

# **INDIGENOUS DEVELOPMENTS ARCHAMBAULT MEDIUM**

## **SPECIFICATIONS**

FILE

SPAC R.101213.001

ISSUE DATE

Issued for addendum no 1 : 2022.06.08

**ARCHITECTURE**

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# Correctional Service Canada (CSC)

## Indigenous Developments Archambault Medium

PROJECT No. PSPC R.101213.001

### ADDENDUM No. 1

Civil/Structural/Mechanical/Electrical/Physical Security

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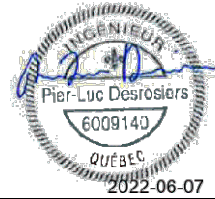


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Revision: 02 | 2022-06-08 | Addendum No. 1  
Revision: 01 | 2022-04-27 | Issued for Tender (Rev. 1)  
Revision: 00 | 2022-01-14 | Issued for Tender (Cancelled)  
Revision: 0C | 2021-11-12 | SR4 Issue - 99%  
Revision: 0B | 2021-06-04 | SR4 Issue - 66%  
Revision: 0A | 2021-03-03 | SR4 Issue - 33%

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2022-06-08

Page 2

**DATE :** 2022.06.08**ADDENDUM NUMBER :** 01**PROJECT NUMBER :** R.101213.001

The following modifications to the tender documents are effective immediately.  
This addendum will form part of the contract documents.

This addendum completes, modifies, or eliminates certain elements of the tender documents, which this addendum refers to. It is an integral part of the tender documents.

**DRAWINGS :****1. ARCHITECTURE**

The following drawings are modified with this addendum (specific modifications identified as 03 on the drawings) :

- A00, rév. 03 (drawing issued)
- A01, rév. 03 (drawing issued)
- A03, rév. 03 (drawing issued)
- A04, rév. 03 (drawing issued)
- A05, rév. 03 (drawing issued)
- A06, rév. 03 (drawing issued)
- A07, rév. 03 (drawing issued)
- A08, rév. 03 (drawing issued)
- A09, rév. 03 (drawing issued)
- A10, rév. 03 (drawing issued)
- A11, rév. 03 (drawing issued)

The following drawings are added with this addendum:

- A12, rév. 01 (drawing issued)

**2. CIVIL**

The following drawings are issued with the current addendum :

- C00, rév. 02 (drawing issued)
- C01, rév. 02 (drawing issued)
- C02, rév. 02 (drawing issued)
- C03, rév. 02 (drawing issued)

**3. STRUCTURAL**

The following drawings are issued with the current addendum :

- S00, rév. 02 (drawing issued)
- S01, rév. 02 (drawing issued)
- S02, rév. 02 (drawing issued)
- S03, rév. 02 (drawing issued)
- S04, rév. 02 (drawing issued)
- S08, rév. 02 (drawing issued)

- S09, rév. 02 (drawing issued)

#### 4. MECHANICAL

The following drawings are issued with the current addendum :

- Plan n° M01, rév. 2 (drawing issued)
  - Adding the fire connection symbol in the legend.
- Plan n° M03, rév. 2 (drawing issued)
  - Modification to drainage and domestic water systems.
- Plan n° M04, rév. 2 (drawing issued)
  - Correction to the sanitary drainage diagram.
- Plan n° M05, rév. 2 (drawing issued)
  - Removal of one pendent sprinkler in room V7-108.
  - Modification of the section view.
  - Addition of the nameplate table.
- Plan n° M06, rév. 2 (drawing issued)
  - Adding the installation detail of the fire department connection.
- Plan n° M08, rév. 2 (drawing issued)
  - Added a demolition note.
- Plan n° M09, rév. 2 (drawing issued)
  - Modification to the ductwork layout.

#### 5. ELECTRICAL

The following drawings are issued with the current addendum :

- Plan n° E06, rév. 2 (drawing issued)
  - Modification of light fixture in room V7-108.
- Plan n° E07, rév. 2 (drawing issued)
  - Expansion of electrical room V7-107 of the longhouse.
  - Power supply for automatic door openers in accessible washrooms (V7-106 and V6-107) and addition of door elevation details.
  - Addition of an electrical outlet in front of the counter in the kitchen.
- Plan n° E09, rév. 2 (drawing issued)
  - Addition of circuit breakers to electrical panels.
- Plan n° E10, rév. 2 (drawing issued)
  - Modification of the electrical outlet position dedicated to the microwave in detail 3.
  - Addition of an electrical outlet in front of the counter in the kitchen in detail 4.

**6. PHYSICAL SECURITY**

The following drawings are issued with the current addendum :

- Plan n° PH-G001, rév. 0 (drawing issued)
  - The drawing is added as a front page with legend and drawing list.
- Plan n° PH-D001, rév. 2 (drawing issued)
  - The door control system detail is removed.
- Plan n° PH-L001, rév. 2 (drawing issued)
  - Site Plan is resubmitted to fix the drawing name and remove the legend.
- Plan n° PH-L002, rév. 2 (drawing issued)
  - The door control system wiring detail is removed.
  - The emergency call system and its location are added.
- Plan n° PH-L003, rév. 2 (drawing issued)
  - The control on identified doors is removed.

**SPECIFICATIONS :**

The following complete specification sections are reissued and modified with this addendum (specific modifications identified as 1 or Add 01) :

<u>Sections</u>	<u>Pages issued</u>
00 01 10	1 à 8
03 15 00	1 à 7
03 20 00	1 à 9
03 30 00	1 à 15
07 46 19	1 à 7
07 46 23	1 à 6
07 61 00	1 à 11
08 11 00	1 à 10
08 50 00	1 à 11
21 13 13	1 à 10
25 01 01	1 à 8
26 05 00	1 à 15
28 05 01	1 à 14
28 13 00	1 à 11

The following complete quote sections are fully reissued and amended with this addendum :

<u>Sections</u>	<u>Pages issued</u>
Annexe A	1 à 4
Annexe B	1 à 3

The following complete specification sections are added with this addendum :

<u>Sections</u>	<u>Pages issued</u>
07 62 00	1 à 5
10 50 00	1 à 4

The following appendix are added with this addendum:

<u>Appendix</u>	<u>Pages issued</u>
Appendix 2 – Geotechnical investigation	1 à 106
Appendix 3 – Hazmat report	1 à 76

**Precisions :**

- Appendix 2 :
  - The Appendix has been translated and is issued with this addendum.

**END OF ADDENDUM 01**

**DEVIS**

<b>DIVISION</b>	<b>SECTION</b>		<b>NUMBER OF PAGES</b>
DIVISION 00	00 01 07	Seals page	2
	00 01 10	Table of contents	8
DIVISION 01	01 11 01	Work related general information	3
	01 31 19	Project meeting	3
	01 32 16.07	Construction progress schedule – Bar chart (GANTT)	3
	01 33 00	Submittal procedures	5
	01 35 13	Specials procedures – Detention facilities	8
	01 35 29.06	Health and safety requirements and Health and safety subordination agreement	30
	01 45 00	Quality control	3
	01 51 00	Temporary utilities	3
	01 52 00	Construction facilities	3
	01 56 00	Temporary barriers and enclosures	2
	01 61 00	Common product requirements	4
	01 73 00	Execution	2
	01 74 00	Cleaning	3
	01 74 19	Waste management and disposal	3
	01 78 00	Closeout submittals	7
	01 79 00	Demonstration and training	2
	01 91 13	General Commissioning (Cx) Requirements	19
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DIVISION 02	02 41 99	Demolition for minor work	3
DIVISION 03	03 10 00	Concrete Formwork	10
ADD 01	03 15 00	Concrete Accessories	7
ADD 01	03 20 00	Concrete Reinforcement	9
	03 30 00	Cast-in-Place Concrete	16
	03 35 00	Concrete finishing	4
	03 35 00	Finishing of Concrete Slabs	6
DIVISION 04	04 20 00.08	Masonry for minor works	5



	<b>DIVISION</b>	<b>SECTION</b>	<b>NUMBER OF PAGES</b>
	DIVISION 05	05 12 23 Structural Steel for Building	12
		05 51 00 Metal stairs and ladders	5
	DIVISION 06	06 10 53 Miscellaneous rough carpentry	4
		06 18 00 Glued-Laminated Construction	8
		06 20 00 Finish carpentry	6
		06 40 00 Architectural woodwork	8
	DIVISION 07	07 11 13 Bituminous dampproofing	4
		07 21 13 Board insulation	5
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		07 26 00 Vapour retarders	5
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		07 52 00 Modified bituminous membrane roofing	12
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ADD 01		<b>07 62 00 Sheet metal flashing and trim</b>	<b>4</b>
		07 84 00 Fire stopping	5
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		07 92 00 Joints sealants	6
	DIVISION 08	08 11 00 Metal doors and frames	8
		08 34 63.13 Metal doors and frames for detention purposes	9
		08 50 00 Windows	9
		08 71 00 Doors hardware	5
		08 80 00 Glazing	5
ADD 01		Appendix A Hardware slip	<b>4</b>
		Appendix B Doors and frames schedule	3
	DIVISION 09	09 21 16 Gypsum board assemblies	7
		09 22 16 Non-structural metal framing	4
		09 91 00.08 Painting for minor work	6
		09 96 59 High-built glazed coating	6

	<b>DIVISION</b>	<b>SECTION</b>	<b>NUMBER OF PAGES</b>
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		10 28 00 Toilet and bath accessories	5
		10 44 16.19 Portable Extinguishers	4
<b>ADD 01</b>		<b>10 50 00 Special products</b>	<b>4</b>
	DIVISION 21	21 05 00 Common Work Results for Fire Suppression	9
		21 13 13 Wet Pipe Sprinkler Systems	9
		21 13 16 Dry Pipe Sprinkler Systems	8
	DIVISION 22	22 05 00 Common Work Results for Plumbing	12
		22 05 15 Plumbing - Specialties and Accessories	9
		22 10 10 Plumbing - Pumps	4
		22 11 16 Domestic Water Piping	9
		22 13 16.13 Drainage Waste and Vent Piping - Cast Iron and Copper	6
		22 13 16.16 Sanitary Waste and Vent Piping - Plastic	3
		22 33 00 Domestic Water Heaters	3
		22 42 13 Commercial Water Closets, Urinal and Bidets	5
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	DIVISION 23	23 01 05 Operation and Maintenance of HVAC Systems during Construction	1
		23 05 00 Common Work Results for HVAC	12
		23 05 29 Hangers and Supports for HVAC Piping and Equipment	10
		23 05 48 Vibration and Seismic Controls for HVAC	8
		23 05 48.16 Seismic Restraint Systems (SRS)	8
		23 05 53 Identification for HVAC Piping and Equipment	6
		23 05 93 Testing, Adjusting and Balancing for HVAC	6
		23 05 94 Pressure Testing of Duct Air Systems	3
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	23 37 13 Diffusers, Registers and Grilles	2
	23 51 00 Breechings, Chimneys and Stacks	4
	23 55 13 Duct Heaters	3
	23 72 00 Air-to-Air Energy Recovery Equipment	5
	23 73 00.13 Air Handling - Built-up	13
DIVISION 25	25 01 01 EMCS - General Requirements	7
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	25 30 01 EMCS - Building Controllers	11
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	25 90 01 EMCS - Site Requirements, Applications, and Systems Sequences of Operation	5
	25 99 05 EMCS - Requirements Relative to Programming and Dynamic Screens	6
DIVISION 26	26 05 00 Common Work Results for Electrical	12
	26 05 05 Selective Demolition for Electrical	3
	26 05 20 Wire and Box Connectors (0 – 1,000 V)	3
	26 05 21 Wires and Cables (0 – 1,000 V)	5
	26 05 28 Grounding - Secondary	5
	26 05 29 Hangers and Supports for Electrical Systems	4
	26 05 30 Seismic Restraint Systems (SRS)	5
	26 05 31 Splitters, Junction, Pull Boxes and Cabinets	3
	26 05 32 Outlet Boxes, Conduit Boxes and Fittings	4
	26 05 34 Conduits, Conduit Fastenings and Conduit Fittings	6
	26 05 43.01 Installation of Cables in Trenches and in Conduits	3
	26 12 16.01 Dry-Type Transformers up to 600 V - Primary	4
	26 24 16.01 Panelboards Breaker Type	5
	26 27 26 Wiring Devices	5
	26 28 13.01 Fuses - Low Voltage	2
	26 28 23 Disconnect Switches – Fused and Non-Fused	3
	26 29 10 Motor Starters to 600 V	4
	26 50 00 Lighting	4
	26 52 13.13 Emergency Lighting	3
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	<b>DIVISION</b>	<b>SECTION</b>	<b>NUMBER OF PAGES</b>
	DIVISION 27	27 05 26 Grounding and Bonding for Communication Systems	3
		27 05 28 Pathways for Communications Systems	3
	DIVISION 28	28 05 01 Security - Common Work Results	13
ADD 01		28 13 00 Security - Door Control System and Intrusion Detection	11
		28 23 00 Security - Video Surveillance System	4
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	DIVISION 31	31 05 16 Aggregates for Earthwork	3
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	DIVISION 32	32 31 13 Chain Link Fences and Gates	8
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		32 92 23 Sodding	5
	DIVISION 33	33 05 16 Maintenance Holes and Catch Basin Structures	6
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		33 14 16 Site Water Utility Distribution Piping	23
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**DRAWINGS****Architecture**

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A03	Ground floor plan	03
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A05	Ceilings and finishes plan, central foyer detail	03
A06	Sections and elevations	03
A07	Wall sections and details	03
A08	Wall sections and details	03
A09	Details, enlarged plans and built-in furniture	03
A10	Modifications in the existing building	03
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**Civil**

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**Structure**

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S04	Roof Plan and Elevations	02
S05	Anchor Plan and Bottom	01
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S08	Elevations and Details - Wood	02
S09	Details - Wood	02
S10	Typical Details - Wood	01
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S13	Typical Details - Concrete	01
S14	Existing Ground Floor Plan and Interventions	01

S15	Existing First Floor Plan and Interventions	01
<b>Mechanical</b>		
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M02	Mechanical Plumbing Wing K and Wing J (Crawl Space)	01
M03	Mechanical Plumbing Longhouse / Shaputuan	02
M04	Mechanical Plumbing Details and tables	02
M05	Mechanical Fire Protection Wing J, Wing K Longhouse / Shaputuan	02
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M07	Mechanical Ventilation Wings J-K-T-U	01
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END OF SECTION

**Part 1        General****1.1        DESCRIPTION**

- .1        Provide all the expertise, labour, materials, products, equipment and services needed to supply and deploy all the accessories specified and detailed on the drawings for all the disciplines, regardless of whether or not they are described in this section of the Specifications.

**1.2        RELATED REQUIREMENTS**

- .1        The Contractor is responsible for reviewing the content of all sections listed below along with all other section of these specifications, even if they do not appear to pertain to his speciality. If he does not, it shall be understood that he agrees to the clauses and requirements of all sections in these specifications.
  - .1        03 10 00 Concrete Formwork
  - .2        03 20 00 Concrete Reinforcement
  - .3        03 30 00 Cast-In-Place Concrete
  - .4        03 35 00 Finishing of Concrete Slabs

**1.3        REFERENCE STANDARDS**

- .1        American Society for Testing and Materials (ASTM)
  - .1        ASTM D1751-18, Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
  - .2        ASTM D2240-15e1, Standard Test Method for Rubber Property-Durometer Hardness.
  - .3        ASTM D412-16e1, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
- .2        Canadian Standards Association (CSA).
  - .1        CSA-A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction / Methods of Test and Standard Practices for Concrete.
  - .2        CAN/CSA-G40.21-13, Construction Steel.



- .3 CAN/CSA-S16-14, Design of Steel Structures.
- .3 Canadian General Standards Board (CGSB).
  - .1 CAN/CGSB-51.33-M89, Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.
  - .2 CAN/CGSB-19.24-M90, Multicomponent, Chemical-Curing Sealing Compound.

#### **1.4 MANUFACTURED PRODUCTS**

- .1 The brand of each of the manufactured products described in this section of the specifications shall be approved by the Departmental Representative. At the Departmental Representative's request, provide him with the technical description and/or samples of these products as well as certified copies of the results of analyses and trials conducted by independent laboratories attesting that these products comply with the manufacturing standards that apply to them.
- .2 Submitted drawings will be in the form of one (1) electronic copy and one (1) electronic copy of the commented shop drawings will be returned to the Contractor.

#### **1.5 FASTENERS**

- .1 In all cases where fasteners not indicated on the drawings are required in concrete components to provide vertical and/or lateral support for architectural elements, prefabricated concrete components, parts for mechanical, electrical or other equipment, the structural design and engineering of these fasteners are the full and sole responsibility of the manufacturer who shall provide them, and shall in no way confer liability on the Departmental Representative.
- .2 The fasteners to which sub-article .1 above refers to includes plates, angle irons and all other hardware in direct contact with the concrete of components identified on the drawings, including rods, bolts, dowels and various anchoring devices wholly or partially embedded in this concrete.
- .3 The Contractor shall nevertheless provide the Departmental Representative with a reproducible copy and a copy of the shop drawings, for information purposes, clearly indicating the location of all fasteners required as well as the intensity and direction of the stresses that each of the fasteners exert on the concrete components. These drawings shall have been approved for construction beforehand by an Engineer in good standing with the Ordre des Ingénieurs du Québec.

**Part 2 Products****2.1 MATERIALS**

- .1 **Pre-molded joint fillers:** flexible polyethylene, closed-cell expansion joint filler that is made of chemical-resistant, ultraviolet stable, non-absorbent, low density and compressible foam, with detachable pre-scored strip, approved by the Departmental Representative. The dimensions required match the joints to be put in place on the drawings.
- .2 **Vapour barrier membrane under slabs-on-grade:** 0.15 mm thick polyethylene sheets in compliance with the CAN/CGSB-51.33 standard.
- .3 **Auxiliary backer rod for joints:** closed cell polyethylene foam, diameters required based on the dimensions shown on the drawings.
- .4 **Sealant for horizontal joints:** two-component polyurethane elastomeric sealant with chemical cure and self-levelling consistency, in accordance with the CAN/CGSB-19.24 standard, approved by the Departmental Representative.
- .5 **Sealant for vertical joints:** two-component polyurethane elastomeric sealant with chemical cure and non-sag consistency, in accordance with the CAN/CGSB-19.24 standard, approved by the Departmental Representative.
- .6 **Primer for use with joint sealer:** For appropriate use, approved by the Departmental Representative. The primer and sealer must be compatible.
- .7 **Reinforcing steel:** according to Section 03 20 00.
- .8 **Embedded steel components:** in compliance with the requirements of the CSA-G40.21 standard, 300 MPa grade.
- .9 **Bonding agent:** three-component, water-based epoxy resin, anti-corrosion coating and bonding agent, in accordance with the CAN/CSA-A23.1/A23.2 standard such approved by the Departmental Representative.
- .10 **Rustproof coating:** three-component, water-based epoxy resin, anti-corrosion coating and bonding agent, in accordance with the CAN/CSA-A23.1/A23.2 standard such approved by the Departmental Representative.
- .11 **Sealant for pressure injection of cracks:** two-component epoxy resin, 100% solids, moisture tolerant, approved by the Departmental Representative.

- .12 **Epoxy for pressure injection of cracks:** two-component structural epoxy resin, 100% solids, moisture tolerant, low viscosity, approved by the Departmental Representative.
- .13 **Chemical anchoring system:** ultimate-performance two-component injectable hybrid adhesive with approvals for rebar connections and heavy-duty anchoring, approved by the Departmental Representative.
- .14 **Mechanical rebar splicing system:** Mechanical rebar system type and color approved by the Departmental Representative. Mechanical splices must develop 120% of the steel rebar's tension.
- .15 **Waterstops and Seals:**
  - .1 Waterstops: Ribbed extruded polyvinyl chloride PVC waterstops with the following properties:
    - .1 Minimal tensile strength: 11.4 MPa
    - .2 Elongation to failure: 275%
    - .3 Minimum tear resistance: 50 kN/m (ASTM D624-00 standard, Die "B" Method)
    - .4 The waterstops shall be of the width and thickness specified on the drawings. If no other dimension is provided, the waterstops shall be at least 150 mm wide and 10 mm thick.
    - .5 At T, L or X intersections use factory pre-cut and pre-assembled components Minimum tear resistance: 50 kN/m (ASTM D624-00 standard, Die "B" Method)
  - .2 Sealing strips: Sealing strip made of rubberized bitumen with inert hard crushed stone around, approved by Departmental Representative.
- .16 **Sealer for concrete surfaces:** Silane based sealer or approved by Departmental Representative.
- .17 **Repair grout:** Non-shrink cementitious grout approved by the Departmental Representative.
- .18 **Repair mortar:** A polymer-modified, with migrating corrosion inhibitor added, cementitious, two-component, fast setting, trowel-grade mortar, approved by Departmental Representative.
- .19 **Caulking mortar:** Once the injection is completed, caulk the cracks with an epoxy mortar approved by the Departmental Representative.

- .20 **Epoxy repair grout:** Three-component epoxy resin at a 6:1 ratio approved by the Departmental Representative.



- ~~.21 **Repair Concrete:** Ready mixed cement concrete approved by the Departmental Representative.~~

- .21 **Concrete for slab obturations:** One-component, cementitious, silica fume-modified, pumpable and easily pourable concrete mix plus migrating corrosion inhibitor, approved by Departmental Representative. Compressive strength at 28 days: 45 MPa.

- .22 **Concrete for wall obturations:** Ready-to-use, highly flowable, self-compacting, cement-based concrete, approved by Departmental Representative. Compressive strength at 28 days: 55 MPa.

### Part 3 Performance

#### 3.1 JOINT FILLER

- .1 Locate and form isolation and / or expansion joints according to the indications provided. Install the joint filler.
- .2 Unless otherwise indicated on the drawings, use a 12 mm thick joint filler to separate slabs-on-grade from vertical surfaces, and a 25 mm joint filler to separate slabs-on-grade from one another at the required locations.

#### 3.2 VAPOUR BARRIER MEMBRANE

- .1 Install a vapour barrier membrane under concrete slabs-on-grade located inside buildings.
- .2 At locations where there are joints, overlap the sides of the polyethylene sheets (see architecture) by at least 150 mm.
- .3 Repair any perforations in the vapour barrier membrane before pouring the concrete. Use pieces that extend at least 150 mm beyond all the edges of the perforations.

#### 3.3 JOINT CAULKING:

- .1 Remove dust, loose mortar and other foreign material and dry the surfaces of the joint.
- .2 Prepare the surfaces in compliance with the caulking manufacturer's instructions.

Clear the joint to the required depth to install a backer rod. This will allow the application of a layer of caulking that complies with the manufacturer's recommendations for the width of the joint involved.

- .3 Apply the primer on the contact surfaces, and then apply the caulking following the manufacturer's recommendations. Clean adjacent surfaces immediately after application.

### **3.4 WATERPROOFING THE JOINTS**

- .1 Refer to the drawings to determine which construction joints need to be sealed with waterstops. Even if there are no indications on the drawings, all joints below the grade shall be sealed with waterstops.
- .2 Take care not to deform or damage the waterstops when fastening them to the form. Avoid moving adjacent reinforcements and ensure the waterstops cannot shift or bend during the pour.
- .3 Butt weld the waterstops together, following the manufacturer's recommendations. Each weld shall be perfectly watertight. Butting waterstops together on the construction site is only permitted in the case of waterstop segments that are an extension of one another.

### **3.5 EMBEDDED COMPONENTS**

- .1 All embedded component manufacturing work shall be performed in compliance with the requirements of the CAN/CSA-S16 standard.

### **3.6 IMPLEMENTATION – CHEMICAL ANCHORING SYSTEM:**

- .1 Drill a hole 4 mm wider than the bar to be anchored.
- .2 Make sure the drill hole is clean, dry, free of clay, debris and cement dust. The holes shall be drilled with a hammer drill and cleaned with compressed air.
- .3 Prepare and apply epoxy resin according to the recommendations provided on the manufacturer's data sheet.
- .4 Where possible, partially fill the hole with epoxy and insert the bar. If not, introduce the rod and inject epoxy resin.
- .5 Anchor the rod in the concrete to a depth at least 15 times the diameter of the bar unless otherwise indicated.

### **3.7 IMPLEMENTATION – RUSTPROOF COATING**

- .1 Dry or wet sandblast the rebar to clean it and remove all grease, oil or rust. It may be necessary to clean the steel rebar using a mechanical steel brush to remove the rust.

- .2 Following the manufacturer's recommendations, use a stiff brush or a roller to apply a 0.5 to 1 mm thick coat on the steel rebar.
- .3 Allow to dry for 2 to 3 hours before applying a second coat of the same thickness.
- .4 Allow to dry for 2 to 3 hours before placing the repair concrete.

### **3.8 IMPLEMENTATION – BINDING AGENT**

- .1 Dry or wet sandblast the surfaces to clean them and remove all traces of grease, oil or rust, as well as loose aggregate.
- .2 Moisten the surface of the concrete to obtain a saturated, superficially dry substrate.
- .3 Following the manufacturer's recommendations, use a stiff brush or a roller to apply a 0.5 mm coat over the entire area to be bound.
- .4 Place the repair concrete within the maximum time limits prescribed by the manufacturer.

### **3.9 INJECTING THE CRACKS**

- .1 Roughen the cracks and clean the surfaces with compressed air jet.
- .2 Install injection points and seal them and the surfaces of the cracks to be injected to prevent resin loss. The distance between injection points shall not exceed the thickness of the part to be injected.
- .3 When the sealer has hardened, inject epoxy at the injection points. Inject the filler until the filler begins to come out of the next injection point.
- .4 Then plug the first injection point before going on to the next one.
- .5 When the epoxy resin has hardened, grind the top of the concrete surfaces at the sealing location to remove the sealer and the excess epoxy from the surface. The repaired crack surfaces shall have a quality finish.

**END OF SECTION**

**Part 1        General****1.1        DESCRIPTION**

- .1        Provide all the expertise, labour, materials, products, equipment and services needed to supply, detail, manufacture and install all the reinforcement steel shear heads, dowels, metallic wires that must be incorporated in the concrete components indicated in the structural drawings.

**1.2        RELATED REQUIREMENTS**

- .1        The Contractor is responsible for reviewing the content of all sections listed below along with all other section of these specifications, even if they do not appear to pertain to his speciality. If he does not, it shall be understood that he agrees to the clauses and requirements of all sections in these specifications.
  - .1        03 10 00 Concrete Formwork
  - .2        03 15 00 Concrete Accessories
  - .3        03 30 00 Cast-In-Place Concrete
  - .4        03 35 00 Finishing of Concrete Slabs

**1.3        REFERENCE STANDARDS**

- .1        American Concrete Institute (ACI)
  - .1        SP-66(04), ACI Detailing Manual 2004.
- .2        American Society for Testing and Materials (ASTM)
  - .1        ASTM A82/A82M-07, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
  - .2        ASTM A143/A143M-07(2014), Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
  - .3        ASTM A185/A185M-07, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
  - .4        ASTM A775/A775M-07b, Standard Specification for Epoxy-Coated Steel Reinforcing Bars.


- .3 Canadian Standards Association (CSA)
  - .1 CAN/CSA-A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction / Methods for Test and Standard Practices for Concrete.
  - .2 CSA-A23.3-14, Design of Concrete Structures for Buildings.
  - .3 CAN/CSA-G30.18-09, Cold-Drawn Steel Wire for Concrete Reinforcement.
  - .4 CAN/CSA-G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
  - .5 CSA W186-M1990 (R2012), Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .2 Institut d'acier d'armature du Canada (RSIC/IAAC)
  - .1 IAAC-2004, Acier d'armature, Manuel de normes recommandées.
- .3 National Research Council Canada (NRCC) and Régie du bâtiment du Québec :
  - .1 Construction Code of Quebec – Chapter I, Building.
  - .2 National Building Code of Canada 2015 and the Structural Commentaries (User's Guide – NBC 2015: Part 4 of Division B).

#### **1.4 SAMPLING, TRIALS AND INSPECTION**

- .1 Always provide the Departmental Representative with free access to the plant and the construction site to enable him to verify, examine and supervise the quality of materials and their manufacture, and if required, take samples for testing, trial and analytical purposes.
- .2 Pouring of the concrete is not authorized before the Departmental Representative has inspected and approved the reinforcement in place.
- .3 At his request, send the Departmental Representative one (1) copy of the certificates issued by the steel mill attesting to the chemical composition and physical properties of the steel used to manufacture the reinforcement.
- .4 Upon request, inform the Departmental Representative regarding the proposed source of supply for the materials to be provided.



**1.5 SHOP DRAWINGS**

- .1 Submit for review and comments by the Departmental Representative, all shop drawings for all steel reinforcement for the work in compliance with the following requirements.
- .2 The format of the reinforcement drawings shall be the same as that of the drawings upon which they are based. The full project title and the name of the Departmental Representative, Professionals and the Contractors shall appear on each drawing.
- .3 Submitted drawings will be in the form of one (1) electronic copy of each reinforcement drawing. One (1) copy of each order slip will accompany the drawings. One (1) electronic copy of the commented shop drawings will be returned to the Contractor.
-  .4 ~~Drawings must bear the seal and signature of a qualified Engineer licensed or licensed to practice in the Province of Quebec, Canada.~~
- .4 The reinforcement drawing shall clearly indicate:
  - .1 The number, nominal diameter, length, position, spacing and bending details of each type of bar shown on the drawings.
  - .2 The bar-supports, separators, additional bars and other accessories required to support and fasten the reinforcements while the concrete is being poured.
- .5 When not specified in the plans:
  - .1 Reinforcement overlap and sealing lengths shall comply with the requirements of Articles 7 and 12 of the CAN/CSA-A23.3 standard. Unless otherwise indicated on the drawings, all overlaps shall be Class B (1.3 Lc), in compliance with Table 17b: pre-stressed overlapping requirements for upper reinforcement in the Reinforcing Steel Institute of Canada's manual of standard practice.
  - .2 Overall dimensions of hangers, ties and coils shall comply with the minimum concrete cover thicknesses stipulated in Article 6.6.2 of the CSA-CSA A23.1/A23.2 standard.
- .6 Unless otherwise indicated in the drawings, the hooks required at the end of certain bars, including hangers, ties and spirals are all "standard hooks", which shall comply with the description provided in Articles 6.6.2 of the CSA A23.1/A23.2 standard.
- .7 The reinforcement shall be marked so that it is quick and easy to find on the purchase orders.
- .8 The Contractor shall provide shop drawings, so the Departmental Representative has at least ten (10) working days to examine and comment on the shop drawings, which are submitted at each phase of the concrete work.

- .9 The reviewed shop drawings, which may or may not be annotated by the Departmental Representative, shall be returned to the Contractor, who shall revise these drawings and resubmit them to the Departmental Representative for review and comment, if required.
- However, if the Departmental Representative finds that too many revisions are required, he shall return the drawings without annotating them; in addition, if the drawings need to be submitted more than twice, the Departmental Representative shall withhold funds from the Contractor to pay for the cost of the Departmental Representative's additional reviews.
- .10 The Contractor is solely responsible for the accuracy of his drawings; he cannot claim any supplement for delays caused by the discovery, on site, of errors or omissions on his own drawings, even if they have been reviewed by the Departmental Representative.
- .11 Unless otherwise indicated, use steel reinforcement details that comply with the "Manuel des normes recommandées" published by the Institut d'acier d'armature du Québec.
- .12 Wait for final approval of the shop drawings before cutting and bending the rebar.
- .13 Submit the steel schedules that match the various shop drawings at the same time as the shop drawings.

## Part 2 Products

### 2.1 MATERIALS

Description	Standards
▪ High adherence billet-steel reinforcement bars, regular category (R).	CAN/CSA G30.18 Grade 400
▪ Weldable high adherence steel reinforcement bars made of low alloy weldable steel, weldable category (W).	CAN/CSA G30.18 Grade 400
▪ Tie wire, annealed cold-drawn steel wire	ASTM A82/A82M
▪ High adherence steel wire for concrete reinforcement, 16 gauge	ASTM A82/A82M
▪ Welded steel wire fabric provided in flat sheets only	ASTM A185/A185M
▪ High adherence welded steel wire fabric in flat sheets only	ASTM A82/A82M

Description	Standards
▪ Non-prestressed galvanized reinforcement	CAN/CSA G164
▪ Chairs, bar chairs, bar supports, spacers (rustproof)	CSA A23.1/A23.2
▪ Metal coupling	Reinforcement steel, “recommended standards manual” subject to the Departmental Representative’s approval
▪ Steel fibres	ASTM A820/A820M-16 NOVOCON 1050 (FE) type of SI Concrete Systems

**2.2 SUBSTITUTES**

- .1 Obtain the Departmental Representative’s written approval to substitute specified bars with bars of different dimensions, and to change spacing, overlapping or bending specified on the drawings.

**2.3 FORMING**

- .1 Form the bars at the factory, in compliance with requirements of the CAN/CSA-A23.1/A23.2 standard.
- .2 Unless otherwise indicated, forming tolerances are those indicated in Chapter 6 of the “Manuel des normes recommandées” published by the Institut d’acier d’armature du Québec. Bars that do not comply with these tolerances shall be rejected.

**2.4 IDENTIFICATION**

- .1 Clearly identify bar and wire fabric lots to conform to the shop drawings and steel schedules before shipping them to the construction site.
- .2 Use factory-labelled reinforcement bars. The label identifies the size, quality and manufacturer of the bar. All unlabelled bars shall be rejected.

**Part 3 Performance****3.1 ON-SITE BENDING**

- .1 Unless otherwise expressly indicated or authorized by the Departmental Representative, do not bend steel reinforcement bars on the construction site.

- .2 It is forbidden to bend rebar partially embedded in hardened concrete on site unless the Departmental Representative has authorized this procedure.

### **3.2 MANUFACTURE OF REINFORCEMENT**

- .1 The manufacture of the reinforcement shall not start until the Departmental Representative has reviewed the drawings of this reinforcement.
- .2 Cut and bend the bar in strict compliance with the details shown on the drawings and in accordance with the requirements of the CAN/CSA-A23.1/A23.2 standard.
- .3 No substitution of the bars shown on the reinforcement drawing shall be allowed without the Departmental Representative's authorization.
- .4 Take every precaution to avoid deforming or dirtying the reinforcement during transportation, handling and storage.

### **3.3 REINFORCEMENT INSTALLATION**

- .1 Assemble and install the rebar with care and tie them with black annealed drawn steel wire. Use a pattern and number of supports that comply with Section 6.6.8 of the CAN/CSA-A23.1/A23.2 standard.
- .2 Install the rebar and keep them in place during the pouring of the concrete in compliance with the tolerances stipulated in Section 6.6.8 of the CAN/CSA-A23.1/A23.2 standard.
- .3 Unless otherwise indicated on the drawings or in Section 3.6 of these specifications, the minimum concrete cover thickness around reinforcement bars is that stipulated for each of the various structural components in Article 6.6.6 of the CAN/CSA A23.1/A23.2 standard.
- .4 If required, before placing the rebar in the formwork, remove all excess rust, scale, mud, oil and any other dirt likely to reduce the concrete's adherence.
- .5 Use an adequate number of support bars of the height and rigidity required to ensure all concrete coverage of the rebar complies with the thicknesses stipulated on the drawings and in the standards.
- .6 Have the Departmental Representative approve the rebar and its installation, before pouring the concrete. The Departmental Representative shall have 48 hours to approve the steel reinforcement before the concrete is poured.

### **3.4 OVERLAPS**

- .1 Overlap the reinforcement as indicated on the drawings and typical details.

- .2 Overlapping lengths and extension lengths of bars beyond critical points shall comply with the CSA-A23.3 standard. Unless otherwise indicated on the drawings, all overlaps shall be Class B (1.3 Lc), in compliance with Table 17b: tension overlapping requirements for upper reinforcement in the Reinforcing Steel Institute of Canada's manual of standard practice.
- .3 Obtain the Departmental Representative's approval for the locations of reinforcement overlaps other than those shown on the drawings.
- .4 Overlap at least 150 mm of the surface of the wire fabric sheets, but never less than two mesh width.

### 3.5 WELDING

- .1 Do not weld steel rebar unless authorized in writing by the Departmental Representative.
- .2 Where permitted by the Departmental Representative, perform the rebar welding work in compliance with Section 6.6.10. of the CAN/CSA-A23.1/A23.2 standard and the requirements of the CSA W186 standard. When welding is performed, the use of category W weldable bars is mandatory.
- .3 All welding work shall be assigned to a company accredited by the Canadian Welding Bureau and shall be performed in compliance with the requirements of the most recent version of the CSA W186 standard. Prior to starting any welding work, submit to the Departmental Representative for verification, all details regarding the welds to be performed. In this case, the steel reinforcement to be welded shall comply with the requirements of the most recent version of the CSA G30.18 standard. Pre-heat all steel reinforcement as required by these standards.

### 3.6 REINFORCEMENT COVERAGE

- .1 Unless otherwise indicated on the drawings, the reinforcement bars shall be installed at the following specific distances from the surface of the concrete:

	Coverage
A) Concrete poured directly on the ground	75 mm
B) Concrete exposed to the ground or the weather	
a) Bars larger than 15 M in walls and slabs or main bars in beams and columns	40 mm
b) Bars 15 M or smaller	40 mm
c) Ties, hangers and spiral reinforcement	40 mm

	Coverage
C) Concrete not exposed to the weather Class N  a) Slabs (other): - top steel rebar - bottom steel rebar b) Curbs and coping c) Beams (main steel rebar) d) Columns (main steel rebar) e) Walls f) Ties, hangers and column's spiral reinforcement	25 mm 25 mm 50 mm 40 mm 50 mm 25 mm 40 mm
D) Concrete exposed to chlorine (exposure classes C-1, C-XL, C-3 and C-4)	The reinforcement coverage shall not be less than any of the following values; - 60 mm - twice the nominal diameter of the reinforcement - twice the maximum nominal diameter of aggregates

- .2 For conditions A-B-C of the preceding table, the ratio between coverage and the maximum size of the aggregate as well as the ratio between the coverage and the nominal diameter of the bars shall be at least 1.5 for concrete exposed to the ground and weather, and 1.0 for concrete not exposed to the ground and weather.

### 3.7 STORAGE AND DELIVERY

- .1 Deliver the reinforcement and wire fabric to the construction site in clearly identified lots.
- .2 Handle the reinforcement and wire fabric with care to avoid deforming them.
- .3 As soon as they are delivered on site, properly stack the steel reinforcement and wire fabric on wood skids to protect them against rust and keep them off the ground.
- .4 Cover all stored steel with a woven tarp to protect it from the weather.

- .5 During transportation and handling, use a covering to protect the parts of the bars coated with epoxy and paint.

### **3.8 CLEANING**

- .1 In order for the pouring of the concrete to take place, the condition of the reinforcement bars shall comply with Section 6.1.5 of the CAN/CSA A23.1/A23.2 standard.
- .2 If required, clean the reinforcement immediately before the concrete is poured.

### **3.9 REINFORCEMENT DOWELLING**

- .1 The installation of reinforcement dowels in concrete that has already been poured shall be performed using a high-performance epoxy-based system.
- .2 The sealing length of the dowels is that indicated in the sealing lengths table provided on the drawings.
- .3 Certain types of dowels shall have conical threads designed to work with anchors equipped with conical threads.

### **3.10 ON-SITE TOUCH-UPS**

- .1 Using a compatible finishing product, touch up damaged or cut ends of galvanized or epoxy-coated reinforcement to provide a continuous coat.

**END OF SECTION**

**Part 1        General****1.1        DESCRIPTION**

- .1        This section specifies the requirements regarding the providing, placement, finishing, protection and curing of the cast-in-place concrete.

**1.2        RELATED REQUIREMENTS**

- .1        The Contractor is responsible for reviewing the content of all sections listed below along with all other section of these specifications, even if they do not appear to pertain to his speciality. If he does not, it shall be understood that he agrees to the clauses and requirements of all sections in these specifications.
  - .1        03 10 00 Concrete Formwork
  - .2        03 15 00 Concrete Accessories
  - .3        03 20 00 Concrete Reinforcement
  - .4        03 35 00 Finishing of Concrete Slabs

**1.3        REFERENCE STANDARDS**

- .1        The following standards and publications are mentioned in this section of the specifications. They form an integral part of the specifications, and their provisions apply but are not limited by the other provisions of this section.
- .2        American Society for Testing and Materials (ASTM)
  - .1        ASTM C109/C109M-12, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 in. or 50 mm Cube Specimens).
  - .2        ASTM C260-10a, Air-Entraining Admixtures for Concrete.
  - .3        ASTM C309-11, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
  - .4        ASTM C332-09, Standard Specification for Lightweight Aggregates for Insulating Concrete.
  - .5        ASTM C494/C494M-13, Chemical Admixtures for Concrete.



- .6 ASTM C827/C827M-16, Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures.
- .7 ASTM C939/C939M-10, Standard Test Method for Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method).
- .8 ASTM D412-06 (2013), Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
- .9 ASTM D624-00 (2012), Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
- .10 ASTM D1751-04 (2013)e1, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
- .11 ASTM D1752-04a (2013), Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
- .3 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-37.2-M88, Emulsified Asphalt, Mineral-Colloid Type, Unfilled, for Damp proofing and Waterproofing and for Roof Coatings.
  - .2 CAN/CGSB-51.34-M86 Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
  - .3 ~~CGSB-81-GP-1M-77, Flooring, Conductive and Spark Resistant.~~
- .4 CAN/CGSB-51.34-M86 Vapour Barrier, Polyethylene Sheet for Use in Building Construction Canadian Standards Association (CSA)
  - .1 CAN/SA-A3000-13, Cementitious Materials Compendium: includes A3001, A3002, A3003, A3004 and A3005).
  - .2 CSA-A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction / Methods of Test and Standard Practices for Concrete.
  - .3 CSA-A23.3-14, Design of Concrete Structures.
  - .4 CSA A283-14, Qualification Code for Concrete Testing Laboratories.
- .5 National Research Council Canada (NRC) and Régie du bâtiment du Québec:
  - .1 Construction Code of Quebec – Chapter I, Building.




- .2 National Building Code of Canada 2015 and the Structural Commentaries (User's Guide – NBC 2015: Part 4 of Division B).
- .6 Bureau de normalisation du Québec
  - .1 BNQ 2621-905/2018, Béton prêt à l'emploi – Programme de certification (élaboré à partir des exigences des chapitres 4, 5 et 8 de la norme CSA A23.1-F14/A23.3-F14)

#### **1.4 SAMPLES**

- .1 At least four (4) weeks before beginning the work, advise the Departmental Representative regarding the proposed source of supply for the aggregates, and allow him to access the source for sampling purposes.

#### **1.5 CERTIFICATES**

- .1 At least (4) weeks prior to starting concrete work, provide the Departmental Representative with copies of the manufacturer's trial reports, as well as a certificate issued by a qualified independent testing and inspection laboratory attesting that the materials listed hereinafter will comply with the specified requirements.
  - .1 Portland Cement
  - .2 Blended Hydraulic Cement
  - .3 Supplementary Cementing Materials
  - .4 Grout
  - .5 Admixtures
  - .6 Aggregates
  - .7 Water
  - .8 Waterstops
  - .9 Waterstop Joints
  - .10 Joint Filler

- .2 Provide the mix formulas for approval by the Departmental Representative and a certificate attesting that the selected mix will produce concrete of the required quality, strength and performance, and that it complies with the requirements of the CSA-A23.1/A23.2 standard.
- .3 Provide a certificate attesting that the batching plant, equipment and materials that will be used to produce the concrete comply with the requirements of the CSA-A23.1/A23.2 standard.
- .4 All concrete must be produced and delivered by a concrete plant that possesses a certificate of compliance issued by the BNQ in accordance with the certification protocol BNQ 2621-905 « Béton prêt à l'emploi – Programme de certification (élaboré à partir des exigences des chapitres 4, 5 et 8 de la norme CSA A23.1-F14/A23.3-F14) ». A forementioned certificate must be provided.
-  .5 **The analysis certificates from the cement concrete supplier must be provided to the Departmental Representative for each type of concrete required for this project.**
- .6 The Departmental Representative's acceptance of the cement mix or mixes shall in no way release the Contractor from his responsibility to provide concrete whose properties, in both its elastic and hardened states, meet the requirements of these specifications.
- .7 All documents will be submitted in one (1) electronic copy. One (1) annotated electronic copy will be returned to the Contractor.

## 1.6 QUALITY ASSURANCE

- .1 At least four (4) weeks prior to starting concrete work, submit proposed quality control methods for approval by the Departmental Representative, regarding the following items:
  - .1 Erection of temporary shoring works
  - .2 Hot weather concreting
  - .3 Cold weather concreting
  - .4 Curing
  - .5 Finishes
  - .6 Stripping
  - .7 Joints

**Part 2 Products****2.1 MATERIALS**

- .1 Cement: Type GUL and/or GUB Portland cement that complies with the CSA-A3001 standard. Use a single recognized brand of cement, by type of concrete for the entire contract.
- .2 Fine aggregate: of normal density, complying with Article 4.2.3 of the CSA-A23.1/A23.2 standard. The aggregate may be natural sand or manufactured sand containing at least 20% natural sand.
- .3 Coarse aggregate: of normal density, complying with CSA-A23.1/A23.2 standard. The particles shall be clean, durable and free from dust and harmful materials. The maximum aggregate size shall be 20 mm, unless otherwise indicated. Subject to the Departmental Representative's approval, a 13 mm maximum aggregate size may be used in certain areas where concrete flow is restricted. Coarse aggregates must be of normal density. The quantity of flat and elongated particles shall be in accordance with Table 12 of CSA-A23.1 / A23.2 standard.
- .4 Mixing water complies: with CSA-A23.1/A23.2 standard.
- .5 Air-entraining admixture: complies with the ASTM C260 standard.
- .6 Chemical and pozzolanic mineral admixtures: comply respectively with the requirements of the ASTM C494/C494M and ASTM C1017/C1017M standards. The use of calcium chloride or admixtures that contain calcium chloride is not allowed. The Departmental Representative must approve accelerators or retarders during hot and cold weather concrete work.
- .7 Non-shrink mortar for concrete repairs: pre-mixed Portland cement-based product containing a non-metal aggregate and a plasticizer, capable of achieving at least 35 MPa of compression strength at seven (7) days.
- .8 Superplasticizer: complies with requirements of the ASTM C494/C949M standard.
- .9 Supplementary Cementing Materials: comply with the CSA-A3001 standard.
- .10 Cementitious hydraulic slag: complies with the CAN/CSA-A362 standard.
- .11 Set retarders: comply with the ASTM C494/C494M water-based, low VOC content, solvent-free standard. The set retarder film shall never be exposed to humidity.

## 2.2 MIX DESIGN

- .1 Assume responsibility for the mix of each type of concrete required, while taking into account the requirements described in Section 2.1 of these specifications and the following criteria in compliance with possibility No. 1 presented in Table 5 of the CSA-A23.1/A23.2 standard.

.1 Types of concrete:

- a) **Exposed concrete elements:** exterior slabs, entrance slabs and mechanical pit:
- tested compression strength: 35 MPa at 28 days
  - cement type: GUb-SF
  - exposure category (Table No. 1, CSA-A23.1/A23.2): C-1
  - maximum nominal size of coarse aggregate: 20 mm
  - air content: 5 to 8%
  - maximum mass ratio water / cement: 0,40
  - Desired field sagging: 80 mm ( $\pm$  30 mm)
  - Chemical admixtures: comply with the ASTM C494/C494M standard.
  - normal density concrete
- b) **Exterior concrete elements:** exterior foundation walls, pilasters, footings and mat footings:
- minimum tested compression strength: 30 MPa at 28days
  - cement type : GUL
  - exposure category (Table No. 1, CSA-A23.1/A23.2): F-2
  - maximum nominal size of coarse aggregate: 20 mm
  - air content: 4 to 7%
  - maximum mass ratio water / cement: 0,50

- Desired field sagging: 80 mm ( $\pm$  30 mm)
  - Chemical admixtures: comply with the ASTM C494/C494M standard.
  - normal density concrete
- c) **Interior concrete elements:** interior foundation walls, pilasters, footings, and interior slabs on grade:
- minimum tested compression strength: 30 MPa at 28 days
  - cement type : GUL
  - exposure category (Table No. 1, CSA-A23.1/A23.2): N
  - maximum nominal size of coarse aggregate: 20 mm
  - maximum mass ratio water / cement: 0,55
  - Desired field sagging: 80 mm ( $\pm$  30 mm)
  - Chemical admixtures: comply with the ASTM C494/C494M standard.
  - normal density concrete
- .2 Obtain the Departmental Representative's approval for all admixtures used in concrete mixes (superplasticizers and required air-entrainers or other admixtures needed for any specific purpose, designated by the Contractor). The use of calcium chloride is prohibited.
- .3 Provide a sample of the admixture(s) used, at the Departmental Representative's request.
- .4 Follow the manufacturer's instructions when using admixtures.
- .5 The Contractor is responsible for ensuring the admixtures are compatible with one another and with the materials included in the mix.
- .6 Enter the type and quantity of the admixture(s) used on the concrete shipping slip.
- .7 The use of an admixture shall never reduce the soundness of the concrete or its ability to withstand freezing and thawing.

**2.3 CONCRETE CONTROL**

- .1 Concrete quality control performed in compliance with the CSA-A23.1/A23.2 standard by a laboratory designated by the Departmental Representative.
- .2 Submit to the laboratory for approval, proposed formulas for batching the mixes for each class of concrete; specify the type and brand of all admixtures used.
- .3 Provide the laboratory with samples of the fine and coarse aggregates that will be incorporated into the concrete blends and identify the quarry they come from.  
  
Unless otherwise directed in writing by the Departmental Representative, also provide the laboratory with a document signed by a recognized petrographer certifying that none of the harmful alkali-aggregate and cement-aggregate reactions described in Appendix B of the CSA-A23.1/A23.2 standard are likely to occur in the concrete after it has been poured.
- .4 Notify the laboratory at least 24 hours before each concrete pour, whatever the volume involved.
- .5 Cooperate with sampling and facilitate testing. Provide free access to the structures. Provide the required concrete at no cost. If applicable, protect and provide a storage area for the samples taken.
- .6 The concrete's compression strength shall be checked during construction by taking 3 core samples per 75 m<sup>3</sup> poured or at least 3 core samples per pour. The Departmental Representative may ask the laboratory to produce a fourth core sample and let it cure on the construction site as a control sample. A sample shall be crushed on the 7<sup>th</sup> day; the two other samples shall be crushed on the 28<sup>th</sup> day.
- .7 The cylinders shall be numbered consecutively, and the laboratory report shall indicate the exact location of the concrete they represent in the framework, as well as the number of the truck that delivered the concrete.
- .8 The laboratory shall measure the concrete slump and air content every time it samples the concrete for strength tests and as often as necessary depending on the type of structure to be built.
- .9 Provide a sheltered location on site where the concrete core samples can be stored at an ambient temperature ranging from a minimum of 10°C to a maximum of 25°C before they are shipped to the trial laboratory.
- .10 If the core sample test results do not comply with Article 4.4.6.6 of the CSA A23.1/A23.2 standard, the Departmental Representative may require that Section 4.4.6.7 of the standard be applied.

- .11 The Contractor is solely responsible for all concrete work required to complete the structures as indicated on the drawings or stipulated in the Specifications. All work that does not meet the requirements of the Specifications, for any reason whatsoever (quality of materials, batching, placement, strength, impermeability, etc.), shall be modified in compliance with the Departmental Representative's requirements, or it shall be completely demolished and rebuilt in compliance with the provisions of the Specifications and drawings, at the Contractor's expense.

### **Part 3 Performance**

#### **3.1 REPARATION**

- .1 Ensure that the forms are erected and that they are clean and free of ice, snow and water, and that form reinforcement and hardware are installed in compliance with the requirements of Sections 03 10 00, 03 20 00 and 03 25 00 of the specifications.
- .2 Before starting the work, obtain the Departmental Representative's approval of the concrete placement methods, which shall comply with Section 7.2 of the CAN/CSA-A23.1/A23.2 standard.
- .3 Obtain the Departmental Representative's written authorization before performing the concrete work and notify him 24 hours before beginning the work. To notify the Departmental Representative, the « Avis de bétonnage » form from Stantec must be used and duly completed by the Contractor.
- .4 When concrete is pumped, concrete formulas must be adjusted accordingly. The concrete must maintain its characteristics until the exit of the pump's pipe.
- .5 Ensure that the reinforcement and embedded components are not moved while the concrete is being poured.
- .6 Before performing the concrete work, obtain the Departmental Representative's written authorization regarding the proposed method for protecting the concrete during the pour and the subsequent cure.
- .7 No concrete shall be poured without the Departmental Representative's written authorization.
- .8 Authorization to pour concrete shall only be provided once the Departmental Representative has completed his own inspection of the formwork and determined that the requirements of Article 3.1 appear to have been met.



- .9 It is forbidden to pour concrete when it is raining or snowing, unless the Departmental Representative provides the required authorization, being satisfied with the measures taken to shelter the concrete while it is being transported and placed.
- .10 The Departmental Representative's authorization to pour concrete when the outside temperature is below 5°C or above 25°C shall in no way release the Contractor from his full responsibility regarding the strength and soundness of the concrete to be poured.
- .11 Keep a concrete placement log, which indicates the date and location of each placement, the concrete's characteristics, the truck numbers, the ambient temperature, samples taken and other relevant information.
- .12 Immediately before placing the concrete, carefully clean and remove all waste and debris of any kind from the space the concrete will occupy.
- .13 In areas where new concrete is bonded to an existing structure, drill holes in the existing concrete and install steel dowels made of high adherence steel rebar in it and thoroughly embed the dowels with non-shrink epoxy grout to anchor and maintain them in the positions indicated.
- .14 No load shall be exerted on the new concrete components until the Departmental Representative has provided the required authorization.

### **3.2 MANUFACTURE AND DELIVERY OF THE CONCRETE**

- .1 Provide ready-to-use concrete manufactured in a concrete plant, transported and discharged at the site in compliance with Section 5.2 of the CAN/CSA-A23.1/A23.2 standard, or provide concrete manufactured on site, in compliance with all the requirements of that same section. If the second alternative is chosen, submit the entire procedure to the Departmental Representative for approval.
- .2 The manufacturer of the ready-to-use concrete is solely responsible for batching the concrete, and he shall personally, at his expense, take all necessary measures to ensure the quality and uniformity of his product.
- .3 Require that the concrete supplier provide a delivery slip for each load of concrete and provide the Departmental Representative with a copy of these slips. The slips shall contain the following information: name and address of the supplier's company, truck number, Contractor's name, project name and location, class of concrete, cumulative quantity, start of discharge, end of discharge, maximum size of aggregate, slump and air-entrainment required, types of admixtures used, quantity and type of cement and quantity of water.

- .4 The addition of water to the mix after the initial batching shall only be carried out in strict adherence with Article 5.2.4.3.2 of the CAN/CSA-A23.1/A23.2 standard, but the maximum quantity used shall be 6 l/m<sup>3</sup>. Submit all anticipated additions to the Departmental Representative for approval and control. Indicate on the delivery slip the quantity of all water added at discharge.
- .5 Plan the manufacture of the concrete and schedule the deliveries to the site so that each pour can be performed without any interruptions. Each batch of concrete shall be completely discharged into the forms within two (2) hours of beginning of batching.
- .6 Never remix concrete or mortar that has started to set.
- .7 The temperature of the concrete at discharge shall be within the range presented in Table 14 of the CAN/CSA-A23.1/A23.2 standard and shall be controlled according to Article 5.2.4.4 of the same standard. Use all protective measures required for this purpose.
- .8 No aluminum component shall be used to batch, transport or place the concrete.

### **3.3 IMPLEMENTATION**

- .1 Place the concrete in compliance with the requirements of the CAN/CSA-A23.1/A23.2 standard.
- .2 Carry out the consolidation of the concrete using models and sizes of mechanical vibrators approved by the Departmental Representative.
- .3 Select an appropriate type and number of vibrators and use them in accordance with Section 7.2.5 of the CAN/CSA-A23.1/A23.2 standard.
- .4 Bind the fresh concrete with rock or hardened concrete in accordance with Section 7.2.2 of the CSA-A23.1/A23.2 standard.
- .5 Saturate hardened concrete surfaces with water immediately before pouring concrete on these surfaces.
- .6 Lay the concrete without interruption or in layers thick enough that each new layer will bind with the underlying layers before they have hardened enough to form cold joints.
- .7 If difficulties arise during pouring, change the concrete formula following the laboratory's directives and use the admixture(s) prescribed by the laboratory, and assume all expenses for this procedure.
- .8 Adding a superplasticizer to the concrete before it has been poured into the forms is mandatory when pouring walls (including retaining walls) and columns.

**3.4 CONCRETE CURING**

- .1 The concrete shall be cured according to the requirements of section 7.4 of the CSA-A23.1/A23.2 standard. Walls and slabs 500 mm thick or thicker are considered mass concrete.
- .2 The use of curing compounds is prohibited.
- .3 The concrete of walls and other vertical elements shall be cured using two layers of jute always kept moist.
- .4 The concrete of slabs shall be cured using a cover always kept moist,
- .5 Slabs and other unformed surfaces shall be kept moist for a period of at least 7 days.
- .6 Walls, beams, columns and other formed surfaces shall undergo the following 7-day curing schedule:
  - .1 forms left in place: 3 days;
  - .2 moist curing after removal of the forms: 4 days.
- .7 When the outside temperature exceeds 20°C for mass concrete or otherwise 27°C, keep the forms moist before pouring the concrete and throughout the entire time they remain in place.
- .8 In cold weather, water curing ends 12 hours before the end of protection.
- .9 Throughout the entire cure, the concrete shall never be under any load and shall be adequately protected against violent shocks, excessive vibration, weather and other disturbances.
- .10 The supply, installation and maintenance of all falsework and devices required for the curing and protection of the concrete in hot or cold weather, as well as the powering of the equipment, are part of the contract work. The Contractor must cover all related costs.

**3.5 CONCRETE PROTECTION**

- .1 In hot weather, the concrete shall be protected according to Article 7.4.1.4 of the CSA-A23.1/A23.2 standard.
- .2 Concrete components containing silica fume shall be protected from drying according to Article 7.4.1.2 of the CSA-A23.1/A23.2 standard.

- .3 Other concrete components shall be protected from dryout based on Appendix D of the CSA-A23.1/A23.2 standard.
- .4 In cold weather, the concrete shall be protected according to Article 7.4.1.5 of the CSA-A23.1/A23.2 standard.
- .5 Methods for protecting concrete in cold weather are detailed in Chapter 7.4.1.5.3 of CSA-A23.1/A23.2 standard.

### **3.6 FINISHING OF FORMED SURFACES**

- .1 Clean and finish the formed surfaces in compliance with Section 7.7.2 of the CSA-A23.1/A23.2 standard. Visible surfaces in completed buildings require smooth formed surfaces in accordance with Article 7.7.3.6 of the CSA-A23.1/A23.2 standard.

All other surfaces require a rough formed surface in accordance with Article 7.7.2.5 of the CSA A23.1/A23.2 standard.

- .2 Fill the holes left by the form ties in compliance with Section 03 10 00 of these specifications.
- .3 Make sure to control the emission of crystalline silica dust when polishing the concrete.

### **3.7 CONCRETE PREPARATION**

- .1 Remove and replace all damaged or defective concrete with concrete that meets the specifications and requirements of the drawings.
- .2 After the forms have been removed, the Departmental Representative shall examine all voids, honeycombs and other defects. If applicable, submit the methods for repairing the voids, honeycombs and other defects to the Departmental Representative for approval. Do not repair any of the surfaces before having received the Departmental Representative's authorization.
- .3 Wherever possible, repair formed surfaces as soon as possible after the forms have been removed.
- .4 Cover the concrete surfaces with a cement-latex slurry or an epoxy-based glue before performing concrete or mortar repairs.
- .5 The product used shall comply with Section 2.1.7 of this section.
- .6 Make sure to control the emission of crystalline silica dust during activities that can generate dust.

**3.8 CUTS, DRILL HOLES AND CUT-OUTS IN HARDENED CONCRETE**

- .1 Components that have already been poured shall never be cut, drilled or cut-out for any reason whatsoever, unless the Departmental Representative has authorized these procedures.
- .2 Any cut, drill hole or cut-out in hardened concrete authorized by the Departmental Representative shall be performed at the specific location, using the exact dimensions he has approved. Use rotary tools that prevent the concrete from shattering.
- .2 Make sure to control the emission of crystalline silica dust during sawing, drilling or any other intervention on concrete that can generate dust.

**3.9 TOLERANCES**

- .1 If the tolerances specified in Article 6.4 of the CSA-A23.1/A23.2 standard have not been met during the construction of any component of a structure shown on the drawings, the Departmental Representative may require that this component be demolished and rebuilt according to the tolerances of said article, at no additional expense to the Departmental Representative.

**3.10 CONSTRUCTION JOINTS**

- .1 Follow the indications of Section 7.3 of the CSA-A23.1/A23.2 standard for construction joints.
- .2 The Departmental Representative shall approve the location of the construction joints that demarcate each concrete pour. If the Departmental Representative deems it appropriate, he may require that these joints be brought closer together or relocated.
- .3 None of the construction joints already indicated on the drawings shall be moved or eliminated without prior authorization from the Departmental Representative.
- .4 Immediately before resuming pouring against a construction joint or above it, clean and score the surface of the hardened concrete to eliminate all loose fragments and any trace of bleeding, moisten the surface and allow to dry to obtain saturated, dry surface conditions.
- .5 Install 80 mm thick shear keys on construction joints along the entire length/height of the component, of a width equal to one-third the thickness of the component. Slightly bevel the sides of the shear keys.

- .6 For vertical components (walls, strip footings) construction joints shall be a maximum of 20 m apart. For structural raft foundation and slabs install construction joints with maximum 20 m x 20 m spacing. Submit the location of the construction joints to the Departmental Representative.
- .7 Allow a section to cure for a minimum of 7 days before pouring a new section next to it.

### **3.11 WATERSTOPS**

- .1 Where indicated on the drawings, install waterstops to provide continuous watertightness. Do not bend or puncture the waterstops to avoid hindering their performance. Do not move the reinforcement when installing waterstops. Splice waterstops on site using equipment that complies with the manufacturer's requirements. Firmly secure the waterstops before the concrete is poured.
- .2 Joints butt-welded on site are only allowed between the points of intersection of the straight lengths. Weld the intersecting parts on site.
- .3 Where indicated on the drawings, install weather-stripping and waterstops for cold joints to provide continuous watertightness. Strictly follow manufacturer recommendations regarding the installation, handling and materials required for each type to be used. Submit for the Departmental Representative's approval the installation method for each type used, in keeping with the manufacturer's recommendations.

### **3.12 CONCRETE SCREEDS**

- .1 Place concrete screeds as per drawings in accordance with section 7.6 of CSA-A23.1/A23.2 standard.
- .2 Clean the concrete surface, to eliminate all demolished concrete and dirt and to remove all dust. The concrete surface must be clean and rough.
- .3 Clean the existing rebar by grinding or other method (no sand or water blast permitted).
- .4 Replace or anchor new rebar (if required) if existing rebar is in bad condition.
- .5 On existing concrete surfaces, prepare surface in accordance with clause 7.6.4.1 of CSA A23.1/A23.2 standard, to remove all laitance, dirt, dust, debris, grease and other substances which could inhibit bond between existing concrete and new concrete. However, only methods c) and d) of clause 7.6.4.1 are allowed.
- .6 Have cleared surfaces approved by the Departmental Representative before applying the bonding product.

- .7 Apply bonding agent immediately before placing new concrete, in compliance with requirements of section 7.6.4.2 « Système de liaisonnement » of A-23.1/A23.2 standard as well as the following requirements:
  - .1 Keep the slab surface continuously wet prior to the placement of the concrete screed.
  - .2 Moisten the surface as per the bonding agent's manufacturer's recommendations.
- .8 Pour and finish the surface of the concrete screed in accordance with clause 3.6 of this section of the specifications.

### **3.13 ON-SITE QUALITY CONTROL**

- .1 A testing laboratory designated by the Departmental Representative shall inspect and test the concrete and its constituents in accordance with the CSA-A23.1/A23.2 standard.
- .2 The owner shall assume all costs for the trials.
- .3 The Laboratory shall take additional core samples during cold weather concrete work. These core samples shall be cured on site, under the same conditions as the concrete pours they represent.
- .4 Non-destructive concrete trials shall be performed according to the methods described in the CSA-A23.1/A23.2 standard.
- .5 The inspection and trials performed by the Laboratory shall not replace or finalize the quality control performed by the Contractor, nor shall they release the Contractor from his contractual obligations in this respect.

### **3.14 CLEANING**

- .1 Provide on site, adequate space for safe washing of concrete trucks.
- .2 Dispose of waste in accordance with the requirements of provincial/territorial and federal local regulations.

**END OF SECTION**

**PART 1 GENERAL****1.1 RELATED REQUIREMENTS**

- .1 Division 01- General Requirement (All sections)
- .2 Section 06 10 53 – Miscellaneous rough carpentry
- .3 Section 07 21 13 – Board insulation
- .4 Section 07 21 16 – Blanket insulation
- .5 Section 07 26 00 – Vapour retarders
- .6 Section 07 92 00 – Joint sealants
- .7 Section 08 34 63.13 – Metal doors and frames for detention purposes
- .8 Section 08 50 00 – Windows

**1.2 REFERENCE STANDARDS**

- .1 Conform to latest date of issue of referenced standards in effect on date of submission of Bids, except where specific date or issue is specifically noted in specifications. When standard is listed in the current NBC, conform to date of issue indicated in latest revision of NBC.
- .2 American Society of Mechanical Engineers (ASME)
  - .1 ASME B18.6.3, Machine Screws, Tapping Screws, and Metallic Drive Screws (Inch Series).
- .3 ASTM International
  - .1 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  - .2 ASTM A924, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
  - .3 ASTM D523- Standard Test Method for Specular Gloss, appearance, directional reflectance factor, gloss, goniphotometry, high gloss, relative
  - .4 ASTM D4145 -Standard Test Method for Coating Flexibility of Prepainted Sheet , coating flexibility, prepainted sheet, T-bend flexibility, Prepainted steel sheet
  - .5 ASTM D4214- Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films , chalking, evaluation, exterior paint films
  - .6 ASTM D5402 -Standard Practice for Assessing the Solvent Resistance of Organic Coatings Using Solvent Rubs , coating, curing characteristics, double rub method
  - .7 ASTM D5796 - Standard Test Method for Measurement of Dry Film Thickness of Thin-Film Coil-Coated Systems by Destructive Means Using a Boring Device
  - .8 ASTM E330 – Standard Test Method for Structural Performace by Static Pressure Difference



- .9 ASTM G26- Practice for Operating Light-Exposure Apparatus (Xenon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials
- .4 CSA Group
  - .1 CSA B111, Wire Nails, Spikes and Staples (Clous, fiches et cavaliers en fil d'acier).
  - .2 CAN/CSA S136 - North American Specification For The Design Of Cold-Formed Steel Structural Members
- .5 Underwriters Laboratories (UL)
  - .1 UL 2761 Sealants and Caulking Compounds
- .6 ULC Standards
  - .1 CAN/ULC-S706, Standard for Wood Fibre Insulating Boards for Buildings.
  - .2 CAN/ULC-S741, Standard for Air Barrier Materials – Specification.

### 1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for metal siding and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit two copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Shop Drawings:
  - .1 The drawings must indicate the dimensions and the profile of the elements, the methods of fixing, the level dimensions of the walls, the details of the trim and the closing pieces, the edges of the roof, the furring, as well as related works.
- .4 Samples:
  - .1 Submit duplicate 300mm x 300mm sample.

### 1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00- Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for installed products for incorporation into manual.

### 1.5 ACCEPTABLE MATERIALS OR PRODUCTS

- .1 When materials or products are prescribed by their trademark, consult the Instructions to bidders for the procedure to follow regarding the request for approval of replacement materials or products.

**1.6 QUALITY ASSURANCE**

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Installer Qualifications: minimum three years documented experience with products specified.
- .4 Mock-Up:
  - .1 Provide site mock-up for work of this Section indicating methods and materials, and procedures proposed to achieve final results in accordance with Section 01 45 00– Quality Control, and to comply with following requirements, using materials indicated for completed work:
    - .1 Build mock-ups in location and of size as directed by Departmental Representative.
    - .2 Obtain Departmental Representative's acceptance of mock-ups before starting construction; mock-up used throughout construction period as standard of acceptance for subsequent work.
    - .3 Mock-up may form part of permanent structure when accepted by Departmental Representative ; repair or replace unacceptable mock-ups at no additional cost to Owner.

**1.7 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00- Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

**1.8 SITE CONDITIONS**

- .1 Execute work of this Section within environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer.

**1.9 WARRANTY**

- .1 With regard to Section 07 46 19, the warranty period of 12 months prescribed in the General Conditions, is extended to 40 years for finishes of steel siding.

**PART 2 PRODUCTS****2.1 PERFORMANCE CRITERIA**

- .1 Calculate the steel siding in accordance with CAN / CSA-A136 and CSA-S136.1.
  - .1 Design elements so that they can withstand static load, wind loads and seismic loads in accordance with CNB requirements for the work area.
  - .2 The maximum allowable bending of metal coverings is 1/180 of the span.
- .2 Design metal panels in such a way that they can allow expansion and contraction of their component materials, observed in an ambient temperature range of - 40°C to + 65°C.
- .3 The installation of the steel siding must allow thermal expansion and contraction movements of the component materials, according to the thermal differences indicated in the design parameters, without exerting excessive stresses on the fasteners, nor causing buckling of the components. panels, broken gaskets or any other deterioration.
- .4 Design the joints so that they can absorb the expansion and contraction movements between the panels themselves and between the panels and the building frame, taking into account the anticipated movements of the frame.
- .5 Install the panels in such a way as to ensure the effective evacuation to the exterior of the condensation water which forms inside the walls and of the rainwater which enters through the joints, according to the "principle of the rain screen".
- .6 The final work must be free from vibrations, wind whistles and noise due to thermal, structural or wind pressure movements.
- .7 Design the steel siding taking into account the tolerances prescribed for the assembly of the frame.

**2.2 MATERIALS**

- .1 Hot dipped galvanized steel sheet: to ASTM A924M, commercial grade, coated on each side with a layer of zinc of 275 g/m<sup>2</sup> (designation Z275) according to ASTM A653 / A653M.
- .2 Steel siding identified **RM1** in the documents: Steel siding system, pre-painted, in prefabricated panels, nominal steel thickness of 0.61mm (24 gauge), without visible screws, with screwless staple, height of the staples of 27mm (1-1 / 16in), with anti-siphon space inside the clips, clips hidden under the panels.
  - .1 Widths panels: Three widths required, arranged as indicated on the drawings;
    - .1 488mm, 390mm and 286mm.
  - .2 Installation: Vertical installation, full height, without intermediate joint.
- ADD 01** .3 **Color: In the manufacturer's standard range. As indicated on the drawings.**
- .4 Finish: 70% Kynar500 / Hylar500 PVDF fluopolymer paint, in accordance with AAMA 2605. Protective primer on the back.
- ADD 01** .3 **Perforated soffit: Same material and finish as RM1, with perforation, according to manufacturer's standards.**
- .4 Carpentry: In accordance with section 06 10 53 - Miscellaneous rough carpentry

- .5 Sealants: in accordance with section 07 92 00 – Joints sealants

### **2.3 ACCESSORIES**

- .1 Visible trims: re-entrant and protruding corner pieces, counter flashings, coping strips, mud flaps, starter strips, sill and sill trims as well as framing trims window and door must be the same color as the cladding, and be pre-drilled to accommodate the fasteners.
  - .1 Hot dipped galvanized steel sheet: steel conforming to ASTM A924M, commercial grade, coated on each side with a layer of zinc of 275 g / m<sup>2</sup> (designation Z275) according to ASTM A653 / A653M .

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts acceptable in accordance with manufacturer's written instructions.
  - .1 Check dimensions, tolerances and methods of anchoring to adjacent structures.
  - .2 Ensure that adjacent materials are compatible with each other.
  - .3 Inspect all panels and accessories immediately after delivery and reject any damaged material.

### **3.2 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

### **3.3 INSTALLATION**

- .1 Install steel siding in accordance with manufacturer's written instructions and drawings indications.
- .2 Install metal cladding panels vertically, as indicated on drawings. Panels must be full height, with no intermediate joint.
- .3 Install continuous starter strips, inside and outside corners, edgings, soffit, drip, cap, sill and window/door opening flashings as indicated.
- .4 Install outside corners, fillers and closure strips with carefully formed and profiled work.
- .5 Attach components in manner not restricting thermal movement.
- .6 Caulk junctions with adjoining work with sealant. Do work in accordance with Section 07 92 00- Joint Sealants.

### **3.4 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00- Cleaning.
  - .1 Leave Work area clean at end of each day.

- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00- Cleaning.
- .3 Waste Management: separate waste materials for reuse, recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**3.5 PROTECTION**

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

**END OF SECTION**

**PART 1 GENERAL****1.1 RELATED REQUIREMENTS**

- .1 Division 01- General Requirement (All sections)
- .2 Section 06 10 53 – Miscellaneous rough carpentry
- .3 Section 07 21 13 – Board insulation
- .4 Section 07 21 16 – Blanket insulation
- .5 Section 07 26 00 – Vapour retarders
- .6 Section 07 92 00 – Joint sealants

**1.2 REFERENCE STANDARDS**

- .1 Conform to latest date of issue of referenced standards in effect on date of submission of Bids, except where specific date or issue is specifically noted in specifications. When standard is listed in the current NBC, conform to date of issue indicated in latest revision of NBC.
- .2 ASTM International (ASTM)
  - .1 ASTM D5116, Standard Guide For Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.
- .3 CSA Group
  - .1 CSA B111, Wire Nails, Spikes and Staples.
  - .2 CSA O121, Douglas Fir Plywood.
  - .3 CSA O151, Canadian Softwood Plywood.
- .4 National Lumber Grading Authority (NLGA)
  - .1 NLGA Standard Grading Rules for Canadian Lumber.
- .5 Sustainable Forestry Initiative (SFI)
  - .1 SFI, Standard.
- .6 Underwriters Laboratories (UL)
  - .1 UL 2761, Sealants and Caulking Compounds.
- .7 ULC Standards (ULC)
  - .1 CAN/ULC-S741, Standard for Air Barrier Materials – Specification.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:

- .1 Submit manufacturer's instructions, printed product literature and data sheets for wood siding and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Submit two copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Shop Drawings:
  - .1 Indicate dimensions, siding and soffit profiles, attachment methods, schedule of wall elevations, trim and closure pieces, furring , and related work.
- .4 Samples:
  - .1 Submit duplicate 3000mm x 300mm each siding type and finish.

#### **1.4 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00- Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for [installed products] for incorporation into manual.

#### **1.5 ACCEPTABLE MATERIALS OR PRODUCTS**

- .1 When materials or products are prescribed by their trademark, consult the Instructions to bidders for the procedure to follow regarding the request for approval of replacement materials or products.

#### **1.6 QUALITY ASSURANCE**

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Mock-Up:
  - .1 Provide site mock-up for work of this Section indicating methods and materials, and procedures proposed to achieve final results in accordance with Section 01 45 00– Quality Control, and to comply with following requirements, using materials indicated for completed work:
  - .2 Build mock-ups in location and of size as directed by Departmental Representative.
  - .3 Obtain Departmental Representative acceptance of mock-ups before starting construction; mock-up used throughout construction period as standard of acceptance for subsequent work.
  - .4 Mock-up may form part of permanent structure when accepted by Departmental Representative.

#### **1.7 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00- Common Product Requirements] [with manufacturer's written instructions.

- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

## 1.8 SITE CONDITIONS

- .1 Execute work of this Section within environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer.

## 1.9 WARRANTY

- .1 With regard to Section 07 46 23, the 12 month warranty period prescribed in the General Conditions is extended as follows:
  - .1 Guarantee against wood rotting: 50 years
  - .2 Warranty on 2-coat opaque stain: 15 years
  - .3 Guarantee on natural dye: 8 years
  - .4 Labor warranty: 5 years.

## PART 2 PRODUCTS

### 2.1 MATERIALS

- .1 Timber cladding: in accordance with classification rules for Canadian lumber established by the National Commission for the classification of sawn timber (NLGA).
  - .1 **Siding identified RB-1 in documents: Siding of real kiln-dried spruce wood, humidity between 12% and 16%.**
  - .2 **Boards minimum 115mm wide x 16mm thick x 4.9m long, laid vertically, with concealed nail system.**
  - .3 **Wood finish: brushed texture, acrylic stain finish, one opaque layer and one semi-transparent layer, satin. Finish applied at the factory on the 6 sides of the boards, color chosen by the Departmental representative.**
  - .4 Profile of boards: "Modern" profile, with 14mm overlap.
- .2 Fasteners: nails conforming to CSA B111, in aluminum or hot-dipped galvanized steel, dimensions according to requirements, type recommended by the wood coating manufacturer.
- .3 Visible trims: re-entrant and protruding corner pieces, counter flashings, coping strips, mud flaps, starter strips, sill and sill trims as well as framing trims window and door must be the same color as the cladding, and be pre-drilled to accommodate the fasteners.

ADD 01



- .4 Hot dipped galvanized steel sheet: steel conforming to ASTM A924M, commercial grade, coated on each side with a layer of zinc of 275 g / m2 (designation Z275) according to ASTM A653 / A653M.
- .5 Wood furs: Dried cedar. Dimensions as indicated in the drawings.
- .6 Joints sealants: in accordance with section 07 92 00- Joints sealants

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts acceptable in accordance with manufacturer's written instructions.

#### **3.2 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

#### **3.3 PREPARATION**

- .1 Clean surfaces thoroughly prior to installation.
- .2 Repair substrate flaws or defects before applying siding or soffits.
- .3 Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under project conditions.

#### **3.4 INSTALLATION**

- .1 Install wood furring as indicated on drawings.
- .2 Install wood coverings in accordance with manufacturer's written instructions.
- .3 Install flashings and sill and sill trims, wooden starter strips, re-entry corner pieces, edging and flashing as well as door and window opening trims.
- .4 Install the wood plank siding in straight lengths and aligned with the furring as indicated on the drawings.
- .5 Stagger butt joints at least 800 mm and distribute them evenly over wall surfaces. Seal the trimmed ends and, in the case of vertical siding, trim the angle outward.

#### **3.5 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00- Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00- Cleaning.
- .3 Waste Management: separate waste materials for reuse, recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

- .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**3.6 PROTECTION**

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

**END OF SECTION**

**PART 1 GENERAL****1.1 RELATED REQUIREMENTS**

- .1 Division 01- General requirement (All sections)
- .2 Section 06 10 53 – Miscellaneous rough carpentry
- .3 Section 07 21 13 – Board insulation
- .4 Section 07 26 00 – Vapour retarders
- .5 Section 07 92 00 – Joint sealants
- .6 Division 22 – Plumbing (All sections)

**1.2 REFERENCES**

- .1 Conform to latest date of issue of referenced standards in effect on date of submission of Bids, except where specific date or issue is specifically noted in specifications. When standard is listed in the current NBC, conform to date of issue indicated in latest revision of NBC.
- .2 Aluminum Association (AA)
  - .1 DAF-45 - Designation System for Aluminum Finishes - 9th Edition.
  - .2 ASM-35 - Specifications for Aluminum Sheet Metal Work in Building Construction, Section 5.
- .3 Architectural Aluminum Manufacturers Association (AAMA)
  - .1 AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Chrome Pretreatments.
- .4 ASTM International
  - .1 ASTM A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
  - .2 ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
  - .3 ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .4 ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot Dip Process.
  - .5 ASTM A924M - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
  - .6
  - .7 ASTM B32 - Standard Specification for Solder Metal.
  - .8 ASTM D523 - Standard Test Method for Specular Gloss.

- .9 ASTM D822 - Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
- .10 ASTM D968 - Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive.
- .11 ASTM D1970 – Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials used as Underlayment.
- .12 ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials
- .13 ASTM E 96 – Standard Test Methods for Water Vapor Transmission of Materials.
- .14 ASTM E331 - Standard Test Method For Water Penetration Of Exterior Windows, Skylights, Doors, And Curtain Walls By Uniform Static Air Pressure Difference
- .1 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-37.5 - Mastic plastique de bitume fluxé.
  - .2 CAN/CGSB-37.29 - Mastic d'étanchéité à base de caoutchouc et de bitume.
  - .3 CAN/CGSB-51.32 - Membrane de revêtement, perméable à la vapeur d'eau.
  - .4 CAN/CGSB-93.1 - Tôle d'alliage d'aluminium préfinie, pour bâtiments résidentiels.
- .2 Groupe CSA (CSA)
  - .1 CSA A123.3- Asphalt Saturated Organic Roofing Felt.
- .3 Underwriters Laboratories' of Canada (ULC)
  - .1 CAN/ULC-S107, Méthode normalisée d'essai de résistance au feu des matériaux de couverture.
  - .2 CAN/ULC-S701, Isolant thermique en polystyrène, panneaux.
  - .3 CAN/ULC-S706, Norme sur l'isolant thermique en fibre de bois pour bâtiments.
  - .4 CAN4-S102.2, Surface Burning Characteristics
- .4 Santé Canada - Système d'information sur les matières dangereuses utilisées au travail (SIMDUT)
  - .1 Fiches signalétiques (FS).
- .5 National building code – Canada (CNB).
  - .1 CCMC- Recueils d'évaluations de produits.

### 1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

- .2 Product Data:
  - .1 Submit required technical data sheets as well as manufacturer's instructions and documentation for sheet metal roofing. The technical sheets must indicate the characteristics of the products, the performance criteria, the dimensions, the limits and the finish.
  - .2 Provide two copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Shop drawings:
  - .1 The submitted shop drawings must bear the seal and signature of a competent engineer recognized or authorized to practice in the province of Quebec, Canada.
  - .2 The drawings must indicate the dimensions and profiles of the elements, the fixing methods, the plans of the roofs, the nature of the materials and the finishes, the details of the upstands, valleys, ventilation openings, ties, details of trim and joint covers, soffits, roof edges and compliance with related work requirements.
- .4 Sample:
  - .1 Submit two (2) samples of 300 mm x 300 mm of each type of sheet or metal sheet proposed.
- .5 Manufacturer's Installation Instructions: indicate special precautions required for seaming the membrane.

#### **1.4 DOCUMENTS / ELEMENTS TO BE SUBMITTED ON COMPLETION OF THE WORK**

- .1 Submit the documents / items required in accordance with section 01 78 00 - Documents / Items to be submitted upon completion of the work.
- .2 Operation and maintenance documents: provide instructions relating to operation and maintenance, which will be incorporated into the O&M manual.

#### **1.5 ACCEPTABLE MATERIALS OR PRODUCTS**

- .1 When materials or products are prescribed by their trademark, consult the Instructions to bidders for the procedure to follow regarding the request for approval of replacement materials or products.

#### **1.6 QUALITY ASSURANCE**

- .1 Test reports: submit test reports certifying that products, materials and equipment meet the requirements for physical characteristics and performance criteria.
- .2 Certificates: submit documents signed by manufacturer, certifying that products, materials and equipment meet the requirements for physical characteristics and performance criteria.

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.3 Work samples

- .1 Complete samples, on site, for the work in this section. Indicate the methods and materials proposed in order to obtain the expected results in accordance with section 01 45 00 - Quality control, and in order to comply with the following requirements using the materials indicated for the completion of the work.
- .2 Fabricate samples at location indicated and size required by Departmental Representative.
- .3 Obtain approval of samples before starting construction; the samples will be used as a standard to approve all subsequent work, for the duration of the work.
- .4 The sample can be part of the permanent structure if it has been accepted by the Departmental representative.

**1.7 FIRE PROTECTION**

- .1 Fire Extinguishers:
  - .1 ULC labelled for A, B and C class protection.
- .2 All work, including post-work monitoring, shall be conducted in accordance with the AMCQ Fire Prevention Manual.

**1.8 SITE CONDITIONS**

- .1 Ambient Conditions
  - .1 Do not install roofing when temperature remains below -18 degrees C for torch application, or to manufacturers' recommendations for mop application.
  - .2 Minimum temperature for solvent-based adhesive is -5 degrees C.
- .2 Install roofing on dry deck, free of snow and ice, use only dry materials and apply only during weather that will not introduce moisture into roofing system.

**1.9 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions and Section 01 61 00 - Common Product Requirements.
- .2 Delivery and acceptance: deliver materials and equipment to site in their original packaging, which must bear a label indicating the name and address of the manufacturer.
- .3 Storage and Handling Requirements:
  - .1 Storage and handling: .1 Store materials and equipment so that they do not rest on the ground, in a clean, dry and well ventilated place, in accordance with the manufacturer's recommendations.
  - .2 Replace damaged materials and equipment with new materials and equipment.
- .4 Packaging Waste Management: remove for reuse of pallets, crates and packaging materials in accordance with Section 01 74 19 - Waste Management and Disposal.

**1.10 WARRANTY**

- .1 With regard to Section 07 61 00, the 12-month warranty period prescribed in the General Conditions is extended to five (5) years on all roofing works.
- .2 Manufacturer's warranty on metal coating finish: Forty (40) years.

**PART 2 - PRODUCTS****2.1 PERFORMANCE CRITERIA**

- .1 Ensure the compatibility of products and materials forming part of the roofing system.
- .2 The roof must correspond to a Class A, B or C (ULC) roof according to the CAN / ULC-S107 standard.
- .3 The dynamic pullout resistance due to wind loads must be defined according to the data provided by the National Research Council of Canada (NRC) on site, at the following address:
  - .1 <https://www.nrc-cnrc.gc.ca/eng/services/windrci/accord.html>
  - .2 The calculation must take into consideration the location of the building, its height, dimensions and use.
  - .3 Elements must be able to withstand static load and wind loads in accordance with CNB requirements and relevant local regulations.
- .4 Metal roof panels must be designed so as to allow thermal expansion and contraction movements of the component materials at a differential temperature of approximately 100° C without exerting excessive stresses on the fasteners, nor causing buckling of the components, panels, broken gaskets or any other deterioration.
- .5 Joints must be designed to be able to absorb expansion and contraction movements between the panels themselves and between the panels and the building frame, movements caused by displacements of the frame, without any deformation, permanent damage, damage to filling materials, broken construction and waterproofing joints or water infiltration.
- .6 The panels must be designed taking into account the tolerances prescribed for the assembly of the supporting framework.

**2.2 SHEET ROOFING**

- .1 Hot dipped galvanized steel sheet: steel conforming to ASTM A924M, commercial grade, coated on each side with a layer of zinc of 275 g / m<sup>2</sup> (designation Z275) according to ASTM A653 / A653M .
- .2 Metallic coating identified **RM1** in the documents: Metal coating system in prepainted steel, nominal steel thickness of 0.61mm (24 gauge), without visible screws, with screwless staple, 488mm (19.2in) interlocking ) c / c, staple height of 27mm (1-1 / 16in), with anti-siphon space inside the staples, fasteners concealed under the panels.
  - .1 Widths: As indicated on the drawings.
  - .2 Color: As indicated on the drawings.

- .3 Finish: 70% Kynar500 / Hylar500 PVDF fluopolymer paint, in accordance with AAMA 2605. Protective primer on the back.
- .4 Manufacturer's warranty on finish: Forty (40) years.
- .3 Sealants: in accordance with section 07 92 00- Sealants for joints.
- .4 Carpentry: In accordance with section 06 10 53 - Miscellaneous rough carpentry.

## 2.3 MEMBRANES

- .1 Underlayment membrane identified as **type 12** in the documents:
  - .1 Self-adhesive membrane for high temperature use, made of a high melting point SBS rubberized bitumen compound fully laminated to a crossed polyethylene film, designed for self-adhesive application to a prepared substrate, flexible at low temperature, impermeable to air, moisture and water.
  - .2 Thickness: 1.0mm (40 mils)
  - .3 Air tightness (ASTM E2178): less than 0.004 ft<sup>3</sup>m / ft<sup>2</sup>
- .2 . Water vapor permeability (ASTM E96): 0.05 perms
- .3 Underlayment membrane identified as **type 14** in the documents:
  - .1 Self-adhesive water-resistant sheet air membrane composed of a patented permeable adhesive layer and a removable polyfilm, in accordance with CGSB 51.32 and ASTM E331.
  - .2 Thickness: 0.58mm minimum thickness
  - .3 Water vapor permeance of 1658ng / Pa.m<sup>2</sup>.s (29 perms) according to ASTM E96 (Desiccant method)
  - .4 Air permeability of 0.02 L / m<sup>2</sup>.s maximum according to ASTM E2178 (75 Pa)
  - .5 Smoke development (ASTM E84): 105, Class A
  - .6 Flame Spread (ASTM E84): 0, Class A

## 2.4 INSULATION

- .1 Insulation identified as **type A2** in documents: High density closed cell expanded polystyrene insulation, in accordance with standard CAN / ULC-S701, type II. Produced without CFCs, HCFCs and zero ozone depletion potential and having the following characteristics:
  - .1 Thermal resistance according to ASTM C-518: RSI 0.71 / 25mm
  - .2 Panel dimensions: 1220mm x 2440mm or 2745mm.
  - .3 Thickness: As indicated on the drawings
  - .4 Compressive strength according to ASTM D-1621: 110 kPa.
  - .5 Vapor permeability according to ASTM E-96: 200 ng / Pa · s · m<sup>2</sup> max.
  - .6 Water absorption according to ASTM D2842: 4%
  - .7 Edges: Rebate on 2 sides.
  - .8 Sealant for joints between sheets: According to manufacturer's recommendations.



**2.5 ACCESSORIES**

- .1 Metal support: continuous bars in profiled steel in L, J or Z shape (in one or more parts mechanically joined as indicated), hot-dipped galvanized according to designation Z-275 (G-90), dimensioned, drilled, spaced and positioned to meet the design criteria and performance requirements.
  - .1 Minimum steel thickness before galvanizing: 1.0872mm (cal.18)
- .2 Metal furring: as described above for the metal support, but in profile indicated on the drawings.
  - .1 Minimum steel thickness before galvanizing: 0.836mm (20 gauge)
- .3 Visible trims and flashings: re-entrant and protruding corner pieces, counter-flashings, coping strips, bibs, starter strips must be of the same material, color and shine as the roof covering unless otherwise indicated in the drawings, and be pre-drilled to receive the fixings.
- .4 Roof ridge ventilation: Continuous roof ridge ventilation system, custom made.
  - .1 Construction in 24 gauge galvanized steel, manufactured according to the slope of the roof.
  - .2 Insulated with 12mm fiberglass insulation.
  - .3 24 gauge galvanized steel fan, with blades on 4 sides, with bird screens and deflectors against snow and water infiltration.
  - .4 Dimensions: According to manufacturer's recommendations.
  - .5 Complies with ASTM 527 and CSA A93-M82-CAN3
  - .6 Color: At the choice of the Departmental representative.
  - .7 Finish: UV resistant baked polyester powder paint.
  - .8 Manufacturer's warranty: Five (5) years on corrosion.
- .5 Mosquito nets: aluminum.
- .6 Rubber and bitumen-based sealant: in accordance with CAN / CGSB-37.29.
- .7 Fastening tabs: in the same material and in the same tempering as the sheet or sheet used, minimum width of 50 mm.
  - .1 Same thickness as the sheet or sheet to be fixed.
- .8 Fastening devices: concealed.
- .9 Touch-up paint: according to the recommendations of the sheet or metal sheet manufacturer for roofing.
- .10 Snow guards :**
  - .1 **Metal snow guards made of an aluminum alloy, designed specifically to prevent the sliding of snow and ice on the metal roof.**
  - .2 **Dimensions: 75mm high x 90mm wide x 110mm long.**
  - .3 **Finish: Factory paint to manufacturer's standard, color similar to metal roofing.**

- .4 **Laying: Linear laying method, in two rows, at the bottom of the roof slopes. Maximum spacing of 300mm between snow guards.**
- .5 **Anchoring: 3 stainless steel screws with sealing washer for each snow guard. Make sure there is a 19mm plywood anchoring bottom directly under the snow guards. Seal the anchors with sealant.**
- .6 **Provide snow guards manufacturer's written installation instructions.**
- .11 Carpentry: In accordance with section 06 10 53 - Miscellaneous rough carpentry.

## **2.6 FABRICATION**

- .1 Shape aluminum sheets in accordance with designation AA ASM-35.
- .2 Shape parts up to 2400 mm in length. Provide, at the joints, the clearances necessary for expansion.
- .3 Fold the visible edges on their underside, over a width of 12 mm. Assemble the mitered elements and seal the joints.
- .4 Shape the elements square, level and with precision, to the dimensions envisaged, so that they are free of any deformation and any other defect likely to affect their appearance or their effectiveness.
- .5 In the case of contiguous elements made of metals of a different nature, cover the faces of the elements which must come into contact with a layer of plastic cement producing a dry film with a thickness of at least 0.2 mm.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- .1 Verification of conditions: before proceeding with the installation of the sheet metal roofing, ensure that the condition of the surfaces / supports previously implemented under the terms of other sections or contracts is acceptable and allows the work to be carried out. in accordance with the manufacturer's written instructions.

### **3.2 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with the manufacturer's written requirements, recommendations and specifications, including any available technical bulletin, instructions appearing in the product catalog, those appearing on the packaging of the products and the indications in the technical data sheets.

### **3.3 INSTALLATION**

- .1 Install galvanized steel supports as indicated on the drawings.
- .2 Install membranes according to drawings and manufacturer's instructions.
  - .1 Prime all surfaces intended to receive a self-adhesive membrane.
- .3 Install insulation panels according to the indications on the drawings. Secure the insulation boards, leaving no gaps. Install staggered and stagger the insulation joints at least 300mm.

- .4 Install plywood panels as indicated on drawings. Screw in the galvanized steel support at 300mm c / c maximum.
- .5 Conceal fixing devices, except in places where the Departmental representative has given permission in writing, before their installation, to leave them visible.
- .6 Install sheets or metal sheets using conceal fixing tabs.
- .7 Secure each tab using two (2) clips, then fold the tabs of the tabs over these clips.
- .8 Stagger transverse joints of adjoining sheets as indicated on drawings.
- .9 Install flashings made of a material offering the same characteristics as that of the roofing sheets around the elements crossing the roof, and make these penetrations watertight.
- .10 Install roof ventilators according to manufacturer's directions and instructions.
- ADD 01 .11 **Install snow guards as indicated on drawings and manufacturer's recommendations. Seal the perforations.**

### 3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

### 3.5 PROTECTION

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

**END OF SECTION**

**PART 1 - GENERAL****1.1 RELATED REQUIREMENTS**

- .1 Division 01- General Requirement (All sections)
- .2 Section 05 50 00 – Metal fabrications
- .3 Section 06 10 00 – Rough carpentry
- .4 Section 07 52 00 – Modified bituminous membrane roofing
- .5 Section 07 61 00 – Sheet metal roofing
- .6 Section 07 92 00 – Joint sealants

**1.2 REFERENCES**

- .1 Conform to latest date of issue of referenced standards in effect on date of submission of Bids, except where specific date or issue is specifically noted in specifications. When standard is listed in the current NBC, conform to date of issue indicated in latest revision of NBC.
- .2 The Aluminum Association Inc. (AAI)
  - .1 AAI-Aluminum Sheet Metal Work in Building Construction.
  - .2 AAI DAF45, Designation System for Aluminum Finishes.
- .3 American Society for Testing and Materials International (ASTM)
  - .1 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .2 ASTM A792/A792M, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
  - .3 ASTM B32, Standard Specification for Solder Metal.
- .4 Canadian Roofing Contractors Association (CRCA)
  - .1 Roofing Specifications Manual.
- .5 Association des maitres couvreurs du Québec (AMCQ)
  - .1 Devis de couverture de l'AMCQ.
- .6 Canadian Standards Association (CSA International)
  - .1 CSA A123.3, Asphalt Saturated Organic Roofing Felt.
  - .2 CSA B111, Wire Nails, Spikes and Staples.
- .7 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's printed product literature for sheet metal flashing systems materials, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit two copies WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Samples:
  - .1 Submit duplicate 100 x 100 mm samples of each type of sheet metal material, finishes and colours.
- .4 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.
  - .1 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence and cleaning procedures.

**1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Waste Management and Disposal:
  - .1 Separate waste materials for reuse, recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**PART 2 - PRODUCTS****2.1 SHEET METAL MATERIALS**

- .1 Metal galvanized steel flashing: galvanized steel sheet of 26 gage (0.455 mm thickness before finishing), commercial quality, in accordance with ASTM A653 / A653M, with zinc coating designation Z275, pre-finished in factory.
- .2 Support sheet for flexible flashings: galvanized steel sheet cal. 26, commercial grade, conforming to ASTM A653 / A653M, with zinc coating designation Z275.

**2.2 GUTTERS AND DOWNSPOUTS**

- .1 Supply and install molded and fabricated industrial gutters of a single length with downspout at the end, in sufficient number to properly evacuate the gutters.
- .2 Refer to drawings for location of gutters and downspouts.
- .3 Materials.
  - .1 175 x 175 mm prepainted galvanized steel gutter, cal. 24 and steel support cal. 18.
  - .2 Rigid downspout 125 x 100 mm in 3 mm thick galvanized steel for the first 2400 mm in length. Above the first 2400 mm, provide a descent of 125 x 100 mm in steel cal. 24. All parts, fasteners, goosenecks and directional spouts shall be factory assembled.
  - .3 Leaf protection on gutters made of perforated galvanized steel sheet.
  - .4 Colour: to be chosen by the architect.

**2.3 ACCESSORIES**

- .1 Sealants: Product no 1, to section 07 92 00 – Joint sealant.
- .2 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured
- .3 Fastening devices:
  - .1 For exposed areas: Screws treated against corrosion by a heat-applied polyester coating tested to ASTM B117, with neoprene gasket. Color matched existing cladding.
  - .2 For concealed areas: of the same material as the sheet metal used, in accordance with CSA B111, flat head and corrugated shank nails, length and thickness appropriate to metal flashings.
- .4 Washers: of same material as sheet metal, 1 mm thick with rubber packings.
- .5 Touch-up paint: as recommended by prefinished material manufacturer.

**2.4 FABRICATION**

- .1 Fabricate metal flashings and other sheet metal work in accordance with l'Association des Maîtres Couvresseurs du Québec (AMCQ) and as indicated.
- .2 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.
- .3 Hem exposed edges on underside 12 mm. Mitre and seal corners with sealant.
- .4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .5 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

**PART 3 - EXECUTION****3.1 MANUFACTURER'S INSTRUCTIONS**

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

**3.2 INSTALLATION**

- .1 Install sheet metal in accordance with ACEC / AMCQ instructions and as indicated.
- .2 Use concealed fastenings except where approved before installation.
- .3 Provide underlay under sheet metal.
  - .1 Secure in place and lap joints 100 mm.
- .4 Lock end joints and caulk with sealant.
- .5 Insert metal flashing into reglets to form weather tight junction.
- .6 Turn top edge of flashing into recessed reglet or mortar joint minimum of 25 mm. Lead wedge flashing securely into joint.
- .7 Caulk flashing at with sealant.
- .8 Ensure drip edge to keep rainwater away from vertical surface.
- .9 Install soffits and gutters as indicated on drawings.

**3.3 CLEANING**

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .3 Leave work areas clean, free from grease, finger marks and stains.

**END OF SECTION**

**PART 1 GENERAL****1.1 RELATED REQUIREMENTS**

- .1 Division 01- General Requirement (All sections)
- .2 Section 04 20 00.08 – Masonry for minor works
- .3 Section 07 92 00 – Joint sealants
- .4 Section 08 34 63.13 – Metal doors and frames for detention purposes
- .5 Section 08 71 00 – Door Hardware
- .6 Section 09 21 16 – Gypsum board assemblies
- .7 Section 09 91 00.08 – Painting for minor work

**1.2 REFERENCE STANDARDS**

- .1 Conform to latest date of issue of referenced standards in effect on date of submission of Bids, except where specific date or issue is specifically noted in specifications. When standard is listed in the current NBC, conform to date of issue indicated in latest revision of NBC.
- .2 American Society for Testing and Materials International (ASTM)
  - .1 ASTM A653/A653M, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .2 ASTM E152 - Methods of Fire Tests of Door Assemblies
- .3 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-1.181, Ready-Mixed Organic Zinc-Rich Coating.
  - .2 CGSB 41-GP-19Ma, Rigid Vinyl Extrusions for Windows and Doors.
- .4 CSA Group (CSA)
  - .1 CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2 CSA W59, Welded Steel Construction (Metal Arc Welding).
- .5 Canadian Steel Door Manufacturers' Association (CSDMA)
  - .1 CSDMA, Recommended Specifications for Commercial Steel Doors and Frames.
  - .2 CSDMA, Selection and Usage Guide for Commercial Steel Doors.
- .6 National Fire Protection Association (NFPA)
  - .1 NFPA 80, Standard for Fire Doors and Fire Windows.
  - .2 NFPA 252, Standard Methods of Fire Tests of Door Assemblies.
- .7 Underwriters' Laboratories of Canada (ULC)
  - .1 CAN/ULC-S701, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.



- .2 CAN/ULC-S702, Standard for Thermal Insulation, Mineral Fibre, for Buildings.
- .3 CAN/ULC-S704, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
- .4 CAN4-S104, Standard Method for Fire Tests of Door Assemblies.
- .5 CAN4-S105, Standard Specification for Fire Door Frames Meeting the Performance Required by CAN4-S104.
- .8 Hollow Metal Manufacturers Association (HMMA)
  - .1 HMMA 803 – Steel Tables
  - .2 HMMA 810 – Hollow Metal Door
  - .3 HMMA 820 – Hollow Metal Frame

### **1.3 SYSTEM DESCRIPTION**

- .1 Design Requirements:
  - .1 Design exterior frame assembly to accommodate to expansion and contraction when subjected to minimum and maximum surface temperature of -35 degrees C to 35 degrees C.
  - .2 Maximum deflection for exterior steel entrance screens under wind load of 1.2 kPa not to exceed 1/175th of span.
  - .3 Steel fire rated doors and frames: labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104 [NFPA 252] for ratings specified or indicated.
  - .4 Provide fire labelled frames for openings requiring fire protection ratings. Test products in conformance with CAN4-S104, ASTM E152 or [NFPA 252 and listed by nationally recognized agency having factory inspection services.

### **1.4 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00- Submittal Procedures.
- .2 Provide shop drawings:
  - .1 Shop drawings must indicate each type of door proposed, the nature of the materials of which they are made, the thickness of the bare metal, the mortise joints, the reinforcing pieces, the location of the anchors and visible fasteners , layout of hardware and fire resistance rating and finish coatings.
  - .2 Shop drawings must include a list of doors with references and numbers corresponding to those used on the drawings and on the list of doors.
- .3 Samples:
  - .1 Submit, as a sample, one top corner, hinge side, 300 x 300 mm for each type of door proposed, one corner of 300 x 300 mm for each type of frame proposed, as well as each type of reinforcement for hardware parts.
  - .2 Samples must represent the assembly detail of the mortises for hardware parts, glazing beads and reinforcements.

- .4 Submit two (2) copies of material safety data sheets required under WHMIS, in accordance with section 01 35 29.06 - Health and safety.
- .5 Manufacturer's instructions
  - .1 The instructions submitted must relate to each of the products offered.

**1.5 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and maintenance documents: provide instructions relating to operation and maintenance, which will be incorporated into the O&M manual.

**1.6 ACCEPTABLE MATERIALS OR PRODUCTS**

- .1 When materials or products are prescribed by their trademark, consult the Instructions to bidders for the procedure to follow regarding the request for approval of replacement materials or products.

**1.7 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00- Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

**PART 2 PRODUCTS****2.1 PERFORMANCE CRITERIA**

- .1 Exterior doors must comply with CNEB.
  - .1 The overall thermal transmission coefficient of the doors must not be greater than 1.9 W / (m<sup>2</sup>-K)

**2.2 MATERIALS**

- ADD 01 .1 **Door type PC:** Hot dipped galvanized steel sheet: in accordance with ASTM A653M, with ZF75 zinc coating; minimum bare metal thickness in accordance with relevant CSDMA standard, Table 1 - Thickness for Component Parts.
  - .1 Minimum thickness of bare steel: in accordance with HMMA 803.
    - .1 Exterior door: 1.6mm thick

.2 Interior door: 1.34mm thick.

.2 Reinforcement parts: steel conforming to standard CSA-G40.20 / G40.21, grade 44W, with ZF75 zinc coating according to standard ASTM A653M.

## **2.3 DOOR CORE MATERIALS**

.1 Honeycomb core

.1 Core of the "honeycomb" type, with cells of not more than 24.5 mm, in Kraft paper with a mass of at least 36.3 kg per ream and a density of at least 16.5 kg / m<sup>3</sup>, sanded until the required thickness is obtained.

.2 The core must be tested as an integral part of the door in accordance with CAN4-S104 or NFPA 252 standards relating to door fire behavior tests, and it must be approved by a test organization recognized in the nationwide and providing factory inspection service.

## **2.4 ADHESIVES**

.1 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.

.2 Polystyrene and polyurethane cores: heat resistant, epoxy resin based, low viscosity, contact cement.

## **2.5 PRIMER**

.1 Touch-up prime CAN/CGSB-1.181.

## **2.6 PAINT**

.1 Painting of doors and steel frames: in accordance with section 09 91 00.08 - Paintings - Small-scale work.

.2 Weatherstripping must not be painted. Finished surfaces must be free of scratches or other imperfections.

## **2.7 DOOR HARDWARE**

.1 Door hardware: in accordance with section 08 71 00 – Doors hardware

## **2.8 ACCESSORIES**

.1 Door silencers: single stud rubber/neoprene type.

.2 Glazing beads must be made from shaped profiles at least 16 mm high; they should fit snugly, butt at the corners and be secured to the frame components with oval countersunk tapping screws.

.3 Metal filler: according to manufacturer's specifications.

.4 Firestop homologation labels: fixed with metal rivets.

.5 Sealant: in accordance with section 07 92 00 – Joints sealant

.6 Glazing: in accordance with section 08 80 00 - Glazing.

- .1 Glazing for interior door: 6mm clear glass, tempered.
- .7 Provide for the installation of glazing, as indicated, and provide the necessary glazing beads.
  - .1 The exterior glazing beads must be of the tamper-proof type.

## **2.9 FRAMES FABRICATION GENERAL**

- .1 Fabricate frames in accordance with CSDMA specifications.
- .2 Fabricate frames to profiles and maximum face sizes as indicated. SPEC NOTE: Use 1.6 mm for lead lined doors and frames.
- .3 Minimum thickness of bare steel in accordance with HMMA 803:
  - .1 Exterior frames: 1.7mm thick, welded, thermal break.
  - .2 Interior frames: 1.34mm thick, welded.
- .4 Blank, reinforce, drill and tap frames for mortised, templated hardware, [electronic hardware] using templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware.
- .5 Protect mortised cutouts with steel guard boxes.
- .6 Prepare frame for door silencers, 3 for single door, 2 at head for double door.
- .7 Manufacturer's nameplates on frames and screens are not permitted.
- .8 Conceal fastenings except where exposed fastenings are indicated.
- .9 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
- .10 Insulate exterior frame components with polyurethane insulation.

## **2.10 FRAME ANCHORAGE**

- .1 Provide appropriate anchorage to floor and wall construction.
- .2 Locate each wall anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb.
- .3 Provide 2 anchors for rebate opening heights up to 1520 mm and 1 additional anchor for each additional 760 mm of height or fraction thereof.
- .4 Locate anchors for frames in existing openings not more than 150 mm from top and bottom of each jambs and intermediate at 660 mm on centre maximum.

## **2.11 FRAMES: WELDED TYPE**

- .1 Welding in accordance with CSA W59.
- .2 Accurately mitre or mechanically joint frame product and securely weld on inside of profile.
- .3 Cope accurately and securely weld butt joints of mullions, transom bars, centre rails and sills.

- .4 Grind welded joints and corners to a flat plane, fill with metallic paste and sand to uniform smooth finish.
- .5 Securely attach floor anchors to inside of each jamb profile.
- .6 Weld in 2 temporary jamb spreaders per frame to maintain proper alignment during shipment.

## **2.12 DOOR FABRICATION GENERAL**

- .1 Doors must be manufactured in accordance with CSDMA standards.
- .2 The doors must be manufactured according to the dimensions and profiles indicated.
- .3 Minimum thickness of bare steel in accordance with HMMA 803:
  - .1 Exterior door faces: 1.34mm thick, welded, thermal break.
  - .2 Faces of interior doors: 1.06mm thick, welded.
- .4 The doors must be flat, hinged and must have an opening allowing the installation of glazing or louvers, as indicated.
- .5 Exterior steel doors must have an insulated core. Interior steel doors must have a honeycomb core.
- .6 The longitudinal edges of the doors must be welded. The longitudinal joint should be filled with metal filler, then sanded to a smooth and uniform finish].
- .7 The doors must be cut, reinforced and tapped as needed to accommodate the necessary mortised and jig hardware.
- .8 Openings with a diameter equal to or greater than 12.7 mm must be drilled in the factory, except those intended to receive the mounting bolts and through bolts, which must be drilled on site, when installing the hardware. .
- .9 Doors must be reinforced where hardware is to be protruding. Exterior doors must be fitted with a flush closing steel profile at the top. Interior doors must be fitted, at the top and at the bottom, with a recessed inverted profile, spot-welded.
- .10 The doors must be touched up with primer paint where the zinc coating has been damaged during manufacturing.
- .11 Approved fire doors must be provided in the case of openings to be closed by elements presenting a degree of fire resistance, according to the list or the established nomenclature. The products must be tested in accordance with CAN4-S104 or] NFPA 252, be certified by a nationally recognized organization providing factory inspection service, and be manufactured to the details indicated in the follow-up procedures and Factory inspection manuals published by the certification body and provided to the various manufacturers.
- .12 Manufacturer's nameplates on doors are not permitted.

## **2.13 DOORS: HONEYCOMB CORE CONSTRUCTION**

- .1 Interior doors must be made of steel facing sheets and a honeycomb core bonded under pressure to the facing sheets.

**2.14 HOLLOW STEEL CONSTRUCTION**

- .1 Exterior doors must be made of steel facing sheets and fitted with vertical reinforcements solidly welded to each of the facing sheets, at a maximum distance of 150 mm on center.
- .2 The empty spaces between the reinforcements of the exterior doors must be filled with polystyrene.

**2.15 THERMALLY BROKEN DOORS AND FRAMES**

- .1 Fabricate thermally broken doors by using insulated core and separating exterior parts from interior parts with continuous interlocking thermal break.
- .2 Thermal break: rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19Ma.
- .3 Fabricate thermally broken frames separating exterior parts from interior parts with continuous interlocking thermal break.
- .4 Frames and doors must include insulation.

**PART 3 EXECUTION****3.1 MANUFACTURER'S INSTRUCTIONS**

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

**3.2 INSTALLATION GENERAL**

- .1 Install labelled steel fire rated doors and frames to NFPA 80 except where specified otherwise.
- .2 Install doors and frames to CSDMA Installation Guide.

**3.3 FRAME INSTALLATION**

- .1 Set frames plumb, square, level and at correct elevation.
- .2 Secure anchorages and connections to adjacent construction.
- .3 Brace frames rigidly in position while building-in. Install temporary horizontal wood spreader at third points of door opening to maintain frame width. Provide vertical support at centre of head for openings over 1200 mm wide. Remove temporary spreaders after frames are built-in.
- .4 Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.
- .5 Caulk perimeter of frames[between frame and adjacent material.
- .6 Maintain continuity of air barrier.

**3.4 DOOR INSTALLATION**

- .1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 00- Doors Hardware.
- .2 Provide even margins between doors and jambs and doors and finished floor as follows.
  - .1 Hinge side: 1.0 mm.
  - .2 Latchside and head: 1.5 mm.
  - .3 Finished floor : 13 mm.
- .3 Adjust operable parts for correct function.
- .4 Install louvres where applicable.

**3.5 FINISH REPAIRS**

- .1 Touch up with primer finishes damaged during installation.

**3.6 GLAZING**

- .1 Install glazing in accordance with Section 08 80 00- Glazing.

**3.7 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.
- .3 Waste Management: separate waste materials for reuse, recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

**3.8 PROTECTION**

- .1 Protect installed products and components from damage during construction.

**END OF SECTION**

**PART 1 GENERAL****1.1 RELATED REQUIREMENTS**

- .1 Division 01- General Requirement (All sections)
- .2 Section 06 10 53 – Miscellaneous rough carpentry
- .3 Section 07 26 00 – Vapour retarders
- .4 Section -7 46 19 – Steel siding
- .5 Section 07 46 23 – Wood siding
- .6 Section 07 92 00 – Joints sealants
- .7 Section 08 50 00 – Glazing

**1.2 REFERENCE STANDARDS**

- .1 Conform to latest date of issue of referenced standards in effect on date of submission of Bids, except where specific date or issue is specifically noted in specifications. When standard is listed in the current NBC, conform to date of issue indicated in latest revision of NBC.
- .2 Aluminum Association (AA)
  - .1 AA DAF 45OL - Designation System for Aluminum Finishes.
- .3 ASTM International (ASTM)
  - .1 ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip galvanized) Coatings on Iron and Steel Products.
  - .2 ASTM E 1748 - Standard Test Method for Evaluating the Engagement Between Windows and Insect Screens as an Integral System.
- .4 CSA Group (CSA)
  - .1 AAMA/WDMA/CSA 101/I.S.2/A440, NAFS - North American Fenestration Standard for Windows, Doors, and Skylights.
  - .2 CSA A440S1, Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440, NAFS - North American Fenestration Standard for Windows, Doors, and Skylights.
  - .3 CAN/CSA-A440.2/A440.3, Fenestration energy performance/User guide to CSA A440.2, Fenestration energy performance.
  - .4 CAN/CSA-A440.4, Window, Door, and Skylight Installation
  - .5 CAN/CSA-G164-M, Hot Dip Galvanizing Of Irregularly Shaped Articles
- .5 Office général des normes du Canada (CGSB)
  - .1 CAN/CGSB-79.1 - Screen
- .6 National energy code for building (NECB)
- .7 Screen Manufacturers Association (SMA)



- .1 SMA 1201R-2012 Specification for Insect Screens for Windows, Sliding Doors and Swinging Doors.

### 1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for [windows] and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Glazing: Submit product data for glazing to section 08 80 00 – Glazing.
  - .3 Submit two copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Shop Drawings:
  - .1 Indicate materials and details in full size scale for head, jamb and sill, profiles of components, junction between combination units, interior and exterior trim, elevations of unit, anchorage details, location of isolation coating, description of related components and exposed finishes, fasteners, and caulking. Indicate location of manufacturer's nameplates.
  - .2 Indicate locations, dimensions, openings and requirements of related work.
- .4 Samples:
  - .1 Submit for review and acceptance of each unit.
  - .2 Include frame, sash, sill, glazing and weatherproofing method, insect screens, surface finish and hardware. Show location of manufacturer's nameplates.

### 1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00- Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for windows for incorporation into manual.

### 1.5 ACCEPTABLE MATERIALS OR PRODUCTS

- .1 When materials or products are prescribed by their trademark, consult the Instructions to bidders for the procedure to follow regarding the request for approval of replacement materials or products.

### 1.6 QUALITY ASSURANCE

- .1 Test and Evaluation Reports:
  - .1 Submit test reports from approved independent testing laboratories, certifying compliance with specifications.
  - .2 Test reports that reference the NAFS include, on the first page, a summary of the results including, at minimum:
    - .1 Product manufacturer.

- .2 Type of product.
- .3 Model number/series number.
- .4 Primary product designation.
- .5 Secondary product designation.
  - .1 Positive design pressure.
  - .2 Negative design pressure.
  - .3 Water penetration resistance test pressure.
  - .4 Canadian air infiltration and exfiltration levels.
- .6 Test completion date.
- .3 Report to contain the following information:
  - .1 Test dates.
  - .2 Report preparation dates.
  - .3 Test information retention period.
  - .4 Location of testing facilities.
  - .5 Full description of test samples, including:
    - .1 Finish
    - .2 Condensation resistance.
    - .3 Forced entry resistance.
    - .4 Frame rigidity.
  - .6 Complete description of amendments, as applicable.
  - .7 Conclusion.
  - .8 Drawings signed by the testing laboratory, if provided.
- .2 Certifications: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

## 1.7 MOCK-UP

- .1 Provide site mock-up for work of this Section indicating methods and materials, and procedures proposed to achieve final results in accordance with Section 01 45 00– Quality Control , and to comply with following requirements, using materials indicated for completed work:
- .2 The sample must represent at least one typical window, or more if required by the Departmental representative, and demonstrate the implementation of the following components;
  - .1 Installation details for each of the conditions encountered;
  - .2 The details of the junction with the membranes at the perimeters of the windows and all other conditions deemed necessary by the Professional.
  - .3 Interior and exterior finishes.

**1.8 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00- Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

**1.9 WARRANTY**

- .1 With regard to Section 08 50 00, the 12 month warranty period prescribed in the General Conditions is extended to:
  - .1 **Five (5) years** on windows against any defect in material, workmanship and installation; this guarantee must also stipulate that:
    - .1 The work will remain impermeable to water and bad weather, structurally sound and free from distortions or deformations under normal loads, that the glazing gaskets will not be damaged by sunlight, bad weather or oxidation and will remain free from permanent deformations under normal loads.
  - .2 **Two (2) years** on opening window hardware.
  - .3 **Ten (10) years** for finishes stipulating that the materials and their finishes will not be excessively altered, that the colors will remain uniform without cracking, chipping, delaminating or otherwise deteriorating or corroding.
  - .4 Warranty on glazing: in accordance with section 08 80 00 - GLAZING.

**PART 2 PRODUCTS****2.1 PERFORMANCE CRITERIA**

- .1 General: Windows must comply with AAMA / WDMA / CSA / 101 / IS2 / A440 - North American Window Standard (NAFS) / Specification for Windows, Doors and Skylights and CSA A440S1 - Canadian Supplement to AAMA / WDMA / CSA 101 / IS2 / A440, latest editions.
- .2 The performance characteristics must appear on a label on which the primary and secondary designations are used, in accordance with articles 4.4.2 and 4.4.3 of standard AAMA / WDMA / CSA 101 / I.S.2 / A440 and must include:
  - .1 The performance class;
  - .2 The minimum performance category;
  - .3 The minimum positive design pressure;

- .4 The minimum negative design pressure;
- .5 The minimum test pressure for resistance to water infiltration
- .3 Calculate the components and determine their dimensions so that they withstand the permanent loads and overloads caused by pressure and wind suction forces, acting perpendicular to the plane of the work in accordance with the National Building Code (CNB).
- .4 Window accessories must not be easily disassembled or removed.
- .5 Windows must comply with the Regulation respecting energy conservation in new buildings.
  - .1 Windows to limit air infiltration to a maximum of 0.77 L / s per meter of main frame slot when tested at a pressure of 75 Pa in accordance with ASTM E283 .
  - .2 The overall thermal transmittance of the windows must not be more than 1.9 W / (m<sup>2</sup>.K), in accordance with CNEB.

## 2.2 MATERIALS

- .1 Materials: conform to AAMA / WDMA / CSA 101 / I.S.2 / A440 standard and to the following prescriptions.
- .2 All aluminum windows must be from the same manufacturer, unless otherwise specified specifically in this section.
- .3 Aluminum extrusions: in AA 6063-T5 alloy or according to performance requirements.
- .4 Metal sills: in extruded aluminum meeting the needs of the structure, with a minimum thickness of 2 mm, with joint covers, drip holes, deflectors (at the ends), chairs, anchors and anchoring devices. Colors and finishes identical to the window frames.
- .5 Interior and exterior aluminum fittings: in press-formed aluminum sheet, of type and dimensions indicated or meeting the needs of the work, of a minimum thickness of 2 mm, with concealed fasteners (unless otherwise indicated in drawings).
- .6 Thermal barrier: extrusion in 6/6 reinforced nylon polyamide mechanically extruded and assembled by rolling and crimping.
- .7 Glazing bead with mechanical water / air barrier system at perimeter of sealed units.
- .8 Fasteners: stainless steel.
- .9 Protective coating: bituminous paint resistant to alkalis.
- .10 Insulation:
  - .1 Insulation inserted in window frames: expanded polystyrene insulation, conforming to standard CAN / ULC-S701, type 2.
  - .2 Insulation in polyurethane foam on site, two components, to be used around the perimeter of window frames.
- .11 Waterproofing and junction membrane: in accordance with the requirements of section 07 26 00 - Vapor barrier.

- .12 Sealing products: in accordance with the requirements of section 07 92 00 - Joint sealing products. Color chosen by the representative of the Department.
- .13 Glass and glazing materials: Sealed double glass, in accordance with the requirements of section 08 80 00 - Glazing.

## 2.3 ALUMINIUM WINDOW

ADD 01

### .1 Aluminum extrusion windows: opening outwards (FP1) and fixed model (FP2), as indicated on the drawings.

- .1 Thickness of aluminum walls of main frames and shutters: 1.52 mm.
- .2 Opening shutters: Opening outwards, opening limited to 100mm.
- .3 Main frames: must be filled with type 2 polystyrene insulation, conforming to standard CAN / ULC-S701.
- .4 Frames and shutters: in aluminum, with thermal breaks in CPV of Shore 80 hardness, installed by crimping.
- .5 Frame depth: 152mm
- .6 Glazing: 25.4mm, thermos sealed.
- .7 Glazing beads: pressure type, without visible fixing.
- .8 Macropolyisobutylene exterior seals with internal shim and flexible PVC on the interior side.
- .9 Shutters fitted with triple weatherstripping.
- .10 Color: At the choice of the Departmental representative.

## 2.4 FABRICATION

- .1 Fabricate in accordance with [AAMA/WDMA/CSA 101/I.S.2/A440] supplemented as follows:
- .2 Fabricate units square and true with maximum tolerance of plus or minus 1.5 mm for units with a diagonal measurement of 1800 mm or less, and plus or minus 3 mm for units with a diagonal measurement over 1800 mm.
- .3 Face dimensions detailed maximum permissible sizes.
- .4 Brace frames to maintain squareness and rigidity during shipment and installation.
- .5 Finish steel clips and reinforcement with [380] [shop coat primer to [MPI #79]] g/m<sup>2</sup>zinc coating to [ASTM A123/A123M] .

## 2.5 SCREEN

- .1 Commercial quality screen, conforming to the SMA 6001 standard, installed on the inside of the windows.
- .2 Fixing to the frame using security screws which can facilitate the detection of any sabotage.
- .3 Main frame profiled in 6063-T5 alloy aluminum extrusion to the same finish as the windows, with black aluminum mesh 18x16 mesh per 1 "(25mm), burglary resistance level S2 in accordance with to CAN / CGSB 79.1.

**2.6 WINDOW HARDWARE**

- .1 Hardware: stainless steel or white bronze sash locks and aluminum handles to provide security and permit easy operation of units.
- .2 The various pieces of hardware will be inserted into an appropriate groove for this use, of the "Euro-Groove" type, so that they retain the precision of their location and the ease of their adjustment.
- .3 Any single screw fastening system for hardware parts will be refused.  
The Departmental representative must have a choice of the type of hardware according to the types of assembly.
  - .1 Hardware items:
    - .1 Hinges, handles, multipoint locks, retaining arms and other items required according to manufacturer's standards. Submit technical data sheets for approval.
      - .1 Top and bottom friction arms.
      - .2 Multi-point roller locking system operated by a rack handle.
      - .3 Opening limiter that can be released with a key. The limiter must be strong enough that it cannot be damaged or disassembled. The limiter must be composed of a perforated steel plate or an element which swivels to be placed on the opening part of the window.

**2.7 FABRICATION**

- .1 Windows must be manufactured in accordance with the requirements of the AAMA / WDMA / CSA 101 / I.S.2 / A440 standard and the following prescriptions.
- .2 Windows must be manufactured with precision and square, with a maximum tolerance of 1.5 mm more or less for windows measuring 1800 mm or less diagonally, and 3 mm more or less for windows. windows measuring more than 1800 mm diagonally.
- .3 The detailed front dimensions are the maximum sizes allowed.
- .4 Frames must be braced during transport and installation so as to maintain their rigidity and maintain right angles.
- .5 Provide frames with protected orifices and baffles to allow water to drip outward and pressure balance according to the rain screen principle.
- .6 The staples and the steel reinforcements must be coated with a zinc plating of 380 g / m<sup>2</sup>, in accordance with the ASTM A123 / A123M standard.

**2.8 ALUMINUM SURFACES FINISHES**

- .1 Exposed surfaces of aluminum elements must be finished according to the Aluminum Association Designation System for Aluminum Finishes:
- .2 Thermosetting paint:
  - .1 Interior finish: Coated with thermosetting acrylic resin conforming to AAMA-2603.

- .2 Color: At the choice of the Departmental representative.
- .3 Exterior finish: Coated with Kynar 500 fluoropolymer resin (70% PVDF) including a chromium phosphate pretreatment, an anticorrosion primer and a pigmented resin layer, in accordance with the AAMA-2605 standard.
- .4 Color: At the choice of the Departmental representative.
- .3 Protect exposed aluminum surfaces using protective wrapping, peel-off film or any other means approved by the professional.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts acceptable for product installation in accordance with manufacturer's written instructions.

### **3.2 INSTALLATION**

- .1 Window installation:
  - .1 Install in accordance with AAMA/WDMA/CSA 101/I.S.2/A440 .
  - .2 Arrange components to prevent abrupt variation in colour.
- .2 Sill installation:
  - .1 Install metal sills with uniform wash to exterior, level in length, straight in alignment with plumb upstands and faces. Use one piece lengths at each location.
- .3 Caulking:
  - .1 Seal joints between windows and window sills with sealant. Bed sill expansion joint cover plates and drip deflectors in bedding compound. Caulk between sill upstand and window-frame. Caulk butt joints in continuous sills.
  - .2 Apply sealant in accordance with Section 07 92 00- Joint Sealants . Conceal sealant within window units.

### **3.3 FIELD QUALITY CONTROL**

- .1 Have manufacturer of products supplied under this Section review Work involved in handling, installation/application, protection and cleaning of its product[s] , and submit written reports in acceptable format to verify compliance of Work with Contract.

### **3.4 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00- Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00- Cleaning.

- .3 Waste Management: separate waste materials for reuse, recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

- .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### **3.5 PROTECTION**

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

**END OF SECTION**



**DEFINITION OF FINISHES**

603	ZINC
626	SATIN CHROME
628	CLEAR ANODIZED ALUMINUM
630	SATIN STAINLESS STEEL
689	PAINTED ALUMINUM
719	ROLLER FINISHED ALUMINUM
WHITE	WHITE
BLACK	BLACK

**DEFINITION OF MANUFACTURERS**

ABH	ARCHITECTURAL BUILDERS HARDW.
BEST	BEST DORMA KABA
FA	FOLGER ADAMS
PRE	PRECISION DORMA KABA
REE	REESE
RRB	R R BRINK
SER	SERTRONIC
SM	STANDARD METAL
STA	STANLEY DORMA KABA
STR	STRONGBAR

**KEYS**

- 1- The key path will be provided by CSC.
- 2- Provide four parametric keys for each FOLGER ADAMS lock.

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<b>GR 01</b>				
		BP pair CA		
	6	Hinges FBB199 FNA x torx x 114 x 102	630	STA
	1	concealed vertical rod exit device 2808	630	PRE
	1	concealed vertical rod exit device 2808	630	PRE
	2	exit device exterior trim 4908K	626	PRE
	2	door closer D3550 EDA x SEC	689	STA
	2	adjustable concealed overhead door stop 1020A x SEC	630	ABH
	2	Kick plate K-10A x torx x 254 x width	630	SM
	1	weatherstrip DS76SC x torx x 1 x W X 2x H	628	REE
	2	Door sweep 323A x torx x width	628	REE
	1	threshold S478A x torx x width	719	REE
	1	Door contact switch SER-11076D (DPDT)	BLANC	SER
<b>GR 02</b>				
		storeroom		
	3	Hinges FBB191 FNA x torx x 114 x 101	630	STA
	1	storeroom function lock 83K-7D-4C-S3 x torx	626	BEST
	1	door closer D3550 EDA x SEC	689	STA
	1	wall bumper S147 x torx	626	SM
	1	Kick plate K-10A x torx x 254 x width	630	SM
<b>GR 03</b>				
		storeroom		
	3	Hinges FBB191 FNA x torx x 114 x 101	630	STA
	1	storeroom function lock 83K-7R-4C-S3 x torx	626	BEST
	1	wall bumper S147 x torx	626	SM
	1	Kick plate K-10A x torx x 254 x width	630	SM
<b>GR 04</b>				
		push pull		
	6	Hinges FBB199 FNA x torx x 114 x 102	630	STA
	2	Push bar 6000-3 x 4B x width	630	SM
	2	door pull 3012-3 x 4B	630	SM
	2	door closer D3550 EDA x SEC	689	STA
	2	adjustable concealed overhead door stop 1020A x SEC	630	ABH
	2	Kick plate K-10A x torx x 254 x width	630	SM

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<b>GR 05</b>		privacy		
	3	Hinges FBB191 FNA x torx x 114 x 101	630	STA
	1	privacy function lock with key NM8495 KS x Torx	626	CRP
	1	wall bumper S147 x torx	626	SM
	1	Kick plate K-10A x torx x 254 x width	630	SM
	1	door closer D3550 EDA x SEC	689	STA

From inside the door is locked by the thumbturn, free exit. From outside the lock can be unlocked by the key in case of emergency and can be locked to control access.3

<b>GR 05A</b>		privacy		
	3	Hinges FBB191 FNA x torx x 114 x 101	630	STA
	1	privacy function lock with key NM8495 KS x Torx	626	CRP
	1	wall bumper S147 x torx	626	SM
	1	Kick plate K-10A x torx x 254 x width	630	SM
	1	Door operator SW200i x Torx	628	BES
	1	electric strike 55D-DBM x Torx	630	SDC
	2	push buttons CM40/2 x CM59S	630	CAM

Pressing one of the buttons unlocks the electric strike and opens the door. When the privacy lock is locked from the inside by the thumbturn or from the outside by the key, the two buttons are inactive. In an emergency the privacy lock can be unlocked with the key.3

<b>GR 06</b>		storeroom		
	3	Hinges FBB191 FNA x torx x 114 x 101	630	STA
	1	storeroom function lock 83K-7D-4C-S3 x torx	626	BEST
	1	door closer D3550 EDA x SEC	689	STA
	1	wall bumper S147 x torx	626	SM
	1	Kick plate K-10A x torx x 254 x width	630	SM

<b>GR 07</b>		storeroom		
	6	Hinges FBB199 FNA x torx x 114 x 102	630	STA
	1	storeroom function lock 83K-7D-4C-S3 x torx	626	BEST
	2	concealed adjustable overhead door stop with hold-open 1010A x SEC	630	ABH
	2	Kick plate K-10A x torx x 254 x width	630	SM
	1	weatherstrip DS76SC x torx x 1 x W X 2x H	628	REE
	2	Door sweep 323A x torx x width	628	REE
	1	threshold S478A x torx x width	719	REE
	2	Door contact switch SER-11076D (DPDT)	BLANC	SER

<b>GR 08</b>		hinges by door manufacturer		
	1	detention type lock with dead bolt 86-G	603	FA
	1	floor stop H2960S	NOIR	STR

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**GR 09**

	charnières carcérales H2450M 114 x 114 x trx	630	STR
1	detention deadlock 82 x HM80 x 80-4DB x 2CS	626	FA
1	door pull H2856P	626	STR
1	flush pull H2867P	626	STR
1	jamb gasketing set 9001A x vis Torx x 2x haut. x 1x larg,	628	NGP
1	door bottom 200NSS x vis trox x larg	630	NGP
1	rain drip 16SS x larg cadre	630	NGP
1	threshold 427 x vis torx	719	NGP

**GR 10**

	hasp		
	hinges by door manufacturer		
1	padlock hasp 130	BLACK	ABUS

## **LEGEND**

Note: In general, the third letter of the material index indicates the finish that this material must receive.

Example: ac = steel; acP = painted steel

## **FINISHED MATERIALS**

ac	steel
al	aluminum
bo	wood
vt	tempered glass

A	anodized
E	epoxy paint
P	painting
i	stainless
K	plastic laminate

**REMARKS**

The number identifying each door corresponds to the room number to which this door gives access.

- 1 insulated door
- 2 Access control
- 3 Metal doors and frames, type PC
- 4 Door part of the controlled evacuation route
- 5 Metal doors and frames used for detention purposes

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## DOORS AND FRAMES SCHEDULE

REV : revision, thre.: threshold, mat.: material, thick.: thickness, rf.: fire resistance, hard.: hardware, REM : remark

	LOCALISATION No from / to	THRE. mat.	DOORS type width height thick. hand mat.	FRAMES type mat.	OTHER rf. hard.	REM
<b>V6</b>						
	V6-101	EXT / V6-101	-	B1	1830 2135 45 MGR / MDR	acP Ca acP - 1 1, 2, 3
	V6-102	V6-101 / V6-102	-	C	915 2135 45 MG	acP Ca acP - 2
	V6-103	V6-101 / V6-103	-	C	915 2135 45 MD	acP Ca acP 45 min 2
	V6-104	V6-101 / V6-104	-	B1	1830 2135 45 MGR / MDR	acP Ca acP - 4
	V6-104.1	V6-105 / V6-104	-	B1	1830 2135 45 MGR / MDR	acP Ca acP - 4
	V6-105	EXT / V6-105	-	B1	1830 2135 45 MGR / MDR	acP Ca acP - 1 1, 2, 3
	V6-106	V6-105 / V6-106	-	E	915 2135 45 MD	acP Ca acP - 5
	V6-107	V6-105 / V6-107	-	E	915 2135 45 MG	acP Ca acP - 5A
<b>V7</b>						
	V7-101	EXT / V7-101	-	B1	1830 2135 45 MGR / MDR	acP Ca acP - 1 1, 2, 3
	V7-102	V7-101 / V7-102	-	B	915 2135 45 MG	acP Cb acP - 3
	V7-103	V7-101 / V7-103	-	C	915 2135 45 MD	acP Ca acP - 2
	V7-104	V7-101 / V7-104	-	B1	1830 2135 45 MGR / MDR	acP Ca acP - 4
	V7-104.1	V7-109 / V7-104	-	B1	1830 2135 45 MGR / MDR	acP Ca acP - 4
	V7-105	V7-104 / V7-105	-	E	915 2135 45 MGR	acP Ca acP - 5
	V7-106	V7-104 / V7-106	-	E	915 2135 45 MDR	acP Ca acP - 5A
	V7-107	V7-104 / V7-107	-	C	915 2135 45 MDR	acP Ca acP 45 min 2
	V7-108	V7-104 / V7-108	-	C	915 2135 45 MGR	acP Ca acP - 2
	V7-109	EXT / V7-109	-	B1	1830 2135 45 MGR / MDR	acP Ca acP - 1 1, 2, 3
	V7-110	EXT / V7-110	-	C1	1830 2135 45 MGR / MDR	acP Ca acP - 7 2, 3
	V7-110.1	V7-109 / V7-110	-	C	915 2135 45 MD	acP Ca acP - 6 1, 2
	V7-111	EXT / V7-111	-	C1	1830 2135 45 MGR / MDR	acP Ca acP - 7 2, 3
	V7-111.1	V7-109 / V7-111	-	C	915 2135 45 MD	acP Ca acP - 6 1, 2
<b>EXISTING BUILDING</b>						
	K-100P.1A	EXT / K-100P.1	-	C	915 2135 45 MGR	acP Exist. - - 9 1, 2, 4, 5
	K-100P.1	K-100P.1 / K100P.2	-	Grid	915 2135 45 MGR	acP Ca acP - 8 4
	K-100P.2A	K-100P.2 / Under stairs	-	Grid	915 2135 45 MD	acP Ca acP - 10
	U-127C	U-127 / U-127C	-	B	915 2135 45 MD	acP Cb acP - 3

**PART 1 GENERAL****1.1 RELATED REQUIREMENTS**

- .1 Division 01- General Requirement (All sections)
- .2 Section 06 10 53 – Miscellaneous rough carpentry
- .3 Section 09 21 16 – Gypsum board assemblies
- .4 Section 09 22 16 – Non-structural metal framing

**1.2 REFERENCE STANDARDS**

- .1 Conform to latest date of issue of referenced standards in effect on date of submission of Bids, except where specific date or issue is specifically noted in specifications. When standard is listed in the current NBC, conform to date of issue indicated in latest revision of NBC.
- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
  - .2 ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip.
  - .3 ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .4 ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- .2 Laboratoires des assureurs du Canada (ULC)
  - .1 CAN/ULC-S102 - Méthode d'essai normalisée; caractéristiques de combustion superficielle des matériaux de construction et des assemblages.
- .3 CSA Group (CSA)
  - .1 CAN/CSA-B651, Accessible Design for the Built Environment.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
  - .1 Provide manufacturer's printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
  - .1 Indicate size and description of components, base material, surface finish inside and out, hardware and locks, attachment devices, description of rough-in-frame, building-in details of anchors for grab bars.
- .4 Samples:



- .1 Submit two (2) 300mm x 300mm samples of each finish product specified.
  - .5 Submit a copy of the manufacturer's instructions for the products and materials and indicate, if applicable, any special precautions relating to implementation.
- 1.4 CLOSEOUT SUBMITTALS**
- .1 Provide maintenance data for toilet and bath accessories for incorporation into manual specified in Section 01 78 00- Closeout Submittals.
  - .2 Provide special tools required for vandal-proof screws.
- 1.5 ACCEPTABLE MATERIALS OR PRODUCTS**
- .1 When materials or products are prescribed by their trademark, consult the Instructions to bidders for the procedure to follow regarding the request for approval of replacement materials or products.
- 1.6 DELIVERY, STORAGE AND HANDLING**
- .1 Deliver, store and handle materials in accordance with Section 01 61 00- Common Product Requirements and with manufacturer's written instructions.
  - .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
  - .3 Storage and Handling Requirements:
    - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
    - .2 Replace defective or damaged materials with new.
  - .4 Packaging Waste Management: remove for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.
- PART 2 PRODUCTS**
- 2.1 CORNER GUARDS**
- .1 Corner protector for walls made of stainless steel, 16 gauge, surface installed, having the following characteristics:
    - .1 Dimensions: 88.9mm x 88.9mm x 900mm ht (3.5in x 3.5in x 36in)
    - .2 Installation: Adhesive of the type recommended by the manufacturer.
    - .3 Finish: Type 304 stainless steel, #4 finish, satin.
    - .4 Location: As indicated on the drawings.
- 2.2 VINYL WALL BASEBOARD**
- .1 Vinyl wall baseboard in roll, 100mm high x 3.2mm thick, with groove.
  - .2 Vinyl wall baseboard adhesive: As recommended by baseboard manufacturer.

**2.3 SIGNALING**

- .1 Sign plate for toilet room, to CSA B651.
  - .1 2 mixed panels
  - .2 2 accessible composite panels
  - .3 Minimal dimensions: 190mm x 230mm ht.
  - .4 See drawings for locations.
- .2 Occupancy capacity indicator panel.
  - .1 White plexiglass panel, 6mm thick, rounded corners, with text printed in black in both languages.
  - .2 Dimensions: 400mm x 430mm ht.
  - .3 Anchors: Vandal proof screws in each corner of panel.
  - .4 2 panels required, with different text for each panel.
  - .5 Location: Indicated on the drawings.

**PART 3 EXECUTION****3.1 EXAMINATION**

- .1 Verification of conditions: before proceeding with the installation of the products and materials described in this section, ensure that the condition of the surfaces/supports previously implemented under the terms of other sections or contracts is acceptable and allows to carry out the work in accordance with the manufacturer's written instructions.

**3.2 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written requirements, recommendations and specifications, including any available technical bulletins, instructions for handling, storage and installation of products, and data sheet indications.

**3.3 INSTALLATION**

- .1 Install products and materials plumb, square and level so that surfaces are free from visible defects.
- .2 Touch up damaged surfaces to match original finish.
- .3 Set up, install or assemble the products and equipment prescribed according to the indications in the drawings and manufacturer's instructions.

**3.4 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00- Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00- Cleaning.

**3.5            PROTECTION**

- .1        Protect installed products and components from damage during construction.

**END OF SECTION**

**Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment.
- .2 Section 23 05 48.16 - Seismic Restraint Systems (SRS).
- .3 Section 23 05 53 - Identification for HVAC Piping and Equipment.

**1.2 REFERENCE STANDARDS**

- .1 Unless otherwise indicated, execute all works in accordance with the 2015 National Building Code of Canada as well as local bylaws and regulations.
- .2 Moreover, execute all work in compliance with all applicable Codes or Standards, current Editions, including namely the following, but not restricted to:
  - .1 American National Standards Institute (ANSI)/American Petroleum Institute (API).
    - .1 ANSI/API Spec 5L, Specification for Line Pipe.
  - .2 American Society for Testing and Material (ASTM).
    - .1 ASTM A-47M, Standard Specification for Ferritic Malleable Iron Castings.
    - .2 ASTM A-53, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
    - .3 ASTM A-135, Standard Specification for Electric-Resistance-Welded Steel Pipe.
  - .3 Canadian Standard Association (CSA)/CSA International.
    - .1 CSA B242, Groove and Shoulder Type Mechanical Pipe Couplings.
    - .2 CSA W47.1, Certification of Companies for Fusion Welding of Steel.
  - .4 City of Sainte-Anne-des-Plaines:
    - .3 Bylaw 3007: Fire Prevention.
  - .5 National Fire Protection Association (NFPA).
    - .1 ANSINFPA 13 (2019), Installation of Sprinkler Systems.
    - .2 NFPA 25 (2017), Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems.
    - .3 NFPA 170 (2018), Standard for Fire Safety and Emergency Symbols.
  - .6 National Research Council Canada (NRC).
    - .1 National Building Code 2015.
    - .2 National Fire Code of Canada (NFC) 2015.

**1.3 SUBMITTALS**

- .1 Product Data:
  - .1 Submit data sheets as per Section 01 33 00 - Submittal Procedures. Submit the required data sheets and manufacturer's documentation for the relevant equipment and systems, series or models. Data sheets shall include product characteristics, performance criteria, dimensions, limitations, and finish.
- .2 Shop Drawings:
  - .1 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures and in accordance with NFPA 13 Standard.
  - .2 Submit erection drawing in accordance with execution drawing and prescribed criteria in NFPA 13 Standard.

**1.4 CLOSEOUT SUBMITTALS**

- .1 Submit all required documents and items after completion of work for incorporation into manual such as specified in Section 01 78 00 - Closeout Submittals.
- .2 Maintenance Data Sheets.
  - .1 Maintenance data sheets shall include the following elements:
    - .1 Technical data from catalogs and product literature, including the model number, type, and size for the items mentioned below:
      - .1 Piping and fittings;
      - .2 Sprinklers;
      - .3 Alarm check valves;
      - .4 Valves, including gate valves, check valves, and globe valves;
      - .5 Pipes, hangers, and suspension;
      - .6 Couplings;
      - .7 Monitoring switches;
    - .2 Relevant details concerning operation, maintenance, and servicing.
    - .3 A list of recommended spare parts.
- .3 Provide a copy of NFPA 25 "Inspection, Testing, and Maintenance of Water Based Fire Protection Systems" and incorporate it into the "Operation and Maintenance Manual".

**1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Sort waste to re-use and recycle in compliance with Section 01 74 19 - Waste Management and Disposal.
- .2 Collect packaging materials and send to appropriate recycling facilities.
- .3 Collect and sort plastic, paper, and corrugated cardboard wrappings, and dispose them in appropriate designated bins in compliance with the Waste Management Plan.

- .4 Fold up metal banding, flatten, and place in designated area for recycling.
- .5 Eliminate hazardous materials in compliance with the Canadian Environmental Protection Act, Transportation of Dangerous Goods Act, and provincial and municipal regulations.
- .6 Transport unused metal elements to a recycling facility approved by the Departmental Representative.

## **1.6 QUALITY CONTROL**

- .1 Health and Safety:
  - .1 Take necessary measures to ensure health and safety on construction site, in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Submit the following documents in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Test reports:
    - .1 Submit test reports issued by recognized independent laboratories, certifying that automatic wet pipe sprinkler systems comply with requirements regarding physical characteristics and performance criteria.
    - .2 Submit documents signed by manufacturer certifying that products, materials and equipment meet requirements regarding physical characteristics and performance criteria.
    - .3 Instructions: Submit installation instructions provided by manufacturer.
    - .4 Manufacturer on-site checks: Submit required report.

## **1.7 SPARE PARTS AND MAINTENANCE**

- .1 Provide replacement and maintenance equipment in accordance with the requirements of Section 01 78 00 - Closeout Submittals.
- .2 Provide spare sprinklers and tools as required by ANSI/NFPA 13 Standard.

## **1.8 TRANSPORT, STORAGE, AND HANDLING**

- .1 Conditioning, transport, handling, and unloading:
  - .1 Transport, store, and handle materials and equipment as per manufacturer's written instructions.
  - .2 Deliver materials and equipment to the project site in good condition and in their original packaging which shall bear the manufacturer's name, make, and ULC approval.

- .2 Storage and Protection:
  - .1 Store materials and equipment inside as per manufacturers' instruction, in a dry, well-ventilated, and clean area.
  - .2 Replace defective or damaged materials and equipment by new materials and equipment.

## **1.9 ACCEPTABLE PRODUCTS OR MATERIALS**

- .1 Where acceptable materials or products are prescribed by their trademark, refer to the Instructions to Bidders for instructions on the application for approval of materials or substitutes.

## **Part 2 Products**

### **2.1 GENERAL**

- .1 All products used in fire safety installations shall be "cUL" or "ULC" listed and shall be labelled as such.
- .2 Provide accessories that can withstand the normal pressure exerted in the fire protection network.

### **2.2 PIPES AND FITTINGS**

- .1 Pipes:
  - .1 Pipes up to NPS 50:
    - .1 Black steel, Schedule 40, threaded, complying with ANSI/NFPA 13 and ASTM A-53 or ASTM A-135 Standards.
  - .2 Pipes NPS 65 and over:
    - .1 Black steel, Schedule 40, grooved, complying with ANSI/NFPA 13 and ASTM A-53 or ASTM A-135 Standards.
- .2 Fittings and couplings as per NFPA 13 Standard:
  - .1 Fittings and couplings up to NPS 50:
    - .1 Couplings and fittings, rigid type, from the same manufacturer.
    - .2 Threaded fittings with Teflon tape, complying with ASTM A-47M, grade 32510.
  - .2 Fittings and couplings NPS 65 and over:
    - .1 Couplings and fittings, rigid type, from the same manufacturer.
    - .2 Grooved-end pipe couplings, in compliance with CSA B242 and ANSI B-3620 (API-5L) Standards.
    - .3 Grooved-end fittings in compliance with ASTM-A-536, grade 65-45-12.

**2.3 VALVES**

- .1 All valves to be listed for fire protection service.
- .2 Valves, NPS 50 and less, threaded:
  - .1 Bronze ball valves.
- .3 Butterfly valves, NPS 65 and over with monitoring switch:
  - .1 Cast-iron butterfly valves, with indicating yoke, grooved ends.
- .4 Drain valve: Ball, fitted with a threaded end and a female chain plug.

**2.4 SPRINKLERS**

- .1 General Requirements: Sprinkler heads complying with ANSI/NFPA 13 Standard and approved for fire protection service.
- .2 Sprinkler guard for sprinkler exposed to mechanical shock, with zinc coated steel rod.
  - .1 Guards shall be approved for sprinkler head.
- .3 For tender, provide an additional amount for a 10% extra quantity for each type of sprinkler, including labor for the installation.
- .4 Upright Sprinklers:
  - .1 Upright sprinkler, quick-response, standard coverage, with frangible bulb, "K" factor of  $80.6 \text{ L/min}/(\text{Bar})^{1/2}$  ( $5.6 \text{ US gal/min}/(\text{psi})^{1/2}$ ) (G-05).
  - .2 Temperature ratings: As required.
  - .3 Finish: Bronze.
- .5 Institutional type Sprinklers:
  - .1 Semi-recessed institutional pendant type sprinklers, quick-response for prison environment, standard coverage, fusible link, "K" factor of  $80.6 \text{ L/min}/(\text{Bar})^{1/2}$  ( $5.6 \text{ gal US/min}/(\text{psi})^{1/2}$ ) (G-02).
  - .2 Temperature rating: As required.
  - .3 Finish: Chrome.
- .2 Dry Wall-Mounted Sprinklers:
  - .1 Wall-mounted sprinklers, dry, with semi-recessed rosace, quick-response, standard coverage, with frangible bulb, "K" factor of  $80.6 \text{ L/min}/(\text{Bar})^{1/2}$  ( $5.6 \text{ gal US/min}/(\text{psi})^{1/2}$ ) (G-03).
  - .2 Temperature rating: As required.
  - .3 Finish: Chrome.



**2.5 WET PIPE ALARM CHECK VALVE**

- .1 Wet pipe alarm check valve complying with ANSI/NFPA 13, for fire protection use, including an pressure relief valve, flow detector, supervised control valve, pressure gauges, and all accessories and piping required for proper check valve assembly.

**2.6 PIPE HANGERS**

- .1 Hangers for fire protection service in compliance with prescriptions and ANSI/NFPA 13 requirements.
- .2 Refer to Sections 23 05 29, Hangers and Supports for HVAC Piping and Equipment and 23 05 48.16, Seismic Restraint Systems.

**2.7 MONITORING SWITCHES**

- .1 General: Switches approved for fire protection service, complying with ANSI/NFPA 13 Standard.
- .2 Valve devices:
  - .1 Mechanically attached to valve body, with normally open and normally closed contacts, and with monitoring capability.
  - .2 When the valves are not already equipped with monitoring devices, they are added on the site, as indicated.
- .3 Flow Switch:
  - .1 Designed to ensure monitoring of the system.
- .4 Pressure Switches:
  - .1 Contactors designed to provide system monitoring.

**2.8 TEST AND DRAIN VALVE**

- .1 Combined test and drain valve, comprising a three-position ball valve, two (2) flow sight glasses, a safety valve connected to the drain, outlets for pressure gauge, and a plate indicating the diameter of the orifice. The orifice shall match the smallest orifice of sprinkler installed on site.

**2.9 MAINTENANCE AND SPARE PARTS**

- .1 Provide maintenance equipment, such as special tools and replacement sprinkler heads, including a sprinkler key.
- .2 Store maintenance/replacement equipment inside maintenance/replacement equipment cabinet. There shall be at least one (1) model of each type of sprinkler head. Number of replacement sprinkler heads shall be in accordance with ANSI/NFPA 13.

**2.10 IDENTIFICATION**

- .1 Metal nameplate for test/drain valves: To ANSI/NFPA 13 Standard.
- .2 Provide a hydraulic design information sign for each hydraulic calculation. It shall be permanently installed at the base of riser and shall include the following information:
  - .1 Location of the design area;
  - .2 Discharge density over the design area;
  - .3 System flows and residual pressures requirements at the base of riser;
  - .4 Occupancy classification;
  - .5 Hose stream allowance included.
- .3 Fire protection equipment identification to NFPA 170, Standard for Fire Safety and Emergency Symbols.
- .4 Refer to Section 23 05 53 - Identification for HVAC Piping and Equipment.

**2.11 MAINTENANCE AND SPARE PARTS CABINETS**

- .1 Cabinet for maintenance material, special tools, and spare sprinklers, including sprinkler wrench.
- .2 Installed nearby the sprinkler systems alarm check valve.
- .3 There shall be a minimum of one (1) spare sprinkler for each type of sprinkler installed. The stock of spare sprinklers shall comply with NFPA 13 Standard.
- .4 Cabinets shall be constructed as per sprinkler system manufacturer's standards.

**2.12 DIFFERENTIAL PRESSURE PUMP**

- .1 Pump: positive displacement, double acting, open cylinder, direct drive, with expansion valve.
- .2 Motor: Single phase, induction, squirrel cage, 120 V, 60 Hz, 1 phase, 0.25 kW (1/3 HP), 1725 rpm; enclosed, ball bearing, class B, EEMAC rated, designed for continuous duty and capable of withstanding a temperature rise of 50°C (122°F).
- .3 Flow rate: 7.6 L/min (2 US gal/min).
- .4 Differential pressure pump control switch, set for 103 kPa (15 psi) differential pressure.
- .5 Electrical connections: as per Division 26.
- .6 Pump suction with shut-off valve, strainer, and hose connection; discharge with relief valve, check valve, shut-off valve, and hose connection.

**2.13 FIRE DEPARTMENT CONNECTION**

- .1 Two-way type connection, as per ANSI/NFPA 13 Standard, ULC listed, installed as shown, with metallic caps and chains, with threads matching those of the local fire department.**
- .2 Connection with following characteristics: body in bronze, polished finish, for flush mounting, with chrome indicator plate with an inscription molded into the plate and metallic and bronze caps and chains.**

**Part 3 Execution****3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: Comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheets.**

**3.2 INSTALLATION**

- .1 Install, inspect, and perform acceptance tests in accordance with ANSI/NFPA 13 Standard.**
- .2 Execute installation in accordance with established Standards and Laws, Regulations, and current Codes and Standards requirements.**
- .3 Proper operation and installation coordination of the system, including automatic sprinkler system, system's monitoring points as well as the systems commissioning are all under the Fire Protection Contractor's responsibility.**
- .4 Clearly identify main shut-off valves, drain valves, and all auxiliary valves.**
- .5 Install sprinkler system test drains to open drains.**
- .6 Install hydraulic calculations information placard at alarm valve.**

**3.3 TRAINING**

- .1 Contractor shall organize a 4-hour training session for the building's operation and maintenance staff, in presence of the Departmental Representative.**
- .2 Staff training shall cover normal sprinkler system operation, emergency procedure, and system maintenance, as per NFPA 25 Standard.**

**3.4 TESTS AND VERIFICATIONS**

- .1 Carry out the following tests on the sprinkler system, complying with NFPA 13 Standard:
  - .1 Execute complete hydrostatic testing on the automatic sprinkler systems piping and appurtenances at a pressure of 1,380 kPa (200 psi) for 2 hours;
  - .2 Complete a flow test through the test connection to confirm flow switches operation. The alarm signals shall be transmitted to the alarm panel within one-minute maximum starting at test connection opening and during test flow;
  - .3 Complete a flow test through the test connections fully opened to ensure that no pressure build-up occurs in the drainage piping, that could affect the proper operation of the system.
- .2 Conduct tests in presence of the representative of the Departmental Representative and supply test certificates, as required by ANSI/NFPA 13.

**3.5 REPORT AND CERTIFICATE**

- .1 Provide both inspection report and inspection attestation to the Departmental Representative at the end of the project, in addition to the properly completed and signed contractor materials and tests certificate. Record all tests results in a notebook appended to the report.

**3.6 CLEANING**

- .1 Proceed in accordance with Section 01 74 00 - Cleaning.
- .2 Once installation and performance control work done, remove surplus material, waste, tools, and equipment from the work site.

**END OF SECTION**

**Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 25 90 01 - EMCS: Site Requirements Applications and Systems Sequences of Operation.

**1.2 REFERENCE STANDARDS**

- .1 American National Standards Institute (ANSI)/The Instrumentation, Systems, and Automation Society (ISA).
  - .1 ANSI/ISA 5.5, Graphic Symbols for Process Displays.
- .2 American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE).
  - .1 ANSI/IEEE 260.1-1993, American National Standard Letter Symbols Units of Measurement (SI Units, Customary Inch-Pound Units, and Certain Other Units).
- .3 American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).
  - .1 ASHRAE STD 135, BACnet - Data Communication Protocol for Building Automation and Control Network.
- .4 Canadian Standards Association (CSA International).
  - .1 CAN/CSA-Z234.1-FM89(C1995), Canadian Metric Practice Guide.
- .5 Consumer Electronics Association (CEA).
  - .1 CEA-709.1, Control Network Protocol Specification.
- .6 Department of Justice Canada (Jus).
  - .1 Canadian Environmental Assessment Act (CEAA).
  - .2 Canadian Environmental Protection Act (CEPA).
- .7 Health Canada - Workplace Hazardous Materials Information System (WHMIS).
  - .1 Data Sheets (DS).
- .8 Transport Canada (TC).
  - .1 Transportation of Dangerous Good Act (TDGC), c. 34.

**1.3 CONTRACTOR**

- .1 **Only "Regulvar" who legally owns the products and software such as those used for the control of modified existing systems, is authorized to bid to carry out the work in automatic regulation within the framework of this project.**

**1.4 SYSTEM DESCRIPTION**

- .1 Refer to control drawings for system architecture.
- .2 The above-mentioned Sections aim at the modification of the existing system. The system in place shall include the following, but limited to:
  - .1 Building controllers;
  - .2 Control devices as listed in I/O point summary tables;
  - .3 Data communications equipment necessary to EMCS data transmission system;
  - .4 Field control devices;
  - .5 Software/Hardware complete with full documentation;
  - .6 Complete operating and maintenance manuals, on-site training of operators, programmers, and maintenance staff;
  - .7 Training of staff;
  - .8 Acceptance tests, technical support during commissioning, full documentation;
  - .9 Wiring interface co-ordination of equipment supplied by others;
  - .10 Miscellaneous work as specified in other Sections and as indicated.
- .3 Design Requirements:
  - .1 Design and provide conduit and wiring linking elements of system.
  - .2 Supply sufficient programmable controllers of all types to meet project requirements. Number of measuring points and their content to be reviewed by Departmental Representative prior to installation.
  - .3 Location of controllers to be reviewed by Departmental Representative prior to installation.
  - .4 Provide utility power to EMCS and emergency power to EMCS, as indicated.
- .4 Display and Operation Language:
  - .1 Provide passwords to use the system in English or in French, depending on case.

**1.5 COMMISSIONING**

- .1 Confirm with the Departmental Representative that Design Criteria and Design Intents are still applicable.
- .2 Do commissioning according to the prescriptions.
- .3 Do commissioning under the Departmental Representative's supervision.
  - .1 Inform the Departmental Representative in writing, at least 5 days before the start of commissioning or prior to each test, to get his approval.
- .4 Test each system independently and then in unison with other related systems.
- .5 Correct deficiencies and re-test until satisfactory results and performance are obtained.

- .6 Acceptance of tests will not relieve Contractor from his responsibility to ensure that complete systems are complying with requirements of the contract.
- .7 Commissioning personnel to be fully aware of and qualified to interpret Design Criteria and Design Intent.
- .8 Demonstrate to the Departmental Representative the operation of the systems, including control sequences in normal and emergency modes, as well as in normal and emergency modes, and the start/stop, interlocks, and prohibitions causing stops.
- .9 Provide a written commissioning report stating that each system operates as per Design Criteria.

## 1.6 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00.
- .1 Submit for review:
  - .1 Data sheets of equipment used.
  - .2 Controls schematics, materials lists, sequences of operation, and points lists.
- .2 Quality Control:
  - .1 Provide equipment and material from manufacturer's regular production, CSA certified, manufactured to Standards quoted plus any additional specified requirements.
  - .2 Where CSA certified equipment is not available, submit proposed equipment to approval of inspection authorities prior to delivery on site.
  - .3 Submit proof of compliance to specified Standards with shop drawings and data sheets. Label or listing of specified organizations is acceptable evidence.
  - .4 In lieu of such evidence, submit certificate from testing organization, approved by Departmental Representative, certifying that the material was tested in accordance with their test methods and that item complies with their Standards/Code.
  - .5 For materials whose compliance with organizational Standards/Codes/Specifications is not regulated by organization using its own listing or label as proof of compliance, provide certificate stating that material complies with applicable referenced Standard or Specification.
  - .6 Permits and fees: In accordance with general conditions of contract.
  - .7 Submit an acceptance certificate provided by the competent authority to the Departmental Representative.
  - .8 Existing devices intended for re-use: Submit test report.

**1.7 TRAINING**

- .1 Provide the required training for a complete comprehension of the system. Required training for this contract is 8 hours, divided in two sessions, one week apart minimum.
- .2 Provide the required material for the training.
- .3 Coordinate training with the Owner for required dates and staff to train.
- .4 Submit training content for approval to the Departmental Representative.

**1.8 QUALITY ASSURANCE**

- .1 Have local office within 100 km of project, staffed by trained personnel capable of providing EMCS training, routine maintenance, and emergency service on system.
- .2 Provide record of successful previous installations of similar computer systems.
- .3 Have access to local supplies of essential parts and provide 7-year guarantee of availability of spare parts after obsolescence.
- .4 Ensure qualified supervisory personnel continuously direct and monitor Work, and attend site meetings.

**1.9 IDENTIFICATIONS**

- .1 Nameplates for panels.
  - .1 Plastic laminate, 3 mm ( $\frac{1}{8}$  in.) thick, matt white finish, black core, square corners, lettering accurately aligned and engraved into core.
  - .2 Sizes: 25 x 67 mm (1 in. x 2½ in.) minimum.
  - .3 Lettering: Minimum 7 mm ( $\frac{9}{32}$  in.) high, black.
  - .4 Inscriptions: Machine engraved, indicating function of panel.
- .2 Nameplates for field devices.
  - .1 Field devices to be identified by means of a plastic or metallic card held by a chain.
  - .2 Sizes: 50 x 100 mm (2 in. x 4 in.) minimum.
  - .3 Lettering: Minimum 5 mm ( $\frac{3}{16}$  in.), black, engraved and indelible.
  - .4 Cabinet: Identify interior components using plastic enclosed cards with point name and point address.
  - .5 Identifications used shall be same as those appearing in control diagrams.
- .3 Wiring Identification.
  - .1 Supply and install numbered tape markings on wiring, panels, junction boxes, splitters, cabinets, and outlet boxes.



- .2 Colour coding: To CSA C22.1. Use colour coded wiring in communication cables, matched throughout system.
- .3 Cables without conduit shall be orange or bear a marking of this color.
  - .1 Power wiring: EMCS circuit breakers shall be identified.
- .4 Conduits Identification.
  - .1 All conduits, junction boxes, and connections of the EMCS shall be identified with an orange color marker.
- .5 Existing Panels.
  - .1 Correct existing identifications to show changes made to the system.

**1.10 WARRANTY**

- .1 Provide services, materials, and equipment to maintain EMCS during specified warranty period. Provide detailed preventative maintenance schedule for system components as described in SUBMITTAL article.
- .2 Emergency Service Calls:
  - .1 Initiate service calls each time EMCS is not functioning properly.
  - .2 Qualified control personnel to be available during warranty period to provide service to "CRITICAL" components whenever required at no extra cost for Owner.
  - .3 Perform work continuously until EMCS is restored to reliable operating condition.
- .3 Work Requests: Record each service call request on approved form, including:
  - .1 Location, date, and time of call received;
  - .2 Nature of trouble;
  - .3 Names of personnel assigned;
  - .4 Quantity and nature of materials used;
  - .5 Date and time of work start and completion.

**1.11 O & M MANUALS**

- .1 Custom design Operation and Maintenance (O&M) Manuals (both hard and soft copies) to contain material relevant to this project only, and shall provide full and complete coverage of subjects referred to in this Section.
- .2 O&M Manuals shall be exhaustive. They shall include complete coverage in concise language, readily understood by operating personnel, using common terminology of functional and operational requirements of system. Do not presume knowledge of computers, electronics, or in-depth theoretical knowledge.
- .3 Manuals to include:

- .1 Controls schematics, including existing equipment related to modified systems.
- .2 Material and points lists.
- .3 Operation sequences.
- .4 Equipment maintenance record.
- .5 Specific procedures: Restarting, alarms reception, printing, etc.
- .6 Informations related to licences: version, certificates, and updating procedures.

## **1.12 INTEGRATION OF DOCUMENTS TO THE WORKSTATIONS**

- .1 All information related to the system to be provided in soft copy and integrated by the Contractor to the central station and the workstations. This information shall include:
  - .1 Complete software used to create the database.
  - .2 Updated back-up copy of the database.
  - .3 System operation manual.
  - .4 Spec sheets of the material used.
  - .5 Controls schematics in a format that can be viewed by the operator.
  - .6 Departmental Representative's drawings in PDF format.

## **1.13 WORK IN EXISTING INSTALLATIONS**

- .1 Carry out demolition work on the "K" system controls, while validating the possibility of reusing the metal cabinet of the control panel as well as the electrical/pneumatic converters of the heating coil valves.
- .2 If work is to be done in existing building, integrate system modifications to Owner's documents, soft and hard copies, to update them.
- .3 Incorporate to existing documents all modifications to control system, while keeping information relevant to existing equipment still in use.

## **1.14 EXISTING CONTROL/REGULATION DEVICES**

- .1 Collect existing control/regulation devices that will not be reused or are unnecessary. Store them in an approved storage area, to dispose of them following instructions.

## **Part 2 Products**

### **2.1 EQUIPMENT**

- .1 Control Network Protocol and Data Communication Protocol: To ASHRAE STD 135.
- .2 Complete list of equipment to be used in work, which list is part of tender documents, by adding manufacturer's name, model number, and details related to manufacturing materials of each equipment, and submit for approval.

**Part 3            Execution**

**3.1                MANUFACTURER'S RECOMMENDATIONS**

- .1            Installation: To manufacturer's recommendations.

**3.2                PAINTING**

- .1            Perform painting in accordance with the following requirements:
  - .1            Clean and retouch surfaces that were scratched so that they have the same original finish;
  - .2            Where retouches are not sufficient, a complete reconditioning (primer coat and finishing coat) of the damaged surfaces is required;
  - .3            Clean and use a primer coating on visible elements, such as supports, fasteners, chassis of equipment, and any other fixing devices;
  - .4            Paint all unfinished material installed indoor.

**END OF SECTION**

**Part 1 General****1.1 REFERENCE STANDARDS**

- .1 CSA Group.
  - .1 CAN3-C235-83 (R2015), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
  - .2 CAN/CSA-C22.3 No.7-F10 (C2015), Underground Systems.
  - .3 CSA C22.1-F18, Canadian Electrical Code, Part 1 (24<sup>th</sup> Edition), Safety Standard for Electrical Installations.
  - .4 CSA C22.2 No. 0.3-09 (R2019), Test Methods for Electrical Wires and Cables.
  - .5 CSA 282-15, Emergency Electrical Power Supply for Buildings.
  - .6 CSA-Z462-21, Electrical Safety.
  - .7 Safety Standards for Electrical Installations.
- .2 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC).
  - .1 IEEE 100, The Authoritative Dictionary of IEEE Standards Terms.


**1.2 DEFINITIONS**

- .1 Electrical and Electronic Terms: Unless otherwise specified or indicated, terms used in these specifications and on drawings are those defined by IEEE 100.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 The Contractor shall submit for review single-line electrical diagrams in electronic format. After approval, the Contractor shall locate them in the main electrical installations local.
- .3 Provide, for review, a vertical distribution diagram of the fire alarm network indicating the building plan and zoning, in electronic format.
- .4 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Quebec.
  - .2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that shall be shown to ensure coordinated installation.
  - .3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
  - .4 Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.

- .5 If changes are required, notify Departmental Representative of these changes before they are made.
- .5 Short-Circuit Coordination Study:
- .1 Using the commutation cabinet shop drawings, provide the short-circuit protection device coordination, including the main breaker. The study shall be conducted by an employee of the manufacturer and shall be signed by a certified engineer of the province of Quebec. The coordination study shall be submitted for approval in the same way as the shop drawings. The final corrected copies shall accompany the O&M Manuals.
- .2 The coordination study must be carried out according to the requirements defined in the technical criteria for correctional institutions, 2015. The coordination study must be submitted for approval to the Departmental Representative along with the shop drawings.
- .3 Supply a short-circuit study of the protection devices, in the same fashion as the coordination study. The study shall be signed by an engineer registered and licensed in the Province of Quebec. The short-circuit study shall be submitted for approval in the same way as the shop drawings. The final corrected copies shall accompany the O&M Manuals.
- .6 Electrical Arc-Flash Danger:
- .1 Supply the arc-flash report. The study shall be signed by a certified engineer from the province of Quebec.
- .2 Supply and install a label on each electrical equipment, as requested by Correctional Service Canada (CSC) and Canadian Electrical Code. The manufacturer shall affix the labels on the equipment according to the study results and prepare in both official languages (French and English). Labels shall be approved on all electrical equipment, such as distribution panels, transformers, switches, contactors, starters, etc.
- The label shall respect the following CSC model:

 <b>AVERTISSEMENT</b>	
<b>600 VAC</b> Risque d'éclairs d'arcs et de choc électrique	
<b>1000 mm</b>	Périmètre d'accès Limité (Personne qualifiées seulement)
<b>300 mm</b>	Périmètre d'accès Restreint (ÉPI requis)
<b>0.72 cal/cm<sup>2</sup></b>	Énergie Incidente
<b>333 mm</b>	Périmètre de risque à l'arc (ÉPI requis)
Consulter la CSA Z462 pour l'équipement de protection individuel (ÉPI) approprié	
<b>Équipement: ASSC</b>	
<small>           Attention: Des modifications aux réglages des équipements de protection ou à la distribution rendront invalide la valeur de l'énergie indiquée         </small>	
<small>           Analyse de risque d'éclairs d'arc selon IEEE 1584  <b>11/12/2018</b>            SNC LAVALIN Inc. Projet #640005         </small>	

- .7 Certificates.
  - .1 Provide CSA certified material and equipment.
  - .2 Where CSA certified equipment and material is not available, submit such equipment and material to an authority having jurisdiction for approval before delivery to site.
  - .3 Submit test results of installed electrical systems and instrumentation.
  - .4 Permits and fees: In accordance with General Conditions of Contract.
  - .5 Submit, upon completion of Work, load balance report as described in PART 3 - LOAD BALANCE.
  - .6 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Departmental Representative.
- .8 Manufacturer's Field Reports: Submit to Departmental Representative manufacturer, a written report, within 3 days of review, verifying compliance of Work and electrical system and instrumentation testing, as described in PART 3 - FIELD QUALITY CONTROL, a written report from the manufacturer stating that the work is compliant to the criteria is required.

#### **1.4 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: Submit operation and maintenance data:
  - .1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.
  - .2 Operating instructions to include following:
    - .1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment;
    - .2 Start-up, proper adjustment, operating, lubrication, and shutdown procedures;
    - .3 Safety precautions;
    - .4 Procedures to be followed in event of equipment failure;
    - .5 Other items of instruction as recommended by manufacturer of each system or item of equipment.
  - .3 Print or engrave operating instructions and frame under glass or in approved laminated plastic.
  - .4 Post instructions where directed by CSC.
  - .5 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.
  - .6 Ensure operating instructions will not fade when exposed to sunlight.

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

- .1 Deliver, store, and handle materials in accordance with Section 01 61 00 - Common Product Requirements and the manufacturer's written instructions.

- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials, indoor, off ground, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for reuse as specified in Waste Reduction Workplan in accordance with Section 01 74 19 - Waste Management and Disposal.

**Part 2 Products****2.1 DESIGN REQUIREMENTS**

- .1 Operating Voltages: To CAN3-C235.
- .2 Motors, electric heating, control, and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above Standard.
  - .1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.
- .3 Language Operating Requirements: Provide identification nameplates for control devices in French and English.
- .4 Use one nameplate for each language.

**2.2 MATERIALS AND EQUIPMENT**

- .1 Provide material and equipment in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Equipment and material to be CSA certified. Where CSA certified are equipment and material is not available, obtain special approval from Authority Having Jurisdiction before delivery to site and submit such approval as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
- .3 Factory-assembled control panels and component assemblies.

**2.3 ELECTRIC MOTORS, EQUIPMENT, AND CONTROLS**

- .1 Verify installation and co-ordination responsibilities related to motors, equipment, and controls, as indicated on drawings and specifications.
- .2 Conduit, wiring, and connections below 50 V which are related to control systems specified in Sections of Division 23, related to mechanical installations.

**2.4 WARNING SIGNS**

- .1 Warning Signs: In accordance with requirements of Departmental Representative.
- .2 Porcelain enamel signs, minimum size 175 x 250 mm.

**2.5 WIRING TERMINATIONS**

- .1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

**2.6 EQUIPMENT IDENTIFICATION**

- .1 Identify electrical equipment with nameplates as follows:

- .1 Nameplates: 3 mm thick Lamicoid, matt white finish face, black core, mechanically attached with self-tapping screws.
- .2 Sizes as follows:

NAMEPLATE SIZES	DIMENSIONS	NB. OF LINES	HEIGHT
Size 1	10 x 50 mm	1	3 mm
Size 2	12 x 70 mm	1	5 mm
Size 3	12 x 70 mm	2	3 mm
Size 4	20 x 90 mm	1	8 mm
Size 5	20 x 90 mm	2	5 mm
Size 6	25 x 100 mm	1	12 mm
Size 7	25 x 100 mm	2	6 mm

- .2 For fire alarm systems, plates shall be red face with black inscription.
- .3 Labels:
  - .1 Embossed plastic labels with 6 mm high letters, unless specified otherwise.
- .4 Wording on nameplates to be approved by Departmental Representative prior to manufacture.
- .5 Allow for minimum of 25 letters per nameplate.
- .6 Registrations shall be in English/French.
- .7 Use a plaque or label for each language (French and English).
- .8 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
- .9 Identify equipment with Size 3 labels engraved "ASSET INVENTORY NO. \_\_\_\_" of Departmental Representative.
- .10 Indicator plates for disconnectors, starters and contactors shall indicate the controlled device, the disconnector / contactor or starter number, the panel number from which the supply originates with the circuit (s) used and the voltage, the feed loop P1 or P2.
- .11 Transformers: Indicate capacity, primary and secondary voltages, as well as P1 or P2 power loop.
- .12 Repeat circuit identification with typewritten cards for modified panels during the work.



- .13 Identify outlets and switches with a self-adhesive plastic label (Brother "P-Touch") indicating the panel number and power circuit. The labels shall be white with black letters and be installed inside the plates. Indicate the number of the panel and the supply circuit on the inside of the plates with an indelible ink pencil.

## 2.7 WIRING IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, numbered, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and color coding throughout.
- .3 Color Coding: To CSA C22.1.
- .4 Use color coded wires in communication cables, matched throughout system.

## 2.8 CONDUIT AND CABLE IDENTIFICATION

- .1 Color code conduits, boxes, and metallic sheathed cables.
- .2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.
- .3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

Type	Prime	Auxiliary
Up to 250 V	Yellow	---
Up to 600 V	Yellow	Green
Up to 5 kV	Yellow	Blue
Up to 15 kV	Yellow	Red
Telephone	Green	---
Other Communication Systems	Green	Blue
Fire Alarm	Red	---
Emergency Voice	Red	Blue
Other Security Systems	Red	Yellow

## 2.9 MAINTENANCE, COMMISSIONING, AND OPERATION

- .1 Instruct Departmental Representative of operation and maintenance procedures for facilities, equipment, and components.
- .2 Retain and pay for the services of an engineer seconded from the manufacturer's plant to supervise the start-up of the installation, to check, adjust, balance, and calibrate the various elements and to instruct the operating personnel.
- .3 Provide these services for enough period of time, including the number of visits necessary to start the installation and ensure that operating personnel are familiar with all aspects of the maintenance and operation of the facility equipment.

**2.10 IDENTIFICATION OF JUNCTION BOXES**

- .1 Paint all around junction boxes according to Code, but not covers.
- .2 Using a large indelible ink marker, identify the source (panel) and circuit number(s) of all wiring passing through the boxes.

**2.11 SINGLE-LINE DIAGRAMS**

- .1 Install single diagrams framed in plexiglass as follows:
  - .1 Electrical Distribution System: In the main electrical room.
- .2 Provide a vertical distribution diagram of the fire alarm system indicating the plan and zoning of the building, framed under Plexiglas, and place it near the control panel and the fire alarm annunciator panel.
- .3 Drawings shall measure at least 600 mm x 600 mm.

**2.12 CONDUIT AND CABLE INSTALLATION**

- .1 Conceal ducts and cables in all rooms on the ground floor and the floor.
- .2 Install conduits and sleeves before pouring concrete.
  - .1 Concrete penetration sleeves: Plastic pipe of diameter allowing free passage of conduit and exceeding 50 mm concrete surface on each side.
- .3 When using plastic sleeves for penetrations of walls or floors with a fire-resistance rating, remove them before installing the ducts.
- .4 Install cables, conduits, and fittings that are to be embedded or plastered in a neat manner against structural framing to minimize furring thickness.

**2.13 FINISH**

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two (2) coats of finish enamel.
- .2 Paint outdoor electrical equipment "equipment green" finish as per the AMEEECY1-1-1195 Standard.
- .3 Paint indoor switchgear and distribution enclosures light gray as per the AMEEECY1-1-1958 Standard.
- .4 Clean and retouch painted workshop surfaces that have been scratched or damaged during shipment and installation; use a paint of type and color identical to the original paint.
- .5 Clean non-galvanized hooks, brackets, fasteners, and other fasteners and apply primer to protect them against rust.

**Part 3 Execution****3.1 EXAMINATION**

- .1 Verification of Conditions: Prior to proceed with installation:
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after received of written approval to proceed from the Departmental Representative.

**3.2 INSTALLATION**

- .1 Do complete installation in accordance with CSA C22.1, except where specified otherwise.
- .2 Do overhead and underground systems in accordance with CAN/CSA-C22.3 No.7, except otherwise indicated.

**3.3 NAMEPLATES AND LABELS**

- .1 Ensure manufacturer's nameplates, CSA labels, and identification nameplates are visible and legible after equipment is installed.

**3.4 CONDUIT AND CABLE INSTALLATION**

- .1 Install conduit and sleeves prior to pouring of concrete.
  - .1 Sleeves through concrete: Plastic, sized for free passage of conduit, and protruding 50 mm.
- .2 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.
- .3 Install cables, conduits, and fittings embedded or plastered over, close to building structure so furring can be kept to minimum.

**3.5 LOCATION OF OUTLETS**

- .1 Locate outlets in accordance with Section 26 05 32 - Outlet Boxes, Conduit Boxes and Fittings.
- .2 Do not install outlets back-to-back in wall; allow minimum 150 mm horizontal clearance between boxes.
- .3 Change location of outlets at no extra cost or credit, providing distance does not exceed 3,000 mm, and information is given before installation.
- .4 Locate light switches on latch side of doors.
  - .1 Locate disconnect devices in mechanical and elevator machine rooms on latch side of floor.

**3.6 FIREPROOFING**

- .1 Where cables or ducts pass through floors and firewalls or premises with halon systems, fire and smoke protection will be provided using such products as 3M, CP25, 303, FS195, CS195, and 7902 and 7904 sealing kits. All will be installed according to the manufacturer's recommendations and CAN2 19.13 and modification.

**3.7 OPENINGS**

- .1 All required penetrations in slabs and walls (new and existing) are the responsibility of Division 26.
- .2 Make penetrations fireproof, as prescribed in this Section.

**3.8 MOUNTING HEIGHTS**

- .1 Mounting height of equipment is from finished floor to centerline of equipment, unless otherwise specified or indicated.
- .2 If mounting height of equipment is not specified or indicated, verify prior proceeding with installation.
- .3 Install electrical equipment at following heights, unless indicated otherwise.
  - .1 Local switches: 1,370 mm.
  - .2 Wall receptacles:
    - .1 General: 300 mm.
    - .2 Above top of continuous baseboard heater: 200 mm.
    - .3 Above top of counters or counter backsplashes: 175 mm.
    - .4 In electrical and mechanical rooms: 1,400 mm.
  - .3 Panelboards: As required by Code or as indicated.
  - .4 Telephone and interphone outlets: 300 mm.
  - .5 Wall mounted telephone and interphone outlets: 1,500 mm.
  - .6 Fire alarm stations: 1,050 mm and at most at 1,150 mm.
  - .7 Fire alarm bells: 2,100 mm.
  - .8 Television outlets: See details in drawings.
  - .9 Wall-mounted speakers: 2,100 mm.

- .4 **In accessible washrooms and kitchen, install electrical equipment at following heights:**



- .1 **Local switches: 1,200 mm.**
- .2 **Wall receptacles: 400 mm.**

**3.9 CO-ORDINATION OF PROTECTIVE DEVICES**

- .1 Ensure circuit protective devices, such as overcurrent trips, relays, and fuses, are installed to required values and settings.

**3.10 WORKS IN AN EXISTING BUILDING**

- .1 Coordinate with Departmental Representative, Work to be performed.
- .2 Any work that requires a complete or partial shutdown of any system to make connections or changes that affect other buildings, can only be performed during periods of downtime established by the Representative from the Department and upon prior written authorization.
- .3 Any request for a cut-off shall be sent to the various parties at least one week in advance.
- .4 Provide a schedule of work to be done for coordination with the Departmental Representative and other Divisions to establish these shutdown periods.
- .5 Coordinate the receipt and handling of materials with the Departmental Representative or his representatives.
- .6 Minimize the inconvenience caused by noise and dust.
- .7 Always comply with Departmental Representative regulations and requirements for security or other rules.
- .8 All personnel, including subcontractors, shall wear a badge or identification card when on site.
- .9 Remove and transport off-site all obsolete equipment as a result of new developments, including wiring, conduit, boxes, receptacles, switches, lighting fixtures, dispensing equipment, all ancillary systems, signaling or communications equipment, all accessories forming part of the electrical installations.
- .10 In general, remove wiring, conduits, panels, and boxes. However, casings and ducts embedded in the concrete shall be closed by means of lightweight concrete at the ends to a depth of not less than 200 mm. Some boxes (for smoke detectors in cells) and some ducts (existing arterial and branch lines) can be reused.
- .11 Restore power, control, signaling, or communications circuits, where continuity of these circuits is broken due to the demolition of existing facilities.

**3.11 FIELD QUALITY CONTROL**

- .1 All electrical work shall be performed by licensed, qualified electricians or apprentices, as required by provincial law and the qualification of labor. Employees enrolled in a provincial apprenticeship program will be able to perform specific tasks, depending on their level of training and demonstrated ability to perform specific tasks, provided they are under the direct supervision of a qualified licensed electrician.
- .2 The work covered by this Division shall be carried out by a master electrician or an electrical Contractor, licensed by the "Régie du bâtiment du Québec".
- .3 Load Balance:
  - .1 Measure phase current to panel boards with normal loads (lighting) operating at time of acceptance; adjust branch circuit connections as required to obtain best balance of current between phases and record changes.

- .2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.
- .3 Provide upon completion of work, load balance report as directed in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS, phase and neutral currents on panel boards, dry-core transformers and motor control centers, operating under normal load, as well as hour and date on which each load was measured, and voltage at time of test.
- .4 At the request of the Departmental Representative, modify certain branch circuit connections to achieve better load balancing.
- .4 Conduct following tests in accordance with Section 01 45 00 - Quality Control, in the presence of the Departmental Representative, and pay the fees.
  - .1 Power distribution system including phasing, voltage, grounding, and load balancing.
  - .2 Circuits originating from branch distribution panels.
  - .3 Lighting system and control devices.
  - .4 Motors, heaters, and associated control equipment, including sequenced operation of systems where applicable.
  - .5 Systems: Fire alarm and communications.
  - .6 Any other system: As indicated in drawings and specifications.
  - .7 Provide a certificate or letter from the manufacturer stating that the entire installation of each network has been done to his complete satisfaction.
  - .8 Insulation resistance testing:
    - .1 Megger circuits, feeders, and equipment up to 350 V with a 500-V instrument.
    - .2 Megger 350-600 V circuits, feeders, and equipment with a 1,000-V instrument.
    - .3 Check resistance to ground before energizing.
- .5 Carry out tests in presence of Departmental Representative, as required in Division 26 requirements and as per Section 01 91 13 - General Commissioning (Cx) Requirements.
- .6 Provide instruments, meters, equipment, and personnel required to conduct tests during and at conclusion of Project.
- .7 Submit test results to Departmental Representative.
- .8 Manufacturer's Field Services:
  - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting, and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
  - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

**3.12 SYSTEM START-UP**

- .1 Instruct Departmental Representative in operation, care, and maintenance of systems, system equipment, and components.
- .2 Start devices and ensure that operating personnel are familiar with all aspects of their maintenance and operation.

**3.13 COMMISSIONING**

- .1 Commissioning equipment provided by Division 26 in accordance with Section 01 91 13 - General Commissioning (Cx) Requirements.

**3.14 CLEANING**

- .1 Progress Cleaning: Clean in accordance with Section 01 74 00 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment, in accordance with Section 01 74 00 - Cleaning.
- .3 Waste Management: Separate waste materials for recycling in accordance with Section 01 74 19 - Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**

**Partie 1      General****1.1      RELATED SECTIONS**

- .1      Section 28 13 00 – Security – Door Control System and Intrusion Detection.
- .2      Section 28 23 00 – Security – Video Surveillance System.

**1.2      DEFINITIONS**

- .1      (CAS) Access Control System.
- .2      (CSS) Camera Surveillance System.
- .3      (PSPC) Public Services and Procurement Canada.

**1.3      REFERENCE STANDARDS**

- .1      National Building Code (NBC 2015).
- .2      CSA C22.1 1-2019 24<sup>th</sup> Edition – Canadian Electrical Code.

**1.4      GENERAL WORK DESCRIPTION**

- .1      Work shall consist of, without being limited to:
  - .1      The Contractor shall provide, install, connect, and configure intrusion detection components and configure them on the existing FAAS system at the site.
  - .2      **Contractor must provide parts of an Emergency Call System for accessible washrooms in coordination with Division 08.**
  - .3      The Contractor shall provide and install the cabling infrastructure and accessories required for the installation of new CCTV cameras. The supply, installation of the new cameras and integration to the CSS will be carried out by CSC.
  - .4      The ducts for the systems described above are described in Division 26.

**1.5      USE OF THE PREMISES**

- .1      The use of the premises is restricted to the spaces identified for the execution of the work and storage. The work shall be carried out without hindering the movement of people.
- .2      If necessary, determine with the Departmental Representative the access routes to the site, storage areas, where materials can be stacked and the location of facilities.
- .3      Move stored materials that interfere with the operations of the Departmental Representative or other Contractor.
- .4      If necessary, after obtaining the required authorizations, assume the costs of using the storage areas or additional work required to carry out the work.



**1.6 TIMELINE AND COORDINATION**

- .1 Prepare the physical security work schedule for inclusion in the overall project schedule.
- .2 The General Contractor shall ensure that the necessary coordination of the work is carried out with all involved subcontractors.

**1.7 DESIGN REQUIREMENTS**

- .1 All cables shall be adapted to the condition of use in accordance with Table 19 of the Canadian Electrical Code, even if the type of equipment to be connected is not governed by the Code.
- .2 Unless otherwise specified, cables shall meet the following requirements:
  - .1 The manufacturer's requirements according to their application.
  - .2 When installed indoors, they shall be covered with a sheath meeting the FT4 class and be installed in ducts.
  - .3 The cable gauge shall be increased if the voltage drop is greater than 5%.
  - .4 No splicing is accepted.
  - .5 Be of sufficient length with a reserve to allow a minimum of five (5) connections to the component to be made in the event of accidental breakage.
  - .6 Apart from network cables for the horizontal cable subsystem, all cable cores for security equipment shall be stranded (no solid conductors).

**1.8 SUBMITTALS**

- .1 All documents to be submitted shall be accompanied by a transmission form.
- .2 Submit the following data sheets:
  - .1 Data sheets for all types of cables.
  - .2 All equipment data sheets to be provided in this section.
  - .3 The manufacturer's instructions for installing his equipment.
  - .4 The manufacturer's manuals regarding the use of his equipment.
  - .5 Submit a cable list that covers all cables and wires in place and includes the following:
    - .1 Cable number.
    - .2 Termination.
    - .3 Origin.
    - .4 Function and specifications on equipment interconnections.
    - .5 Cable type.
  - .6 Submit maintenance manuals that will include, for each of the equipment, the following:
    - .1 A description of the required maintenance tasks including inspection methods.

- .2 The periodic preventive maintenance procedure.
- .3 Submit the following shop drawings:
  - .1 Wiring diagrams and details of equipment installation shall indicate the location, suggested layout, cable route and arrangement, control panels, accessories, piping, conduits, and all other elements which shall be shown to achieve a coordinated system.
  - .2 Wiring diagrams shall indicate the circuit terminals, the internal wiring of each device as well as the interconnections between the different devices.
  - .3 Drawings shall indicate the clearances necessary for the operation, maintenance, and replacement of the equipment.
  - .4 If changes are required, inform the Departmental Representative before they are made.
- .4 Documents to be kept on site:
  - .1 The Departmental Representative will provide two (2) sets of drawings. On one of the sets, indicate, as they are made, all the changes made during the execution of the work.
  - .2 At the end of the work, have the information noted on the first set carried over to the second set, to show the systems and devices as they were installed.
  - .3 Keep these drawings on site and make them available for reference and verification purposes.
- .5 Documents marked "as built" to submit to the Departmental Representative:
  - .1 Identify each drawing in the lower right corner, in letters at least 12 mm in height, as follows: "DRAWING 'AS BUILT': THIS DRAWING HAS BEEN REVISED AND SHOWS THE SYSTEMS AND DEVICES AS INSTALLED", "Contractor's name", "Contractor's signature" and "Date".
  - .2 Submit the drawings to the Departmental Representative for approval and then make corrections as directed.

## 1.9 QUALITY ASSURANCE

- .1 Workforce qualification: security work shall be performed by qualified personnel in good standing under the terms of the law of the Province of Quebec on vocational training and workforce qualifications. In addition, the staff assigned to the programming or supervision of security systems shall hold a certification from the manufacturer demonstrating that they have received and successfully completed training courses to install and start up the security system for which they are responsible. Employees enrolled in a provincial apprenticeship program may perform specific tasks if they are under the direct supervision of a skilled worker.
- .2 Qualification of the Specialized Contractor: the security work shall be carried out by a specialized firm in compliance with the Private Security Act (R.S.Q. chapter S3.5) prescribed by the local authorities of the Province of Quebec, including the staff assigned to the work of connecting and starting up the systems.

- .3 The Contractor shall perform the health and safety tasks on construction sites.

#### **1.10 WASTE MANAGEMENT AND DISPOSAL**

- .1 Remove all packaging materials from the site and route them to appropriate recycling facilities.

#### **1.11 WORK INSPECTION**

- .1 Before requesting the provisional inspection, the Contractor shall:
  - .1 Complete work to 100%, otherwise the Departmental Representative may refuse to issue an excessively long list of deficiencies. In addition, the Contractor may be billed for unnecessary trips by the Departmental Representative, due to a lack of coordination or neglect.
  - .2 Clean all devices integrated into the project and retouch the paint on the equipment, if necessary.
  - .3 Submit all documentation requested under "Submittals."
- .2 During the preliminary inspection, the Contractor shall:
  - .1 Fully demonstrate that systems and equipment operate in accordance with the requirements of drawings and specifications.
  - .2 Possess the devices to measure resistance, voltage and amperage, and tools such as screwdrivers, pliers, flashlights, etc., providing access to the connections of components and reconnection if necessary.
  - .3 Provide the Departmental Representative with the means to carry out audits, such as the availability of a person with the required project knowledge to conduct inspections and tests.
    - .1 Place stepladders and ladders where needed, move ceiling tiles, open access doors, etc.

#### **1.12 ACCEPTANCE OF WORK**

- .1 Upon receipt of written notice from the Contractor that his work is complete, the Departmental Representative will conduct a general inspection of the work.
- .2 The Departmental Representative will list all defects that they deem need to be corrected. This list will be called "DEFICIENCIES LIST".
- .3 Following written confirmation by the Contractor that all work has been completed in accordance with the contract documents and the "DEFICIENCIES LIST" issued by the Departmental Representative, the Departmental Representative will conduct a second audit if necessary. If the installation is compliant and acceptable, an official document approving the work will be issued.

**1.13 FINAL ACCEPTANCE**

- .1 A final acceptance certificate is issued by the Departmental Representative when the supplier has:
  - .1 Corrected the deficiencies identified with the provisional approval to the satisfaction of the Departmental Representative.
  - .2 Paid in full all its Subcontractors.
  - .3 Met all the requirements of the Contract.
  - .4 Requested such a certificate from the Departmental Representative.
  - .5 Completed and submitted a formal statement regarding the distribution of initial payment by the Contractor.

**1.14 GETTING STARTED WITH THE INSTALLATION**

- .1 Instruct the Customer's Representative and operating personnel on the mode of operation and maintenance methods of the installation, its devices, and components.
- .2 Failing to control the execution of the work to the satisfaction of the Departmental Representative or when requested specifically for a particular product, retain, and pay for the services of the manufacturer to monitor the start-up of the installation, to verify, adjust, balance, and calibrate the various elements and to instruct the operating personnel.
- .3 Provide these services for a sufficient period, anticipating the number of visits necessary to start up the equipment and ensure that operating personnel are familiar with all aspects of their maintenance and operation.

**1.15 OPERATING INSTRUCTIONS**

- .1 Provide operating instructions for each main system and for each main unit prescribed in the relevant sections of the specification for operations, management, and maintenance personnel.
- .2 Operating instructions shall include the following:
  - .1 Wiring diagrams, control diagrams, control sequence for each main system and for each device.
  - .2 Start-up, adjustment, adjustment, lubrication, operation, and shut down procedures.
  - .3 Safety precautions.
  - .4 Procedures to be followed in case of failure.
  - .5 Other instructions, according to the manufacturer's recommendations for each system or device.
- .3 Provide instructions that are printed or engraved, placed under glass frame, or laminated in an approved manner.
- .4 Display instructions in approved locations.

- .5 Weather-exposed operating instructions shall be made of resistant material, or they shall be placed in a weatherproof envelope.
- .6 Ensure that operating instructions will not fade if exposed to sunlight.

**1.16 WARRANTY**

- .1 See general conditions for details on warranty.

**1.17 SPECIAL PROVISIONS – SECURITY WORK**

- .1 No changes to the original drawings and specifications can be performed without the written request of the Departmental Representative.
- .2 In all cases, the Departmental Representative shall be consulted and only they can give authorization for any changes to be made with respect to drawings and specifications. All work not in accordance with the drawings and specifications shall be modified by the Contractor, at no additional cost.
- .3 During construction, the Departmental Representative has the right to request changes to drawings and specifications when they see fit. These changes will not affect or void the terms of this contract. If they result in an increase or decrease in the cost of the work, an adjustment will be made to this contract following a conformity assessment.

**1.18 SPECIAL PROVISIONS - APPARATUS AND MATERIALS**

- .1 Quality.
  - .1 Unless otherwise specified, the equipment and materials used to carry out the work shall be new, in perfect condition, manufactured, assembled, and tested in the factory, in accordance with the terms of the contractual documents. They shall be ready to be installed for the purposes for which they are intended. If necessary, provide evidence establishing the nature, origin and quality of the products supplied.
  - .2 In accordance with the requirements, equipment and materials shall bear an approval label from a certified body recognized by the Quebec Construction Code.
  - .3 All information on devices and materials (operational or otherwise) shall be bilingual.
  - .4 Equipment and materials found defective before the completion of the work are rejected, regardless of the results of previous inspections. The Contractor shall perform the removal and replacement of defective products at his own expense. They are responsible for delays and associated costs.
  - .5 Devices or materials shall have the characteristics and dimensions suitable for the places where they are installed. Notify the Departmental Representative before installing any device or material that does not meet these conditions.

- .2 Availability.
  - .1 Parts and products shall not be for the exclusive use of the Contractor who obtains the contract. Security devices and software shall be commercially available in Quebec for a minimum of 12 months by at least three (3) accredited installers and at a price comparable to the competition.
  - .2 Immediately after being awarded the contract, the Contractor shall deliver equipment and materials according to requirements and anticipate any delays. The Contractor shall order the required quantities, at the right time, taking into account the work schedule and the storage capacity on site. If it is possible to anticipate certain delays in delivery, notify the Departmental Representative so that measures can be taken to substitute them with replacement equipment or materials or to make the necessary corrections, and this, sufficiently in advance to restrict delaying the work.
    - .1 Should the Departmental Representative not been notified of foreseeable delays in delivery at the beginning of the work, and should it also seem likely that the execution of the work will be delayed, the Departmental Representative reserves the right to substitute the expected equipment or materials with other comparable equipment or materials that can be delivered more quickly, provided that the contract price will not be increased.
- .3 Transport.
  - .1 Transportation costs of equipment or materials required for the execution of the work are the responsibility of the Contractor.
  - .2 The Contractor is responsible for the inspection, storage, installation and connection of equipment and materials arriving on site.
  - .3 Move and store equipment and materials under lock and key, avoiding damage, alteration, or soiling, and following the manufacturer's instructions where applicable.
  - .4 Store equipment and materials in their original packaging, taking care to leave the manufacturer's label and seal intact.
  - .5 Replace damaged equipment or materials at no additional cost, to the satisfaction of the Departmental Representative.
  - .6 Unless otherwise specified, install or set up equipment or materials according to the manufacturer's instructions.

## **Partie 2      Products**

### **2.1            MATERIALS AND EQUIPMENT**

- .1 Where required by the Canadian Electrical Code, equipment shall be CSA certified. In cases where certified equipment cannot be obtained or where it is an assembly to be connected to an electrical installation and the assembly requires certification, submit the

materials and equipment or assembly to the competent authority and obtain the required authorizations before delivering it to the site or putting the assembly into service.

- .2 The security cable conductors (excluding IP network cables) shall be of the multi-strand type (no solid conductor).
- .3 All components shall be of appropriate quality for intensive use.
- .4 All components shall operate within the manufacturer's recommended limits.

## 2.2 WIRING TERMINATIONS

- .1 Ensure that the lugs, terminals, and screws used for wiring terminations are suitable for both copper and aluminum conductors.
- .2 Junction connectors (wire to wire) shall be of the compression type with gel against corrosion and moisture.
- .3 Use eyelet-type compression terminations when connecting to a bolt (e.g., grounding a piece of equipment). Fork-type endings are to be avoided.
- .4 When connecting to a terminal block, strip the wire to a suitable length. The unsheathed portion should not exceed the depth of the terminal block. For stranded wire less than 22 AWG calibre, the conductor shall be unsheathed to a length double to what is normally required and folded on itself, and twisted before being inserted into the terminal.

## 2.3 COMPONENT IDENTIFICATION

- .1 To identify equipment cabinets, use indicator plates that comply with the following requirements:
  - .1 Nameplates: Lamicoid 3 mm thick plastic engraving sheet, melamine with black matte finish face and white core, letters accurately aligned and engraved into core, mechanically attached with self-tapping screws, aligned letters, etched in the plate.
  - .2 Format as indicated in the table below.

NAMEPLATE FORMAT			
Format 1	10 x 50 mm	1 line	3 mm high letters
Format 2	12 x 70 mm	1 line	5 mm high letters
Format 3	12 x 70 mm	2 lines	3 mm high letters
Format 4	20 x 90 mm	1 line	8 mm high letters
Format 5	20 x 90 mm	2 lines	5 mm high letters
Format 6	25 x 100 mm	1 line	12 mm high letters
Format 7	25 x 100 mm	2 lines	6 mm high letters

- .2 Wordings on nameplates shall be approved by the Departmental Representative prior to manufacture.
- .3 Allow at least twenty-five (25) letters per nameplate.

- .4 Equipment cabinets shall bear a label of format 3 when the width of the cabinet is less than 600 mm, and of format 4 in other cases. Number according to the Departmental Representative directives.

## **2.4 WIRING IDENTIFICATION**

- .1 Both ends of the cables shall be permanently and indelibly marked with self-laminating Brady plastic tape or equivalent. Identification shall be carried out in accordance with the following structure:
  - .1 For a component associated with a door, the identification shall be YYYY-BBBB (YYYY is the door number and BBBB is the component code).
  - .2 For a component that is not associated with a door, the identification shall be CCCC-BBBB (CCCC represents the number XXX and BBBB represents the component code).
  - .3 The information to identify the components is found on the drawings. Do not improvise a numbering if the requirements mentioned above are not available. If so, the Representative will provide the missing information.
- .2 The identification structure shall be uniform throughout the installation.
- .3 Use communication cables and conductors with uniform colour marking throughout the network.
- .4 Unless agreed by the Departmental Representative, the colour coding of the cable sheaths and conductors shall be uniform throughout the installation for the same type of component.

## **2.5 DUCT IDENTIFICATION**

- .1 See Division 26 - Electrical.

## **2.6 EQUIPMENT CABINET CONSTRUCTION**

- .1 The size of the cabinets shall be at least 14-gauge steel, unless otherwise specified.
- .2 The size of the mounting plate in the cabinet shall be at least 12-gauge steel, unless otherwise specified.
- .3 When the cabinet is to be mounted on a shaft, the cabinet shall be secured with stainless steel "U" bolts and be suitable for this type of installation.
- .4 All cabinet locking mechanisms shall be equipped with a key lock, two (2) keys per cabinet, with the same key path for all cabinets.
- .5 Cabinet hinges firms shall be of the security type.
- .6 Provide ventilation louvres when the heat released from equipment requires louvres to keep the temperature below the prescribed limits. Add fans if necessary.



**2.7 EQUIPMENT CABINET AND METAL HOUSINGS FINISH**

- .1 The surfaces of metal housings shall be finished at the factory and be coated with one (1) rustproof primer and at least two (2) coats of finishing painting enamel or equivalent.

**Partie 3 Execution****3.1 INSTALLATION**

- .1 Unless otherwise specified, carry out the entire installation in accordance with CSA C22.1.
- .2 Design, supply, install, and integrate all components and accessories such as enclosures, connectors, finishing and mounting plates, cables, and wires, as well as the labour and services necessary for the proper functioning of the security system.
- .3 Take the necessary measures to ensure the protection of the components so that they are protected from vandalism and damage until the final acceptance of the work.
- .4 Drill and patch walls and ceilings following the installation of components and the passage of cables.
- .5 Collect data on the information to be entered into the database. This data will be provided by the Departmental Representative on the Contractor's forms. The Contractor shall guide the Departmental Representative in the collection of data.

**3.2 LABELS, INDICATOR PLATES AND SIGNAGE PLATES**

- .1 Ensure that CSA labels, indicator plates and signage plates are visible and legible once materials are installed.

**3.3 CABLE INSTALLATION**

- .1 Meet the manufacturer's requirements.
- .2 Wiring installation shall be done so that all the cables are installed in the conduits provided for in Division 26. Unless an exception is approved by the Departmental Representative, the wiring assembly shall be inserted into conduits. The Security Contractor is responsible for completing certain conduit runs over a distance not exceeding 3 m. For the ends of runs where installing a rigid conduit is not adequate, the security Contractor will supply and install flexible ducts.
- .3 The security Contractor shall ensure that the power cables for electrical locks are concealed and inaccessible on the unsecured side. Coordinate with the Electrical Contractor responsible for installing conduits so that the pull boxes are not accessible on the unsecured side.
- .4 When grouped, the cables and wires shall be fastened using Velcro type fasteners. The use of self-locking nylon ties is prohibited.

- .5 All cables and wires (horizontal and vertical) shall be free of cuts and/or seal/splice. Cables from end-of-line components shall be continuous to the main panel or control module.
- .6 All cables and wires shall be installed as far as possible from any electrical and/or electromagnetic source such as electrical cables, ballasts, fluorescents, motors, transformers, and all other sources. In particular, the following installation distances shall be respected:

DESCRIPTION OF THE SOURCE	SEPARATION
Wiring or electrical equipment (shielded or unshielded) with a power of less than 2 kVA	130 mm
Wiring or electrical equipment (shielded or unshielded) with a power between 2 and 5 kVA	310 mm
Wiring or electrical equipment (shielded or unshielded) with a power of more than 5 kVA	620 mm
Motors, transformers, photocopiers, electrical room, and other electromagnetic sources	1 000 mm

- .7 All security cables and wires shall be installed and secured in dry areas, respecting the traction limits, the minimum radii of curvature and any other installation constraints indicated by the manufacturer or set out in the applicable installation standards. Shielded cables should be grounded with a single point on each section, unless otherwise stated in the manufacturer's requirements. Where appropriate, all cables that may be exposed to lightning shall be adequately protected with appropriate devices.
- .8 To be electrically impervious to electromagnetic fields, all major metal parts (frames, cabinets, and desks) shall be grounded at the building's grounding grid. Grounding shall be carried out in accordance with the manufacturer's recommendations.
- .9 Cables and wires shall never be in contact with hot surfaces, electrical power cables, machinery or ducts attributed to other services (steam piping, hot water, lighting accessories, motors, transformers, etc.).
- .10 It is the Contractor's responsibility to make all required openings in the floor, ceiling, and walls. All existing walls, floors, ceilings, or other site structures damaged by the passage of wiring or by the installation of the equipment shall be repaired in accordance with the existing finishes.
- .11 If it is necessary to use a lubricant to facilitate cable pulling, use a product that is safe for human contact and the environment. In addition, it shall be compatible with all types of sheaths and CSA approved. Submit the product's data sheet and obtain authorization before use.

### 3.4 INSTALLATION OF CONDUITS

- .1 Described in Division 26 - Electrical.

- .2 The Contractor is responsible for sizing the ducts for security needs according to the cables and equipment he offers.
- .3 Submit for review drawings indicating the distribution of wiring in all conduits.

### **3.5 LOCATION OF EQUIPMENT AND MATERIALS**

- .1 Unless otherwise specified or required, measure the component installation height from the finished floor to the component's horizontal centreline.
- .2 In cases where the mounting height is not indicated, check with the competent persons before starting the installation.
- .3 Observe the manufacturer's recommended mounting heights and those indicated in the drawings. Coordinate the location of components according to expected results and coordinate with Division 26 for the installation of conduits.
- .4 The exact location of the equipment or materials is defined only schematically on drawings, final positioning shall be carried out jointly with the Departmental Representative on the site. The position on drawings can be changed at no additional cost or credit provided that the displacement does not exceed 3 m.
- .5 Install equipment, materials and conduits in a way that minimizes clutter and maintains as much usable space as possible, in accordance with the manufacturer's recommendations for safety, access and maintenance.
- .6 Inform the Departmental Representative of any problems that may be caused by the location of a device or material and install it as directed by the Departmental Representative.
- .7 If access hatches need to be installed to allow maintenance or access to devices or materials, make a request to the Departmental Representative. The supply and installation of access hatches will be the responsibility of the Departmental Representative.

### **3.6 PROTECTION OF WORKS IN PROGRESS**

- .1 Provide sufficient protection for completed or in progress works. Works damaged or altered due to lack of compliance with the indicated protective measures shall be replaced or repaired free of charge, as directed by the Departmental Representative.
- .2 Unless otherwise specified, obtain written authorization from the Departmental Representative before cutting, drilling, or installing a sleeve through framework.

### **3.7 COORDINATION OF PROTECTIVE DEVICES**

- .1 Ensure that circuit protection devices such as circuit breakers, relays and fuses are installed, and that they are the correct size and set to the required values.
- .2 Provide the measuring instruments, indicators, equipment, and personnel required to carry out the tests during the execution of the work and at the completion of the work.

**3.8 COORDINATION OF DRAWINGS AND SPECIFICATIONS**

- .1 The drawings and specifications indicate in a schematic and approximate way the location of the devices and components.
- .2 Verify the dimensions and exact layout of the equipment on the premises and not at scale on the drawings.

**3.9 SYSTEM START-UP**

- .1 Provide the necessary services to ensure, at the end of the work, the start up, coordination, integration, and adjustment of security systems for optimal operation.
- .2 If the technical expertise is not in accordance with the expectations of the Departmental Representative, retain the services of the manufacturer or a specialist accredited by the latter to validate whether the work was carried out in accordance with the manufacturer's requirements. The manufacturer or specialist shall make recommendations on the installation, programming and use of the components and conduct periodic visits to verify whether the implementation has been carried out according to the recommendations.
- .3 All costs incurred by retaining the services of the manufacturer or an accredited specialist are at the Contractor's expense if the Departmental Representative considers that the Contractor does not have full expertise of the work.

**3.10 CLEANING**

- .1 The Contractor shall keep the premises clean and public property free of debris and waste. Remove waste and debris from the workplace and dispose of it. See to clean at the end of the work.
- .2 Clean and retouch painted surfaces in the workshop that have been scratched or damaged during transport and installation; use paint of the same type and colour as the original paint.
- .3 Clean hooks, brackets, fasteners, and other exposed non-galvanized fasteners and apply a primer to protect them from rust.

**END OF SECTION**

**Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 28 05 01 - Security - Common Work Results.
- .2 Section 28 23 00 - Security - Video Surveillance System.

**1.2 DEFINITIONS**

- .1 (CSC) Correctional Service Canada.
- .2 (CSS) Camera Surveillance System.
- .3 (DCS) Door Control System.
- .4 (FAAS) Fire Alarm and Audio System.
- .5 (PSPC) Public Services and Procurement Canada.

**1.3 REFERENCE STANDARDS**

- .1 See Section 28 05 01.

**1.4 DESCRIPTION**

- .1 The intrusion detection system is existing.
- .2 The door control system is existing.
- .3 The work on the ~~door control system~~ and intrusion detection described in this section shall be carried out under the responsibility of the General Contractor.

**1.5 DUTIES**

- .1 Without limitation, the main functions to be performed for the door control application or to be available for future use are the following:
  - .1 The system shall be capable of detecting the position and locking status of the indicated doors and displaying this status in the existing DCS at the control station.
  - .2 The system shall be able to activate the locking mechanism of the indicated doors momentarily and/or in a sustained manner and display this status in the existing DCS at the control post.
  - .3 The system shall allow the supervision of a loss of communication, an auxiliary power fault, etc.
  - .4 The Contractor shall study the existing configurations and configure the system to meet the most restrictive requirements. The Contractor shall replicate the existing nomenclature for the new system components.

- .2 Without limitation, the main functions to be performed for the intrusion detection application or to be available for future use are the following:
  - .1 The system shall be capable of detecting intrusions through motion detector and door contact.
  - .2 The system will have to route the alarms to the checkpoint.
  - .3 The system shall allow the supervision of a loss of communication, an auxiliary power fault, etc.
  - .4 The Contractor shall study the existing configurations and configure the existing FAAS system to meet the most restrictive requirements. The Contractor shall replicate the existing nomenclature for the new system components.

## 1.6 PERFORMANCE REQUIREMENTS

- .1 Environment: the system and components of the intrusion detection system shall be designed to operate in accordance with all prescribed requirements at the following ambient temperatures.
  - .1 Temperature: from to 0°C to 30°C.
  - .2 Humidity: 10% to 90% (non-condensed).

## 1.7 WORKSHOP DRAWINGS AND DATA SHEETS

- .1 Submit the required shop drawings and data sheets in accordance with the requirements described in section 28 05 01 – Security – Common Work Results.
- .2 The data sheets to be submitted are as follows:
  - .1 Data sheets for all types of cables.
  - .2 All equipment data sheets to be provided in this Section.
  - .3 The manufacturer's instructions for installing his equipment.
- .3 The workshop drawings to be submitted are as follows:
  - .1 The wiring lists of the systems in this section.
  - .2 A design book specific to this project showing the connections and connections of the typical devices (at both ends of the cables).
  - .3 Blank test books that will be used by the Contractor to conduct its performance tests prior to provisional inspections.

## 1.8 GUARANTEE

- .1 Submit for comments, the warranty certificate in accordance with the requirements described in section 28 05 01 – Security – Common Work Results.

## 1.9 COMPLETION DOCUMENT

- .1 Submit the required completion documents, in accordance with the requirements described in section 28 05 01 – Security – Common Work Results.

- .2 The completion documents to be submitted are as follows:
  - .1 All up-to-date documentation indicated in the paragraph WORKSHOP DRAWINGS AND DATA SHEETS.
  - .2 The single-line diagram of "As-Built" systems.
  - .3 Printed reports of the entire system configuration.
  - .4 Management, operation, and maintenance manuals.
  - .5 The test book completed with positive results.
  - .6 The guarantee certificate.
  - .7 Software, licenses, and delivery of administrator/installer access codes.

## **1.10 WASTE MANAGEMENT AND DISPOSAL**

- .1 Evacuate all packaging materials from the site and transport them to appropriate recycling facilities.

## **Part 2 Products**

### **2.1 GENERAL**

- .1 The Contractor shall refer to the drawings as well as the technical and functional specifications, as described in the various sections, to determine the exact nature and amount of equipment and accessories to be supplied.
- .2 Based on the drawings and this technical specification, the Contractor shall define the complete list of equipment and software to be supplied according to the requirements requested in order to obtain a complete and functional solution.
- .3 This list should be developed taking into consideration the equipment and software specified in the other sections listed in the "Related Sections" section.
- .4 The supply is not exhaustive, either from a quantity point of view or from a standard point of view. Unless otherwise stated, the Contractor shall provide and install all equipment and accessories necessary for the implementation of the solution.
- .5 All materials, appliances and equipment shall be new, flawless, and free from defects.
- .6 All materials to be provided in this section shall be commercially available in the Province of Quebec. In the event of a failure of a piece of equipment, the manufacturer of the part shall be able to supply and deliver the defective part in less than 24 hours from the request of the order. It is the Contractor's responsibility to obtain and submit the manufacturer's commitment to fulfill this requirement immediately upon warrant.
- .7 The products offered as part of the Contractor's solution shall not be exclusive to a single supplier. In return, the Contractor shall hold all necessary training and licenses to be authorized to purchase and install the products.

**2.2 (MDCR) MAGNETIC DOOR CONTACT RECESSED**

- .1 The magnetic door contact shall have, but is not limited to, the following characteristics:
  - .1 SPDT type contact on standard access door. DPDT type contact on the door in an intrusion partition;
  - .2 Drilling dimensions of 25 mm.
  - .3 Hermetically sealed in a polyurethane compound;
  - .4 Magnet contact and housing moulded in a flame-retardant ABS housing;
  - .5 Insulated magnet for installation in a steel door;
  - .6 Minimum load-free lifecycle of 10,000,000 operations;
  - .7 Activation distance adapted to the installation conditions.
- .2 Coordinate the dimension and positioning of the door contact with Division 08 before machining the doors.

**2.3 (MD) MOTION DETECTOR (90 DEGREES OR 360 DEGREES WHEN INDICATED)**

- .1 The motion detector shall meet, or exceed, the following characteristics:
  - .1 Includes dual-sensing technology: infrared and microwave.
  - .2 Allows detection up to 11 m.
  - .3 Equipped with anti-sabotage contact.
  - .4 Low-voltage operation: 8.9 to 14.5 VDC.
  - .5 Supplied with a mounting accessory adapted to the environment.

**2.4 REMOTE CONTROL PANEL DESK (RCPD)**

- ~~.1 The RCPD is used for remote door opening. The panel is existing and to be kept. LED status indicators and multi-state rotary knobs will need to be added to the existing RCPD. The buttons will be provided by the Departmental Representative, but the installation of the buttons is the responsibility of the Contractor. Status indicators shall be provided and installed by the Contractor.~~



- ~~.2 It has, but is not limited to, the following characteristics:-~~
  - ~~.1 Each button shall have an identifier representing the number (#) of the door and "entry/exit" when applicable (permanent identifier type plate in Lamieoid or equivalent).~~
  - ~~.2 Each button shall be associated with a LED indicator light (red/green) to indicate the lock/unlock status of the door:-~~
    - ~~.1 Green: Door closed.~~
    - ~~.2 Red: Door opened.~~
    - ~~.3 Off: Door unlocked held or momentarily.~~





- .3 If the button is associated with a lock with supervised bolt (refer to the hardware slip), each button shall be associated with a second LED indicator light to indicate the status (engaged or disengaged) of the deadbolt.
  - .1 LED off: Bolt disengaged.
  - .2 LED green: Bolt engaged.
- .4 The opening buttons have three positions. Position 1: Momentary unlock when turned left. Returns to position 2 automatically. Position 2: Normal condition, door normally locked. Position 3: Unlock held when turned right. Remains in this position as long as it is not returned to position 2.
- .5 If the door is kept unlocked via a software control, the indicator light status shall be turned off. Unlocking via the software takes precedence over the buttons' manual functionality.

**2.5****ELECTRIFIED HARDWARE (LOCKING MECHANISM)**

- .1 Electrified hardware is described in Division 08. Perform all power and control connections in accordance with the access controllers described in this section. Refer to the hardware slip in architecture for all the details.
- .2 This Section and the Hardware Section shall be coordinated with each other to ensure compatibility between the components and the access control system.
- .3 Where applicable, electrified hardware has, but is not limited to, the following characteristics:
  - .1 "Fail Secure" lock mode (locked when not powered).
  - .2 Monitoring of the locking condition of the lock and projection of the bolt (spring and dormant, if applicable).

**2.6****(DCS) DOOR CONTROL SYSTEM**

- .1 The door control system is existing and to be retained. The door control system is managed by a Delta programmable logic controller in each wing.
- .2 Prior to the work, the Contractor shall validate the number of inputs and outputs required to control the added doors and provide required expansion cards.
- .3 Provide DIN rail relay terminal blocks for distribution at primary (120 VAC) and secondary (24 VDC). A short circuit shall not affect the other components that are connected in the panel. Relay terminal blocks shall be equipped with a status LED announcing the relay's activity.
- .4 The connecting terminal blocks for the outputs shall be protected by a diode and have a capacity to support twice the load that will be applied.
- .5 Components requiring a power source shall be powered from a power supply independent of that of the PLC's I/O modules. We shall find protection in high school at each exit. The short circuit of one component to be supplied shall not affect the other components.
- .6 Provide DIN type rail terminal blocks for the interconnection between the power supply and the terminal blocks connecting to the PLC. Provide relay terminal blocks when the

~~terminal block needs to power a component. Relay terminal blocks shall be equipped with a status LED announcing the activity of the relay.~~

- ~~.7 Provide DIN-type rail terminal blocks for interconnection between the components to be supervised and the connection points to the PLC. Provide two (2) terminal blocks per component to be supervised.~~

△  
1

- ~~.8 Cables and terminal blocks shall be clearly identified according to the standard of the establishment. The Contractor shall ensure that the identification standard is requested from the Departmental Representative.~~

- ~~.9 Configure and program the existing DCS to enable the activation of any described button features and all described LED states of the RCPD.~~

## 2.7 (FAAS) FIXED ALARM ANNUNCIATION SYSTEM

- .1 The establishment's alarm indication system is existing and needs to be recovered. This system is Senstar's 100 series and components on a Sennet network (NC controller, LTU transponder, etc.).
- .2 The Contractor has the obligation to interface with this system and to make the necessary modifications to the execution of the work described in the drawings and specifications. The Contractor shall connect, program, and configure two new detection zones, one per building.
- .3 Plan all the work required to add the functions to display, control and record events in the FAAS located at the Main Communications and Control Post (MCCP). Changes to the system shall adapt to existing infrastructures and be consistent with existing naming, conventions, and procedures.
- .4 Provide the appropriate output for power and data capture from the supplied detection components.

## 2.8 WIRING AND CONDUITS

- .1 The conduits are described in Division 26.
- .2 The Contractor shall supply and install all cables necessary to connect all components of the intrusion detection system, as well as connectors and Velcro fasteners.
- .3 The cables specifications are defined in section 28 05 01 – Security – Common Work Results.

## 2.9 EMERGENCY CALL

- .1 **Provide the components of a emergency call system for the “accessible” washroom.**
- .2 **Provide an emergency call button with visual and audible indicator. The button shall meet the following requirements:**

△  
1

- .1 **Mounting on steel plate fixed a double gang electrical box.**
- .2 **Vandal resistant.**
- .3 **Mushroom-type red button with Push/Pull operation.**

- .4 Visual LED indicator with French text indicating the request for help
  - .5 Equipped with audible alarm of at least 85 dB
  - .6 24 VDC power. Can be powered directly by the door operator controls.
- .3 Provide a dome type visual LED and audible indicator. The indicator shall meet the following requirements:



- .1 Mounting on a standard electrical box.
- .2 Vandal resistant.
- .3 Clear visibility of the light in day and night environments with French text on the casing indicating the request for help.
- .4 Equipped with audible alarm of at least 90 dB.
- .5 24 VDC power. Can be powered directly by the door operator controls.

### Part 3 Execution

#### 3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with the manufacturer's written requirements, recommendations, and specifications, including any available technical bulletins, instructions in the product catalogue, those appearing on the product packaging and the indications in the data sheets.

#### 3.2 INSTALLATION

- .1 Install components in accordance with the manufacturer's written installation instructions, depending on the locations, mounting heights and monitoring areas appearing on the revised shop drawings.
- .2 The connection of each of the security components shall be carried out using a configuration of double end-of-line resistors. It is imperative that the resistors are localized to the component and not to the panel.
- .3 Securely attach components to walls, ceilings, and other indicated supports.
- .4 Install the required boxes in non-visible accessible areas.
- .5 At all times, the connection of the components shall be non-apparent (concealed in the component housing). As far as possible, all connections should be concealed in the component housing, unless otherwise impossible.
- .6 All control and low-voltage power supply equipment shall be in rooms or cupboards dedicated to the installation of security system control equipment.

#### 3.3 (MDCR) MAGNETIC DOOR CONTACT RECESSED

- .1 The magnetic contact shall be installed in the upper part of the door frame at a maximum distance of 10 cm from the side opposite to the hinges.
- .2 The contact shall be secured firmly with an adhesive or silicone so that it cannot be removed except with a tool or by damaging it.

- .3 In the case of doors with two (2) swings, it is required to install two (2) connected contacts so that the opening of either swing is detected.

- .4 Wiring: two (2) cables of four (4) multi-stranded 22-gauge conductors.

### 3.4 (MD) MOTION DETECTOR (90 OR 360 DEGREES)

- .1 The location of the motion detector shall be determined according to the environment and in accordance with the manufacturer's requirements.

- .2 The detector shall be installed according to the installation manual.

- .3 In the case of an installation without an electrical box, the detector shall be screwed with anchors.

- .4 The detection and anti-sabotage contact shall be connected separately.

- .5 Provide two (2) cables of four (4) stranded 22 AWG conductors.

### 3.5 REMOTE CONTROL PANEL DESK (RCPD)

- ~~.1 Connect the buttons according to the manufacturer's instructions.~~

- ~~.2 Use door and room numbers as an identifier (permanent inscription of the Lamicoid type or equivalent).~~

- ~~.3 The wiring shall be securely fixed and/or mechanically protected so as not to be damaged.~~

- ~~.4 Wiring: a 22-gauge multi-strand multi-cable for all buttons on a panel with a 25% reserve for future use.~~

### 3.6 ELECTRIFIED HARDWARE

- ~~.1 The Contractor shall ensure that the direction of control of the doors (and the side on which the security equipment such as the reader, electrified hardware, etc. is to be installed) represents the Client's intention in terms of control and security. It is important to coordinate with all the stakeholders involved in the supply of the hardware before the preparation of the doors and frames as well as with all the stakeholders involved in the supply of the electrical work before the deployment of the conduits.~~

- ~~.2 The Contractor shall provide and install a protective diode (1N4001) to the electrified hardware to prevent power returns.~~

- ~~.3 The Contractor shall remove the device, make the connections, and put it back in place.~~

- ~~.4 Connection via compression type connectors with anti-corrosion gel (to be concealed in the framing with a cable reserve of sufficient length to access the seal).~~

- ~~.5 Wiring: one cable of four (4) multi-stranded twisted conductors of 22-gauge for each supervision point, one cable of two (2) multi-strand twisted conductors of 18-gauge for each power point.~~

- ~~.6 Where applicable and without limitation:~~

- ~~.1 Perform the connection of the lock state monitoring:~~

- ~~.1 Monitoring of the condition of the bolt should be separated from monitoring of the door contact.~~
- ~~.2 Connect the door position contact.~~
- ~~.3 Connect the hardware supply.~~

~~.7 All the functionalities described and required on the hardware side shall be connected by the Contractor. The Contractor shall adapt its wiring and configuration accordingly, regardless of what is demonstrated in the drawings.~~



~~.8 Wiring: refer to the door type drawings, the manufacturer's specifications and the functions described in the hardware store to provide the appropriate wiring and according to the distances (e.g., type of cable, wire gauge, number of conductors). As a general rule, provide at least one cable of 4 conductors of gauge 22 for each supervision signal and one cable of two (2) conductors of gauge 16 for each power connection.~~

### 3.7

#### **(DCS) DOOR CONTROL SYSTEM**

- ~~.1 Arrange components to facilitate maintenance.~~
- ~~.2 All cables shall be arranged in openwork gutters.~~
- ~~.3 Program the PLC to perform the requested functions. The PLC shall be fully autonomous.~~



### 3.8

#### **(FAAS) FIXED ALARM ANNUNCIATION SYSTEM**

- .1 The FAAS system is existing (Senstar 100 series) and needs to be reused.
- .2 Provide a minimized plan (in the panel) indicating the location of the security components.
- .3 All intrusion detection components shall be connected directly to the FAAS.
- .4 Coordinate the configuration of alarm zones with the Departmental Representative.

### 3.9

#### **CONTROL**

- .1 Visual inspection: a check to assess the quality of the installation and assembly, as well as the overall appearance of the equipment, to ensure that the system complies with the contractual documents, and shall cover the following:
  - .1 Robustness of the fasteners of the material.
  - .2 Absence of damage due to the installation.
  - .3 Conformity of the location of the devices with the revised shop drawings.
  - .4 Compatibility of the installation of the equipment with the physical environment.
  - .5 Supply of all accessories.
  - .6 Identification of devices and identification of wiring.
  - .7 CSA registration or another certified organization for installation in Québec where required by the Code.

- .2 Technical inspection: validation that all systems and devices are properly installed, free from defects and damage, and shall cover the following points:
  - .1 Voltage and power measurement.
  - .2 Junctions/connections and attachment of the equipment.
  - .3 Measurement of signals and parameters.
  - .4 Compliance with the manufacturer's specifications, documentation, and installation instructions.
- .3 Operational control: control to ensure that the performance of devices and systems meets or exceeds established functional requirements, and shall address the following:
  - .1 Operation of each device, individually and in its environment.
  - .2 Operation of each device in combination with specific functions.
  - .3 Demonstrations of the features described in Part 1 of this Section.

### **3.10 ON-SITE TESTING**

- .1 Test the system elements and complete the test book before requesting an inspection.
- .2 In addition to the elements to be compiled in the test book, take the voltage and power measurements of each component connected to the system and compile everything in the test book (measurements taken at the component under the most demanding conditions).
- .3 Provide the necessary manpower and tools to demonstrate that the system is functional.
- .4 Demonstrate with supporting evidence that the system is functional (comparison of results with test book). If it is determined that the Contractor has not carried out his own tests by comparing the result of the test specifications with that of the tests in the presence of the Departmental Representative, the Departmental Representative will interrupt the testing and the Contractor will have to resume his own tests and the time-loss of the Departmental Representative will be borne by the Contractor.
- .5 Rectify any deficiencies that have been identified and re-demonstrate to the Departmental Representative that the system is ready to be delivered to the manager.
- .6 Once the tests have been completed, provide the inspector with the test book listing the items being tested.

### **3.11 CLEANING AND ADJUSTMENT**

- .1 Clean control panels and other system components to remove packaging, fingerprints, and other marks.

### **3.12 TRAINING**

- .1 Training given to the staff managing the intrusion detection system shall meet the following requirements:
  - .1 Training shall be in a real environment with functional equipment (application in a real context).
  - .2 Lasting two (2) hours per working group not exceeding four (4) staff members.

- .3 Provide a 2-hour session to cover all staff members.
- .4 Demonstrate the operation of all controls by performing a real simulation.

### **3.13 EMERGENCY CALL**

- .1 Connect the button, interior light indicator, exterior light indicator and audible alarms to allow for the following functionalities:**



- .1 Pressing the button activated the emergency call request. Once pressed, pulling the button resets the request for help.**
  - .2 The request for help shall activate the light indicators and audible alarms. The request for help shall also unlock the electric strike to allow for assistance whatever the actual state of the door lock.**
- .2 Coordinate the connection to the door operator and other door components for the proper function of the system.**

**END OF SECTION**