9.2.1 The City of Toronto reserves the right, but does not have a duty, to conduct User Monitoring.
- 9.2.2 The City may exercise its right to perform User Monitoring:

9.2.2.1 If in the opinion of the City Solicitor there are reasonable grounds and/or a reasonable belief based on credible information received to support User Monitoring, including but not limited to information or belief that:

- i. An Authorized User is violating this Policy or other City of Toronto by-laws and policies, or any relevant federal and provincial legislation in their use of the City's Information Technology Assets.
- ii. An Authorized User is using the City's Information Technology Assets in a fashion incompatible with the User's employment with the City or grant of access to the City's Information Technology Assets.
- iii. The results from general Systems Monitoring provide reasonable grounds to focus on and review a specific Authorized User's activity.

9.2.2.2 In the alternative, if necessary to:

- i. protect and maintain the City's Information Technology Assets or other assets and interests from an immediate or imminent threat.
- ii. support the City of Toronto's efforts to comply with legal requirements, or defend itself in proceedings.

9.2.2.3 For other legitimate business, corporate or human resources purposes, including as a result of the absence of an employee.

9.2.3 User Monitoring pursuant to Section 9.2.2, User Monitoring, will be conducted in accordance with the User Monitoring Procedures referenced in Section 11.1.11, and the following principles:

9.2.3.1 If effective alternatives to User Monitoring are available in identifying inappropriate use or responding to a legitimate business, corporate, or human resources purpose, they shall be employed.

9.2.3.2 The least intrusive but effective means of User Monitoring shall be used.



- 9.2.3. Results of User Monitoring shall remain confidential, subject to the requirements of the investigation (including matters arising from the investigation), and/or other City by-laws, policies and relevant provincial and federal legislation.
- 9.2.3.4 Any decision to prosecute or refer User Monitoring or investigation results to the Toronto Police Service or other regulatory agencies for independent investigation will be made in accordance with the Toronto Public Service By-law, Chapter 192, Public Service of the Toronto Municipal Code.
- 9.2.4 User Monitoring by any individual for private or personal interest, curiosity, or without cause and appropriate authorization is prohibited and shall be considered a violation of this Policy.
- 9.3 Section 9.2 of this Policy does not apply to Accountability Officers when user monitoring is necessary as part of the fulfillment of their statutory mandate and responsibilities under Part V of the *City of Toronto Act, 2006*.
  - 9.3.1 In circumstances, where an Accountability Officer is conducting user monitoring for their own Office or their staff, the Accountability Officer is responsible for applying Section 9.2 as deemed appropriate by the Accountability Officer.

## 10. Compliance

- 10.1 Failure to comply with this Policy may result in disciplinary action up to and including dismissal and/or legal proceedings where warranted.
- 10.2 In an event of a conflict or difference the federal and provincial legislation supersedes this Policy.
- 10.3 This Policy supersedes other City or divisional policies, standards and guidelines that govern the use of Information Technology Assets in an event of conflict or difference, subject to the principle that specific provisions of the other policies, standards, and guidelines continue to apply despite a more general provision being set out in this Policy.
- 10.4 This Policy shall be reviewed every three to five years and the City reserves the right to amend this Policy at any time.

## 11. Related By-laws, Policies and Procedures

11.1 This Policy is to be implemented and interpreted with other related by-laws and policies, including:

- 11.1.1 Toronto Municipal Code, Chapter 192, Public Service  
<http://www.toronto.ca/legdocs/municode/toronto-code-192.pdf>
- 11.1.2 Application of City Policies to Social Media Use:  
[http://insideto.toronto.ca/social\\_media/pdf/socialmediause.pdf](http://insideto.toronto.ca/social_media/pdf/socialmediause.pdf)
- 11.1.3 City of Toronto Human Rights and Anti-Harassment/Discrimination Policy:  
[Human Rights and Anti-Harassment/Discrimination Policy](#)
- 11.1.4 Corporate Information Security Policy:  
[http://insideto.toronto.ca/itweb/policiesstandards/information\\_security.htm](http://insideto.toronto.ca/itweb/policiesstandards/information_security.htm)
- 11.1.5 IT Asset Management Policy:  
<http://insideto.toronto.ca/itweb/policiesstandards/pdf/asset-management.pdf>
- 11.1.6 Toronto Municipal Code, Chapter 3, Accountability Officers  
[http://www.toronto.ca/legdocs/municode/1184\\_003.pdf](http://www.toronto.ca/legdocs/municode/1184_003.pdf)
- 11.1.7 Toronto Municipal Code, Chapter 217, Records, Corporate (City)  
[Toronto Municipal Code, Chapter 217](#)
- 11.1.8 Business Expense Policy  
[http://insideto.toronto.ca/accounting\\_services/pdf/business\\_expense\\_policy.pdf](http://insideto.toronto.ca/accounting_services/pdf/business_expense_policy.pdf)
- 11.1.9 Information Management Accountability Policy  
<https://www.toronto.ca/wp-content/uploads/2018/07/8ec6-information-management-accountability-policy.pdf>
- 11.1.10 Protection of Privacy Policy  
<https://www.toronto.ca/wp-content/uploads/2017/08/9023-ProtectionOfPrivacyFinalAODA.pdf>
- 11.1.11 User Monitoring Procedures  
<http://insideto.toronto.ca/itweb/policy/pdf/user-monitoring-procedures.pdf>



Approved By:  
Peter Wallace  
City Manager  
February 26, 2018

**END OF APPENDIX B**