SPECIFICATIONS

SCC Modification of cell doors
Port-Cartier Institution

TPSGC

1, Chemin de l'aéroport, CP 1070, Port-Cartier (Québec) G5B 2W2

SR4-100 % Issued for tenders
December, 2020
In collaboration with Pageau Morel, SDK and ARD

TPSGC R.106617.001
File number BFAD : 190718

BISSONFORTIN
ARCHITECTURE + DESIGN

SPECIFICATIONS
SR4-100 % Issued for tenders, December, 2020.

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END OF SECTION

SPECIFICATIONS
SR4-100 % Issued for tenders, December, 2020.

PAGEAU MOREL

MECHANICAL

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ELECTRICAL

2020-12-17

Simon Lacharite, Eng.

END OF SECTION

SCC – MODIFICATIONS OF THE CELL DOORS
PORT-CARTIER ESTABLISHMENT

SDK Project: 191114

TPSGC

Structural quote
Divisions 02, 03 et 31

Prepared by: Stéphan Blais, ing., PA LEED BD+C

Revision	Emission	Date	By
C	SR4-100%_Issued for tenders	2020-12-10	SB
B	SR4-100%_Issued for construction	2020-08-14	SB
A	SR4-100%_Issued for bid	2020-05-07	SB

END OF SECTION

NUMBER OF PAGES

NUMBER OF PAGES

DIVISION 26 – ELECTRICAL

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

DIVISION 31 – EARTHWORK

END OF SECTION

Specifications, SR4-100 % Issued for tenders, December, 2020 prepared by the following firms :

Architecture :	Bisson Fortin et associés architectes
Structure :	SDK et associés
Mechanical and electrical :	Pageau Morel

ARCHITECTURE DRAWINGS :

R_106617.001-A01	Front page
R_106617.001-A02	Demolition plan – Sector S
R_106617.001-A03	Construction plan – Sector S
R_106617.001-A04	Excerpt of demolition and construction plans – Sector S
R_106617.001-A05	Elevations and sections – Sector S
R_106617.001-A06	Sections & Details – Sector S
R_106617.001-A07	Sections & Details – Sector S
R_106617.001-A08	Sections & Details – Sector S
R_106617.001-A09	Schedule of doors and frames, sections & details – Sector S

STRUCTURE DRAWINGS :

R_106617.001-S01	Generals notes
R_106617.001-S02	Ground floor plan
R_106617.001-S03-CO	Section
R_106617.001-S04-DT	Sections typical

MECHANICAL DRAWINGS :

R_106617.001-M01	Front page and legend
R_106617.001-M02	Fire protection - Sector S
R_106617.001-M03	Plumbing-Sanitary drain - Sector S
R_106617.001-M04	Plumbing – Domestic water – Sector S

ELECTRICAL DRAWINGS :

R_106617.001-E01-PN-LE	Electrical legends
R_106617.001-E02-PN-DS-N	Door control diagram – Existing / Modified
R_106617.001-E03-PN-DS-E	Electrical and lighting ground floor and 2nd floor existing
R_106617.001-E04-PN-DS-N	Electrical and lighting ground floor modified
R_106617.001-E05-PN-PRS-E	Services ground floor and 2nd floor existing
R_106617.001-E06-PN-PRS-N	Services ground floor modified
R_106617.001-E07-PN-SA-E	Auxiliary services ground floor existing
R_106617.001-E08-PN-SA-N	Auxiliary services ground floor and 2nd floor modified

END OF SECTION

PART 1 GENERAL

1.1 MAINTENANCE OF OPERATIONS

.1 The work will not in any case interfere with the operations of the establishment.

1.2 SCOPE OF WORK

.1 The following list describes the scope of work to be performed, without being restrictive. Complete the work down to the smallest detail in order to deliver a complete, functional and efficient installation. Unless otherwise indicated, the work includes the supply, installation, connection of equipment and testing.

.2 For the modification of cell doors and other related work, a non-exhaustive list, refer to the plans:

.1 Change all steel doors.
.2 Installation of a new automatic door opening system.
.3 Addition of manual control on either side of the access doors of the two corridors in order to supply power to each of the doors.
.4 Lowering of shower doors.
.5 Modification of the swing door between the even and odd corridors for a sliding door.
.6 Raising of ceilings.
.7 Modification of mechanical ducts above ceilings.
.8 Modification of corridor lighting.
.9 Add drainage channels.
.10 Adjust the runs of electrical conduits to raise the ceiling.
.11 Supply and install an electronic door entry system, including the control console and door integration.
.12 Customized control consoles modification to accommodate all new needs of the new door system.
.13 Refueling the entire new automatic steel door opening system to the technical rooms upstairs.
.14 New door hardware to install.

1.3 WORK BY OTHERS

.1 Co-operate with other Contractors in carrying out their respective works and carry out instructions from the Departmental Representative.

.2 Co-ordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to the Departmental Representative, in writing, any defects which may interfere with proper execution of Work.

.1 Periodically, maintenance work will be carried out by service suppliers designated by the Departmental Representative. The Contractor will be advised two (2) days in advance, except in case of emergencies at which time these designated suppliers will be given access without delay.
.2 Plan for a fire drill done annually at the building and during which all activities must be interrupted for a period representing half a day.

1.4 WORK SEQUENCE

.1 During construction, the Contractor will need to coordinate the work with the Departmental Representative to minimise the impact of the work on the specific sector.

.2 Required stages :
.1 Production of shop drawing and ordering material and equipment.
.2 Reception of all the material and equipment.
.3 Mobilization on site.
.4 Work.

.3 The Contractor will need to provide proof that all the material and equipment are on site or will arrive on site within less than a week prior to be able to mobilize on site.

.4 The Contractor will coordinate with the Departmental Representative the precise date for the site mobilization as soon as the materials are ordered. The occupants will need to be relocate to a different establishment for the duration of the work.

.5 Maintain fire access/control.

1.5 CONTRACTOR USE OF PREMISES

.1 Limit use of premises for Work and for storage to allow :
.1 The Departmental Representative occupancy.
.2 Work by other contractors.
.3 Public usage.

.2 Co-ordinate use of premises under direction of Departmental Representative.

.3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract. Refer to section 01 14 00 and to drawings for spaces made available to the Contractor.

.4 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.

.5 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.

.6 At completion of operations condition of existing work : equal to or better than that which existed before new work started.

1.6 PERIOD OF WORK

.1 Carry out the work in a period of twelve (12) months from the first day of mobilization of site.

1.7 OCCUPANCY BY THE DEPARTMENTAL REPRESENTATIVE

.1 The Departmental Representative will occupy the building during entire construction period for execution of normal operations. The users of sector S will be relocated during the work.

.2 Co-operate with the Departmental Representative in scheduling operations to avoid disturbing normal occupant’s activities and to avoid conflicts and to facilitate the Departmental Representative usage.

1.8 PARTIAL OCCUPANCY BY THE DEPARTMENTAL REPRESENTATIVE

.1 Schedule and substantially complete designated portions of Work for the Departmental Representative's occupancy prior to Substantial Performance of entire Work.

.2 Execute Certificate of Substantial Performance for each designated portion of Work prior to the occupancy by the Departmental Representative shall allow :
.1 Access for the Departmental Representative personnel.
.2 Use of parking facilities.
.3 Operation of HVAC and electrical systems.

.3 When present on the premises and for those areas of occupancy, the Departmental Representative will provide :
.1 Operation of HVAC and electrical systems.
.2 Maintenance.
.3 Security.

1.9 ITEMS SUPPLIED BY THE DEPARTMENTAL REPRESENTATIVE

.1 Contractor Responsibilities :
.1 Carry, receive and unload products at site.
.2 Inspect deliveries jointly with the Departmental Representative; record shortages, and damaged or defective items.
.3 Handle products at site, including unpacking and storage.
.4 Protect products from damage.
.5 Assemble, install, connect, adjust, and finish products.
.6 Provide installation inspections required by public authorities.
.7 Repair or replace items damaged by Contractor or subcontractor on site (under his control).

.2 List of the Departmental Representative furnished items :
.1 Granite slabs.

1.10 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance to building operations, occupants, public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

.2 For moving workers and material, refer to section 01 14 00.

1.11 EXISTING UTILITY SERVICES

.1 Before interrupting utility services, inform the Departmental Representative as well as the utility companies concerned, and obtain the necessary authorizations.

.2 Provide alternate routes for personnel, public and vehicle traffic.

.3 Before starting work, define the extent and location of utility pipes in the work area and inform the Departmental Representative.

.4 Submit to the Departmental Representative for approval a schedule relating to the shutdown or closure of active facilities or works, including the interruption of communications services or power supply. Respect the approved schedule and inform the parties affected by these inconveniences.

.5 Provide temporary utility services as directed by the Departmental Representative to maintain critical building and tenant systems.

.6 When unlisted utility pipes are discovered, immediately inform the Departmental Representative and record them in writing.

.7 Protect, move or keep in service utility lines that are functional. If non-functional pipes are discovered during the work, close them in a manner authorized by the competent authorities.

.8 Record location of utility lines that are maintained, relocated or abandoned.

.9 Build barriers in accordance with section 01 51 00 - Temporary utilities.

.10 Locate and trace existing underground services before any excavation. Any damage to existing services will be the responsibility of the Contractor. The passage of the new network on the plans is shown for information only and must be coordinated with the existing installations.

1.12 REQUIRED DOCUMENTS

.1 Maintain at job site, one copy each document as follows :
- .1 Contract Drawings.
- .2 Specifications.
- .3 Addenda.
- .4 Reviewed Shop Drawings.
- .5 List of Outstanding Shop Drawings.
- .6 Change Orders.
- .7 Other Modifications to Contract.
- .8 Field Test Reports.
- .9 Copy of Approved Work Schedule.
- .10 Health and Safety Plan and Other Safety Related Documents.
- .11 Other documents as specified.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

PART 1 GENERAL

1.1 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.

.2 Maintain existing services to building and provide for personnel and vehicle access.

.3 The contractor will be allowed to use the sanitary facilities of the Sector S, if needed.

.4 A space will be provided on site for the project team only for site meetings.

.5 Rest zone for Contractor's personnel.

.1 Contractor will be allowed to use the free rooms of the Sector S as a rest zone for the personnel. The contractor will provide the temporary furniture required for the personnel.

1.2 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance to building operations, occupants and public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

1.3 EXISTING SERVICES

.1 Before commencement work, define extent and location of utility pipes located within the work zone and advise Departmental Representative.

.2 Submit to the approval of Departmental Representative a detailed timetable related to the interruption or closing of installations or active work, including communication services or electrical power. Respect approved timetable and inform parties affected by this disturbance.

.3 When non identified utility piping are found, immediately inform Departmental Representative and prepare a written description.

.4 Protect, relocate or maintain in service the utility pipes that are functional. When non-functional pipes are discovered during the work, they are to be capped according to ways authorized by the relevant authorities.

.5 Keep log and record location of utility pipes that are maintained, relocated or abandoned.

.6 Provide for personnel traffic.

1.4 SPECIAL REQUIREMENTS

.1 Submit schedule in accordance with Section 01 32 16.06 – 01 32 16.07 – Construction Progress Schedule – Bar (GANTT) Chart.

.2 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.

.3 Keep within limits of work and avenues of ingress and egress.

.4 Ingress and egress of Contractor vehicles at site is limited to the delivery platform for this activity only. Contractor personnel pay use toll free outdoor parking subject to availability and Departmental Representative instructions.

.5 Deliver materials outside of peak traffic hours 9:00 to 11:30 and 13:30 to 15:30 unless otherwise approved by Departmental Representative. The contractor is solely responsible for these deliveries and he or his representative will be on site to receive the material.

1.5 SECURITY

.1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.

.2 Security escort :

.1 Personnel employed on this project must be escorted by a security agent when executing work in non-public areas during normal working hours. Personnel must be escorted in all areas after normal working hours.

.2 Submit an escort request according to Departmental Representative's procedure at least 7 days before service is needed. For requests submitted within time noted above, costs of security escort will be paid for by Departmental Representative. Cost incurred by late request will be Contractor's responsibility.

.3 For any cancellation on the security escort company, the notice request and cost will be at the discretion of the escort company.

.4 Calculation of costs will be based on average hourly rate of security officer for minimum of four (4) hours per day for late service request and for late cancellations.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.1 ADMINISTRATIVE

.1 Schedule and administer project meetings throughout the progress of the work.

.2 Except for the first meeting, distribute written notice for a meeting five (5) days in advance of meeting date to Departmental Representative.

.3 Meetings will be held at the predetermined room by Departmental Representative.

.4 Meeting minutes will be written and distributed by the Departmental Representative.

.5 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.2 PRECONSTRUCTION MEETING

.1 A few days after award of Contract, the Departmental Representative will request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Departmental Representative or their major representatives, Contractor and elevator Subcontractors, will be in attendance at this meeting (other Subcontractors at the request of the Departmental Representative).

.3 Agenda of meeting to be prepared by the Departmental Representative.

1.3 PROGRESS MEETINGS

.1 Establish a calendar of the meetings that will be held every two (2) weeks during course of Work and two (2) weeks prior to project completion.

.2 Major Subcontractors involved in Work and Departmental Representative, as well as their major representatives, and site superintendents must be present at these meetings.

.3 Notify parties minimum five (5) days prior to first meeting.

.4 Meeting minutes will be written and distributed by the Departmental Representative.

.5 Agenda to include the following :

- .1 Review, approval of minutes of previous meeting.
- .2 Review of Work progress since previous meeting.
- .3 Field observations, problems, conflicts.
- .4 Problems which impede construction schedule.
- .5 Review of off-site fabrication delivery schedules.
- .6 Corrective measures and procedures to regain projected schedule.
- .7 Revision to construction schedule.
- .8 Progress schedule, during succeeding work period.
- .9 Review submittal schedules: expedite as required.
- .10 Maintenance of quality standards.
- .11 Review proposed changes for effects on construction schedule and on completion date.
- .12 Health and security on site.
- .13 Other business.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.1 OBJECTIVES

.1 The Contractor must provide an execution calendar for following reasons :
- .1 Understand the different dates the establishment needs to be back in service.
- .2 Understand dates to which dates needs to be respected by professionals to proceed to the work on time (ex: shop drafting).
- .3 Provide a follow up for the project and intervene if there is any delay.
- .4 Rationally establish delays for work orders or changes along the project.

1.2 DEFINITIONS

.1 Activity : element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.

.2 Bar Chart (GANTT Chart) : graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.

.3 Baseline : original approved plan (for project, work package, or activity), plus or minus approved scope changes.

.4 Construction Work Week : Monday to Friday, inclusive, will provide five (5) days work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.

.5 Duration : number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.

.6 Master Plan : summary-level schedule that identifies major activities and key milestones.

.7 Milestone : significant event in project, usually completion of a major deliverable item.

.8 Project Schedule : planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.

.9 Project Planning, Monitoring and Control System : overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

1.3 REQUIREMENTS

.1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.

.2 Plan to complete Work in accordance with prescribed milestones and time frame.

.3 Limit activity durations to maximum of approximately ten (10) working days, to allow for progress reporting.

.4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit to Departmental Representative within five (5) working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.

.3 Submit Project Schedule to Departmental Representative within five (5) working days of receipt of acceptance of Master Plan.

.4 No construction work will start until the Contractor provides a Project Schedule.

.5 If the Project Schedule is considered non-compliant, the Contractor will have 5 work days to correct the Project Schedule to the Departmental Representative requirements and provide a revised copy. The Departmental Representative will have 5 work days to review the document compliance.

.6 If the delays for the Project Schedule are exceeded by the Contractor, the Departmental Representative can withold the payment until the reception and the approval of the Project Schedule.

1.5 PROJECT MILESTONES

.1 Project milestones form interim targets for Project Work Schedule.

.2 Contractor's Construction Progress Schedule must identify for each phase (group) the target dates for the following milestones :

- .1 Dates of preparatory work (beginning and end).
- .2 Decommissioning start date for each elevator of each group and beginning of work.
- .3 Equipment delivery date.
- .4 Commissioning date.
- .5 Partial substantial completion date.

1.6 MASTER PLAN

.1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).

.2 Departmental Representative will review and return revised schedules to the Contractor within five (5) working days.

.3 Revise impractical schedule and resubmit within five (5) working days following receipt of comments.

.4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.7 PROJECT SCHEDULE

.1 Develop detailed Project Schedule derived from Master Plan.

.2 Ensure detailed Project Schedule per phase (group) includes as minimum milestone and activity types as follows:

- .1 Award.
- .2 Shop Drawings, Samples.
- .3 Permits.
- .4 Mobilization.
- .5 Demolition.
- .6 Millwork.
- .7 Hardware.

.8 Fire Systems.
.9 Vertical transport
.10 Testing and Commissioning.
.11 Supplied equipment long delivery items.
.12 Departmental Representative supplied equipment required dates.

1.8 PROJECT SCHEDULE REPORTING

.1 Update Project Schedule to present it at each site meeting, reflecting activity changes and completions, as well as activities in progress. Project schedule is also to be submitted with each monthly progress billing request.

.2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

.3 Submit planning of the work to come three (3) weeks in advance.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

.1 Not used.

1.2 ADMINISTRATIVE

.1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Do not proceed with Work affected by submittal until review is complete.

.3 Present shop drawings, product data, samples and mock-ups in SI Metric units.

.4 Where items or information is not produced in SI Metric units converted values are acceptable.

.5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

.6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Verify field measurements and affected adjacent Work are coordinated.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.

.10 Keep one reviewed copy of each submission on site.

1.3 SHOP DRAWINGS AND PRODUCT DATA

.1 The term " shop drawings " means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

.2 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Québec.

.3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.4 Allow 10 work days for Departmental Representative's review of each submission.

.5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

.6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.

.7 Accompany submissions with transmittal letter, in duplicate, containing :
- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.

.8 Submissions include :
- .1 Date and revision dates.
- .2 Project title and number.
- .3 Name and address of :
  - .1 Contractor
  - .2 Subcontractor.
  - .3 Supplier.
  - .4 Manufacturer.
- .4 Description of each drawing, technical data sheet, test report.
- .5 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .6 Details of appropriate portions of Work as applicable :
  - .1 Fabrication material and details.
  - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
  - .3 Setting or erection details.
  - .4 Capacities.
  - .5 Performance characteristics.
  - .6 Standards.
  - .7 Operating weight.
  - .8 Wiring diagrams.
  - .9 Single line and schematic diagrams.
  - .10 Relationship to adjacent work.

.9 After Departmental Representative's review, distribute copies.

.10 Submit one (1) electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

.11 Submit one electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.

.12 Submit one copy of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
- .2 Testing must have been within three (3) years of date of contract award for project.

.13 Submit one (1) electronic copy of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
- .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
- .2 Certificates must be dated after award of project contract complete with project name.

.14 Submit one electronic copy of Manufacturer’s instructions for requirements requested in specification Sections and as requested by Departmental Representative.
- .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.15 Submit one (1) electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.

.16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.17 Submit six (6) printed copies and one (1) electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental.

.18 Delete information not applicable to project.

.19 Supplement standard information to provide details applicable to project.

.20 If upon review by Departmental, no errors or omissions are discovered or if only minor corrections are made, printed and electronic copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.21 The review of shop drawings by Departmental Representative is for sole purpose of ascertaining conformance with general concept.
- .1 This review shall not mean that the Departmental approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
- .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.4 SAMPLES

.1 Submit for review samples in triplicate as requested in respective specification Sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to Departmental Representative's business address.

.3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.4 Where colour, pattern or texture is criterion, submit full range of samples.

.5 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

.6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.

.7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.5 MOCK-UPS

.1 Erect mock-ups in accordance with 01 45 00 – Quality Control.

1.6 PHOTOGRAPHIC DOCUMENTATION

.1 Submit electronic and one (1) hard copy of colour digital photography in jpg format, standard resolution monthly with progress statement and as directed by Departmental Representative.

.2 Project identification: name and number of project and date of exposure indicated.

.3 Number of viewpoints :
.1 Viewpoints and their location as determined by Departmental Representative.

.4 Frequency of photographic documentation : weekly and before concealment of Work, or as directed by Departmental Representative.

1.7 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit Workers' Compensation Board status.

.2 Submit transcription of insurance immediately after award of Contract.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.1 PURPOSE

.1 To ensure that the work and institutional activities are carried out smoothly with no undue delays, and that institutional security is maintained at all times.

1.2 DEFINITIONS

.1 " Prohibited items " :
- .1 Intoxicants, including alcohol, drugs and narcotics.
- .2 A weapon or a component thereof, ammunition, or anything that is designed to kill, injure or disable a person or that can be assembled or modified for such purposes, possessed without prior authorization.
- .3 An explosive or a bomb, or a component thereof.
- .4 An amount of money exceeding the regulatory limit.
- .5 NOTE : Consult the *Corrections and Conditional Release Regulations* (SOR/92-620) : $ 50 limit in a minimum-security institution, $ 25 limit in a medium-security institution, maximum-security institution, or multi-level security institution.
- .6 Any other item possessed without prior authorization that could jeopardize the security of the penitentiary or the safety of persons.
- .7 Electronic or telecommunication devices.
- .8 Tobacco products and associated products (including, but not limited to, cigarettes, electronic cigarettes, cigars, tobacco, chewing tobacco, cigarette-making machines, matches and lighters) are considered unauthorized items.

.2 " Commercial vehicle " : Vehicle intended for the transportation of material, equipment or tools necessary for the work.

.3 " Work site " : Area in which the Contractor is authorized to work, as indicated in the project plans. This area may be isolated from the institution's security perimeter.

.4 " Perimeter " : Area of the institution surrounded by fencing or walls, preventing the free movement of inmates.

1.3 PRELIMINARY MEASURES

.1 Prior to starting the work, the Contractor must communicate with the technical authority to :
- .1 Discuss the nature and the scope of the work associated with the project.
- .2 Establish mutually-acceptable security measures, in accordance with this directive and the specific needs of the institution.

.2 The Contractor must :
- .1 Be sure to inform their employees of the security requirements.
- .2 Work with institutional staff to ensure that their employees comply with the security requirements.

1.4 CONSTRACTOR'S EMPLOYEES

.1 According to the Warden's preference, the Contractor must be aware that no employee will be admitted access to the institution without valid security clearance and have a recent photo identification card, such as a provincial driver's licence.

.2 The Contractor must submit to the technical authority a list of the names and birth dates of all hi employees scheduled to work in the institution or all other CSC site, as well as their completed security clearance forms (Federal Institution Access Request form). Allow two (2) weeks for the security clearance forms to be processed.

.3 The Warden may require that headshots be taken of the Contractor's Employees so that their pictures can be posted in appropriate areas throughout the institution or entered into a database for identification purposes. The Warden may also require that the Contractor's Employees prominently display photo identification on their clothing when they are within the institutional perimeter.

.4 An individual will be refused entry to institutional premises if there is reason to believe that they pose a security risk.

.5 Individuals will be immediately removed from institutional premises if :
- .1 They appear to be under the influence of alcohol, drugs or narcotics.
- .2 They behave in an abnormal or disorderly manner.
- .3 They are in possession of prohibited items.

1.5 VEHICLES

.1 The personal vehicles of the Contractor's Employees are not allowed within the perimeter of medium- or maximum-security institutions without the express permission of the Warden.

.2 All individuals who leave a vehicle unattended on CSC premises must close the windows and lock the doors and trunk. The owner of the vehicle or the employee from the company that owns the vehicle must ensure that the keys are kept safely in their personal possession.

.3 The Warden can limit the number and type of vehicles permitted within the perimeter at any time.

.4 Those delivering materials needed for the work may be required to have security clearance.

.5 Should the Warden allow trailers to be left within the institution's perimeter, the doors and windows must remain closed and locked when left unattended. Windows must be equipped with expanded metal grates.

1.6 PARKING

.1 The CSC Representative designates authorized parking areas for vehicles. If the Contractor's Employees park elsewhere, their vehicle may be towed.

1.7 SHIPMENTS

.1 All shipments of material, equipment or tools for the work must be addressed to the Contractor to clearly distinguish them from shipments for the institution. The Contractor must ensure that his employees are on site to receive deliveries, as CSC staff will <u>not</u> accept deliveries of materials, equipment or tools intended for the Contractor.

1.8 COMMUNICATION DEVICES

.1 Cellular or digital cordless phones (including, but not limited to, text messaging devices, pagers, BlackBerry, and telephones used as two-way radios), laptop computers and tablets are prohibited in the institution without the express authorization of the Warden. Even when permitted, they are not to be used by inmates.

.2 The Warden may approve but limit the use of two-way radios.

1.9 WORK HOURS

.1 Work hours within the Institution are: Monday to Friday : 7:00 to 17:00.

.2 Contractor's personnel can get on site from 7:00 to 17:00.

.3 All vehicles needs to leave the establishment before 16:00.

.4 The timeframe for deliveries of materials or waste disposal shall be Monday to Friday from 9:00 to 11:30 and 13:30 to 15:30.

.5 Work will not be permitted during weekends and statutory holidays without the permission of the Director. A minimum of seven days advance notice will be required to obtain the required permission. In case of emergencies or other special circumstances, this advance notice may be waived by the Director.

1.10 OVERTIME WORK

.1 No overtime work outsides of the timeframe identified at article 1.1.9.2 will be allowed without permission of the Director. Give a minimum forty-eight (48) hours advance notice when overtime work on the construction project is necessary and approved. If overtime work is required because of an emergency such as the completion of a concrete pour or work to make the construction safe and secure, the contractor shall advise the Director as soon as this condition is known and follow the directions given by the Director. Costs to Canada for such events may be attributed to the contractor.

.2 When overtime work outside of the timeframe identified at article 1.1.9.2, weekend statutory holiday work is required and approved by the Director, extra staff members may be posted by the Director or his designate, to maintain the security surveillance. The actual cost of this extra staff may be attributed to the contractor.

1.11 TOOLS AND EQUIPMENT

.1 The Contractor must keep a comprehensive list of the tools and equipment used during the work. This list must be kept up-to-date for the length of the work and be submitted for inspection when necessary.

.2 The Contractor's Employees must never leave tools unattended, particularly mechanical tools, files, saw blades, hacksaws, wire, rope, ladders and any item used for lifting (jacks, cylinders, etc.).

.3 The Contractor's Employees must store tools and equipment in a secure, authorized location.

.4 The Contractor's Employees must lock all toolboxes after use and keep the keys with them at all times. They must also lock scaffolding that is not being used; once erected, scaffolding must be secured to the satisfaction of the CSC representative.

.5 The Contractor's Employees must notify the Technical Authority immediately if any tools or equipment have been lost or are unaccounted for.

.6 The Warden will ensure that security staff verifies the Contractor's tools and equipment based on the list provided by the Contractor, at the following times :
.1 At the beginning and end of each project.
.2 Each week, if the work lasts more than one (1) week.

.7 Some tools and equipment - such as cartridges and metal saw blades - are closely controlled. At the beginning of the day, the Contractor will be given a sufficient number of these items for one (1) day's work. Used blades/cartridges must be returned to the security personnel at the end of each day.

.8 The use of fastening tools or other tools with cartridges is strictly prohibited.

.9 If propane or natural gas is used as a heat source for the work, the institution requires that a member of its personnel supervise the work site outside of regular working hours.

1.12 KEYS

.1 During the work, the Contractor must use regular cylinders in regular locks.

.2 Once the security locks are installed, the CSC representative who escorts the Contractor's Employees must obtain the keys in order to open doors according to the Contractor's needs. The Contractor must inform his employees that only the CSC representatives escorting them are authorized to use the keys.

1.13 KEYWAY

.1 During the construction work, the contractor will use construction barrel and keys in the lock.

.2 The contractor will send out to is employees, and subcontractor, it it is required, the instructions regarding the safe storage in construction key.

.3 At the end of the work, the contractor will deliver the construction keys to the establishment.

.4 At the end of each construction phases, the CSC Representative, with the help of the lock manufacturer, will :
.1 Establish an operational key schedule.
.2 Receive the definitive keys and barrels for lock directly from manufacturer.
.3 Remove and return the construction barrels and install the definitive barrels.

1.14 PRESCRIPTION MEDICATION

.1 If the Contractor employs individuals who must take prescription medication during the work day, these employees must obtain authorization from the Warden to bring one (1) day's dosage into the institution.

1.15 RESTRICTIONS ON TOBACCO USE

.1 Neither Contractors nor the Contractor's Employees are permitted to smoke inside correctional institutions, nor outside while within the perimeter of a correctional institution. They must not have unauthorized tobacco products in their possession within the institutional perimeter.

.2 All individuals who violate this policy will be asked to stop smoking or to throw out all unauthorized tobacco products immediately. Individuals who continue to violate this policy will be asked to leave the institution.

.3 Smoking will only be permitted outside the correctional institution's perimeter, in a location designated by the CSC representative.

1.16 PROHIBITED ITEMS

.1 Firearms, ammunition, explosives, alcohol, drugs and narcotics are prohibited on institutional premises.

.2 The Warden must be notified immediately if anyone is found in possession of prohibited items on the work site.

.3 The Contractor must be vigilant in monitoring their employees as well as the employees of their Subcontractors. Individuals found in possession of prohibited items may have their security clearance revoked. If the violation is serious, the company in question may be expelled from the institution for the duration of the work.

.4 If firearms or ammunition are found in the vehicle of a Contractor, Subcontractor, supplier, or their personnel, the security clearance of the vehicle's driver will be revoked immediately.

.5 Contractors should be vigilant with both their staff and the staff of their sub-contractors and suppliers that the discovery of contraband may result in cancellation of the security clearance of the affected employee. Serious infractions may result in the removal of the company from the Institution for the duration of the construction.

.6 Presence of arms and ammunitions in vehicles of contractors, sub-contractors and suppliers or employees of these will result in the immediate cancellation of security clearances for the drivers of the vehicles.

1.17 SEARCHES

.1 All individuals and vehicles arriving on the institution's premises may be searched.

.2 If the Warden has reason to believe that one of the Contractor's Employees is in possession of a prohibited item, the Warden may order a search of that individual.

.3 The personal belongings of all the Contractor's Employees arriving at the institution may be checked to search for the residue of contraband drugs.

1.18 CONTACT WITH INMATES

.1 Unless specifically authorized, it is forbidden to come into contact with inmates, to talk with them, to receive objects from them or to give them objects. Any construction employee doing any of the above will be removed from the site and his security clearance revoked.

.2 It is to be noted that cameras are not allowed on CSC property.

.3 Notwithstanding the above paragraph, if the Director approves of the usage of cameras, it is strictly forbidden to take pictures of inmates, of CSC staff members or of any part of the Institution other than those required as part of this contract. Only photographs necessary to the achievement of the project can be taken with the authorization of the Director or his replacement.

PART 2 PRODUCT

2.1 NOT USED

.1 Not used.

PART 3 EXECUTION

3.1 ACCESS TO THE INSTITUTION

.1 Neither the Contractor's Employees nor commercial vehicles may be admitted to the institution's premises outside normal working hours without the express authorization of the CSC representative.

3.2 VEHICLE TRAFFIC

.1 Escorted commercial vehicles will be allowed to enter or leave the institution through the vehicle access gate during the following hours :
- .1 From 7:30 am to 11:30 am.
- .2 From 13:00 pm to 16:00 pm.

.2 Construction vehicles shall not leave the Institution until an inmate count is completed.

.3 The Contractor must provide the Technical Authority forty-eight (48) hours' notice of the arrival of heavy equipment.

.4 Vehicles carrying detritus or other material deemed impossible to search must constantly be monitored by CSC employees or security personnel who report to the Warden or must wait for an official head-count of the inmates to be conducted.

.5 Before a commercial vehicle may be admitted onto the institution's perimeter, the Contractor or its representative must certify that the vehicle's content is essential to the execution of the work.

.6 Entry will be refused to all vehicles carrying materials that the Warden believes pose a risk to institutional security.

.7 Hours for entry and exit of containers :
- .1 From 7:30 am to 11:30 am
- .2 From 13:00 pm to 16:00 pm

.8 The circulation of containers must always be done under security escort. At the start-up meeting, a circulation management agreement will be taken with the institution.

.9 Private vehicles of construction employees will not be allowed within the security perimeter of medium or maximum security institutions without the authorization of the Director.

.10 With prior approval of the Director, a vehicle may be used in the morning and evening to transport a group of employees to the work site. This vehicle will not remain within the Institution the remainder of the day.

.11 With the approval of the Director, certain equipment may be permitted to remain on the construction site overnight or over the weekend. This equipment must be securely locked, with the battery removed. The Director may require that the equipment be secured with a chain and padlock to another fixed object.

3.3 CIRCULATION OF THE CONTRACTOR'S EMPLOYEES ON INSTITUTIONAL PREMISES

.1 Subject to proper institutional security, the Warden will give the Contractor and the Contractor's Employees as much freedom of movement and autonomy as possible.

.2 The previous paragraph notwithstanding, the Warden may :
- .1 Prohibit access to sections of the institution.
- .2 Require that the Contractor's Employees be accompanied by CSC security personnel in designated sections.

.3 Require that the Contractor's Employees remain on-site during coffee/health and lunch breaks, depending on the institution and the situation. The Contractor's Employees are not authorized to eat in the break room of CSC employees, but they may use another area designated by the Technical Authority.

.3 During the lunch and coffee/health breaks, all construction employees will remain within the construction site. Construction employees are not permitted to eat in the officer's lounge or the dining room of the institution.

3.4 UNINSTALLED EQUIPMENTS AND ACCESSORIES

.1 The Contractor must submit all uninstalled devices, machines, equipment, accessories or hardware to the Technical Authority, who will ensure that they are destroyed or stored safely for later use. If so authorized by the Technical Authority, the Contractor must dispose of the object according to established security standards.

3.5 MONITORING AND INSPECTION

.1 CSC security personnel will monitor and inspect the Contractor's Employees activities as well as related movement and vehicle traffic to ensure that established security standards are being followed.

.2 At the start and throughout the duration of the work, CSC staff will convey to the Contractor's Employees the necessity of monitoring and inspections.

3.6 WORK STOPPAGE

.1 At any time, the Warden may ask the Contractor, the Contractor's Employees, or Subcontractors not to enter the work site or to leave immediately if a security incident is in progress in the institution. The Contractor's Employees must note the name of the CSC employee issuing the request as well as the time and comply with the order as soon as possible.

.2 Once notified, the Contractor must inform the CSC representative of work stoppage within twenty-four (24) hours delay.

3.7 WORK COMPLETION

.1 Unless otherwise indicated in the contract, once the project is completed or the facilities handed back to the SCC, the Contractor must remove all materials, tools and equipment from the institution, as well as perform a final clean-up of the site.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

.1 Canada Labour Code - Part II, Canadian Occupational Safety and Health Regulations.

.2 Canadian Standards Association (CSA)

.3 Workplace Hazardous Materials Information System (WHMIS)
- .1 Material Safety Data Sheet (MSDF)

.4 Act Respecting Occupational Health and Safety, R.S.Q. Chapter S-2.1.

.5 Construction Safety Code, S-2.1, r.4.

1.2 SUBMITTALS

.1 Submit the documents required according to section 01 33 00 – Documents and samples to be submitted.

.2 Submit to Departmental Representative, the site-specific safety program, as outlined in 1.8 at least 10 days prior to start of work. The Contractor must review his program during the course of the project if any change occurs in work methods or site conditions. The Departmental Representative may, after receiving the program or at any time during the project, ask the Contractor to update or modify the program in order to better reflect the reality of the construction site and activities. The Contractor must make the required changes before work begins.

.3 Submit to Departmental Representative the site inspection sheet, duly completed, at the intervals indicated in 1.12.1.

.4 Submit to Departmental Representative within 24 hours a copy of any inspection report, correction notice or recommendation issued by federal or provincial inspectors.

.5 Submit to Departmental Representative within 24 hours an investigation report for any accident involving injury and any incident exposing a potential hazard.

.6 Submit to Departmental Representative all safety data sheets for hazardous material to be used at the site at least three days before they are to be used.

.7 Submit to Departmental Representative copies of all training certificates required for application of the safety program, in particular :
- .1 General construction site safety and health courses.
- .2 Safety officer attestations.
- .3 First aid in the workplace and cardiopulmonary resuscitation.
- .4 Work likely to release asbestos dust.
- .5 Work in confined spaces.
- .6 Lockout procedures.
- .7 Wearing and fitting of individual protective gear.
- .8 forklift truck.
- .9 positioning platform.
- .10 Any other requirement of Regulations or the safety program.

.8 Medical examinations : Wherever legislation, regulations, directives, specification or a safety program require medical examinations, Contractor must :
- .1 Prior to start-up, submit to Departmental Representative certificates of medical examination for all concerned supervisory staff and employees who will be on duty when the site opens.
- .2 Thereafter, submit without delay certificates of medical examination for any newly hired concerned personnel as and when they start work at the site.

.9 Emergency plan : The emergency plan, as defined in 1.8.3, shall be submitted to Departmental Representative at the same time as the site-specific safety program.

.10 Notice of site opening : Notice of site opening shall be submitted to the Commission *de la santé et de la sécurité du travail* before work begins. A copy of such notice shall be submitted to Departmental Representative at the same time and another posted in full view at the site. During demobilization, a notice of site closing shall be submitted to the CSST, with copy to Departmental Representative.

.11 Plans and certificates of compliance : Submit to the CSST and to Departmental Representative a copy signed and sealed by an engineer member of the OIQ, of all plans and certificates of compliance required pursuant to the Construction Safety Code (S-2.1, r. 6), or by any other legislation or regulation or by any other clause in the specifications or in this contract. Copies of these documents must be on hand at the site at all times.

.12 Certificate of compliance delivered by the CSST : The certificate of compliance is a document delivered by the CSST confirming that the contractor is in rule with the CSST, i.e. that he had pay out all the benefits concerning this contract. This document must be delivered to Departmental Representative at the end of the work.

1.3 HAZARDS ASSESSMENT

.1 The contractor must identify all hazards inherent in each task to be carried out at the site.

.2 The contractor must plan and organize work so as to eliminate hazards at source or promote mutual protection so that reliance on individual protective gear can be kept to a minimum. Where individual protection against falling is required, workers shall use safety harness that meets standard Can – CSA – Z-259.10 – M90. Safety belts shall not be used as protection against falling.

.3 Equipment, tools and protective gear which cannot be installed, fitted or used without compromising the health or safety of workers or the public shall be deemed inadequate for the work to be executed.

.4 All mechanical equipment shall be inspected before delivery to the site. Before using any mechanical equipment, submit to Departmental Representative a certificate of compliance signed by a qualified mechanic. Whenever he suspects a defect or accident risk, Departmental Representative may at any time order the immediate shut-down of equipment and require a new inspection by a specialist of his own choosing.

.5 For use of equipment for lifting persons or materials, ensure that the inspections required by the standards are met and be able to provide a copy of certificates of inspection upon request of Departmental Representative.

1.4 MEETINGS

.1 Contractor decisional representative must attend any meetings at which site safety and health issues are to be discussed

.2 Contractor must set up a site safety committee, and convene meetings every in accordance with the Construction Safety Code.

1.5 LEGAL AND REGULATORY REQUIREMENTS

.1 Comply with Section 01 41 00 – Regulatory requirements.

.2 Comply with all legislation, regulations and standards applicable to the site and its related activities.

.3 Comply with specified standards and regulations to ensure safe operations at site containing hazardous or toxic materials.

.4 Regardless of the publication date shown in the construction safety code, always use the most recent version.

1.6 SITE-SPECIFIC CONDITIONS

.1 At the site, the contactor must take account of the following specific conditions :
- .1 Permanently occupied buildings, by occupants and public (penitentiary).
- .2 Restricted acces for worker and authorized personnel by CSC (refer to Section 01 35 13 – Special project procedures for Correctional Service Canada Security requirements).
- .3 Controlled displacement in the building with presence of security guard patrol only.
- .4 Circulation in parking lot to come to work, to bring tools and to deliver materials.
- .5 Tools will have to be recorded at the entrance of the establishment and limitation on the use of certain devices (cellphone, etc.)
- .6 Maintain the work area secured at all times.
- .7 Other specialized contractors might be asked to intervene to assure the maintenance of existing equipments that must remain in operation 24 hours a day.
- .8 The project team will have to be informed together with all stakeholders (AAC, PWGSC, CCC, subcontractors, etc.) of the risks pertinent to the site, and of the zones to be considered as construction sit, in order to maintain the rules and requirements in the construction areas.
- .9 Noisy work.
- .10 Dust-generating work.
- .11 Heavy machinery (trucks, etc.).

1.7 SAFETY AND HEALTH MANAGEMENT

.1 Acknowledge and assume all the tasks and obligations which customarily devolve upon a principal Contractor under the terms of the Act Respecting Occupational Health and Safety (R.S.Q., chapter S-2.1) and the Construction Safety Code (S-2.1, r.4).

.2 Develop a site-specific safety program based on the hazards identified and apply it from the start of project work until close-out is completed. The safety program must take account of all information appearing in 1.7 and must be submitted to all parties concerned, in accordance with the provisions set forth in 1.3. At a minimum, the site-specific safety program must include:
- .1 Company safety and health policy.
- .2 A description of the work, total costs, schedule and projected workforce curve.
- .3 Flow chart of safety and health responsibility.
- .4 The physical and material layout of the site.
- .5 First-aid and first-line treatment standards.
- .6 Identification of site-specific hazards.
- .7 Risk assessment for the tasks to be carried out, including preventive measures and the procedures for applying them.
- .8 Training requirements.
- .9 Procedures in case of accident/injury.
- .10 Written commitment from all parties to comply with the prevention program.
- .11 A site inspection schedule based on the preventive measures.

.3 The contractor must draw up an effective emergency plan based on the characteristics and constraints of the site and its surroundings. Submit the emergency plan to all parties concerned, pursuant to the provisions of 1.3.The emergency plan must include:
- .1 Evacuation procedure.
- .2 Identification of resources (police, firefighters, ambulance services, etc.).
- .3 Identification of persons in charge at the site.
- .4 Identification of those with first-aid training.
- .5 Training required for those responsible for applying the plan.
- .6 Any other information needed, in the light of the site characteristics.

1.8 RESPONSIBILITIES

.1 No matter the size of the construction site or how many workers are present at the workplace, designate a competent person to supervise and take responsibility for health and safety. Take all necessary measures to ensure the health and safety of persons and property at or in the immediate vicinity of the site and likely to be affected by any of the work.

.2 Take all necessary measures to ensure application of and compliance with the safety and health requirements of the contract documents, applicable federal and provincial regulations and standards as well as the site-specific safety program, complying without delay with any order or correction notice issued by the " Commission de la santé et de la sécurité du travail ".

.3 Take all necessary measures to keep the site clean and in good order throughout the course of the work.

1.9 COMMUNICATIONS AND POSTING

.1 Make all necessary arrangements to ensure effective communication of safety and health information at the site. As they arrive on site, all workers must be informed of their rights and obligations pertaining to the site specific safety program. The Contractor must insist on their right to refuse to perform work which they feel may threaten their own health, safety or physical integrity or that of other persons at the site. The Contractor must keep and update a written record of all information transmitted with signatures of all affected workers.

.2 The following information and documents must be posted in a location readily accessible to all workers :

.1 Notice of site opening.
.2 Identification of Owner.
.3 Company OSH policy.
.4 Site-specific safety program.
.5 Emergency plan.
.6 Data sheets for all hazardous material used at the site.
.7 Minutes of site committee meetings.
.8 Names of site committee representatives.
.9 Names of those with first-aid training.
.10 Action reports and correction notices issued by the CSST.

1.10 UNFORESEEN CIRCUMSTANCES

.1 Whenever a source of danger not defined in the specifications or identified in the preliminary site inspection arises as a result of or in the course of the work, immediately suspend work, take appropriate temporary measures to protect the workers and the public and notify Departmental Representative, both verbally and in writing. Then the Contractor must modify or update the site specific safety program in order to resume work in safe conditions.

1.11 HEALTH, SAFETY, AND ENVIRONMENT SPECIALIST

.1 As soon as the work starts, hire a security guard, in accordance with articles 2.5.3 and 2.5.4 of the Safety Code for work construction work (S-2.1, r.6) and allow the necessary authority and resources for the performance of his duties.

.2 As soon as the work start, hire a competent person whose task is to ensure compliance and enforcement of all laws, regulations and standards as well as contractual requirements for multidisciplinary work.

.3 Allow the necessary authority, resources and tools for the performance of his duty.

.4 The candidate will have to meet the following requirements:
- .1 Obtain the necessary access authorisation by CSC.
- .2 Has a competency security card recognized on a construction site.

.5 The candidate will :
- .1 Have a thorough knowledge of applicable laws and regulations of the site for multidisciplinary work.
- .2 Develop and disseminate an awareness program for all employees of the site.
- .3 Ensure that no worker is allowed on site without taking the awareness program and meets the training program requirements in accordance with applicable legislation and specific prevention program on site.
- .4 Inspect the work and ensure compliance with all regulatory requirements and those indicated in the contract documents of the prevention program.
- .5 Keep a daily record of his actions and send a copy to the Departmental Representative once a week.

1.12 INSPECTION OF SITE AND CORRECTION OF HAZARDOUS SITUATIONS

.1 Inspect the work site and complete the site inspection sheet at least once a week.

.2 Immediately take all necessary measures to correct any lapses from legislative or regulatory requirements and any hazards identified by a government inspector, by the Departmental Representative, by the site safety and health coordinator or during routine inspections.

.3 Submit to Departmental Representative written confirmation of all measures taken to correct lapses and hazardous situations.

.4 Work interruption: give the safety officer or, where there is no safety officer, the person assigned to safety and health responsibilities, full authority to order interruption and resuming of work as and when deemed necessary or desirable in the interests of safety and health. This person should always act so that the safety and health of the public and site workers and environmental protection take precedence over cost and scheduling considerations.

.5 Without limiting the scope of sections 1.8 and 1.9, Departmental Representative may order cessation of work if, in his/her view, there is any hazard or threat to the safety or health of site personnel or the public or to the environment.

1.13 BLASTING

.1 Blasting and other use of explosives are forbidden unless authorized in writing by Departmental Representative.

1.14 POWDER ACTUATED DEVICES

.1 Use of power hammers and other explosive-actuated devices is forbidden.

1.15 HOT WORK

.1 Hot work means any work where a flame is used or a source of ignition may be produced, i.e., riveting, welding, cutting, grinding, burning and heating.

.2 “Hot Work Permit” will not be required, however the Contractor must notify 48 hours in advance.

.3 A working portable fire extinguisher suitable to the fire risk shall be available and easily accessible within a 5 m radius from any flame, spark source or intense heat.

.4 The Contractor shall be appointed to do continuous monitoring of the fire risks for a period of one hour after the end of the shift. This individual shall countersign the permit and give it to the person in charge of the work site (or the individual he/she appoints) after the one hour period.

.5 The storage of propane cylinders shall comply with the CAN/CSA-B149.2-F00 Propane Storage and Handling Code and meet the specific conditions outlined in this document. The cylinders shall be stored outdoors, in a safe place, away from any unauthorized handling, in a storage cabinet specially designed for this purpose. The cylinders shall be securely kept upright and locked at all times in a place where no vehicles are allowed, unless the cylinders are protected by bars or the equivalent.

.6 All of the cylinders used or stored on the work site shall be equipped with a collar designed to protect the valve.

.7 Filling the cylinders on the work site is forbidden, unless a procedure compliant with the CAN/CSA B149.2 standard is approved and authorized by the Engineer.

.8 Welding and cutting : For welding and cutting activities, the Contractor must assure that the following conditions are met moreover that the ones mentioned above.

- .1 The works must be carried out in accordance with the sections “3.13 Compressed gas supply” and “3.14 Welding and cutting” of the Safety Code for the construction industry, S-2.1, r. 6.
- .2 The welding and cutting devices are excessively dangerous with regard to the fire risk on the building work place. The following precautions must be taken at the time of this type of work :
  - .1 Store all compressed gas cylinder on a fireproof fabrics and make sure that the room is well ventilated.
  - .2 Store all oxygen cylinders more than 6 metres from a flammable gas cylinder (ex : acetylene) or a combustible such as oil or grease, unless the oxygen cylinder is separated from it by a wall made of non-combustible material as mentioned in the article 3.13.4 of the Safety Code for the construction industry, S-2.1, r. 6.
  - .3 Set up fireproof fabrics when work of welding is done in superposition and that there is risk of spark fall.
  - .4 Store the bottles far from all heat sources.
  - .5 Not to store the bottles close to the staircases, exits, corridors and elevators.
  - .6 Not to put acetylene in contact with metals with metals such as silver, mercury, copper and alloys of brass having more than copper 65 %, to avoid the risk of an explosive reaction.
  - .7 Check that welding equipments with electric arc has the necessary tension and are grounded.
  - .8 Ensure that the conducting wire of the electric welding equipments are not damaged.
  - .9 Place the welding equipment on a flat ground away from the bad weather.
  - .10 Move away or protect the combustible materials which can be near the welding equipment.
  - .11 Prohibition to weld or cut any closed container.
  - .12 Envisage protection measures when welding or cutting is carried out near drains, tanks or other containers containing inflammable materials.
  - .13 Do not perform any cutting, welding or work with naked flame on a container, a tank, a pipe or other container containing a flammable or explosive substance unless :
    - .1 Air Samples indicating that work can be made without danger has been taken; or
    - .2 Provisions to ensure the safety of the workers has been done.

1.16 LOCKOUT

.1 For every work on energized equipment or equipment that may be started accidentally, the Contractor shall draw up and implement a lockout procedure and complete the Request for Electrical Isolation Form provided by the Departmental Representative, although the hereunder list is not exhaustive, here are some examples for which the use of the form is obligatory :

- .1 Main building power feeders.
- .2 Feeder supply panels and sub-panels.
- .3 Bus ducts.
- .4 Motor control centres.
- .5 Emergency power circuits.
- .6 Fire alarm and fire protection equipment.
- .7 Mechanical protective equipment.
- .8 Alarm circuit for building services, including all heating, ventilating and air conditioning equipment.
- .9 Circuits supplying more than one (1) piece of equipment.
- .10 Circuits affecting one (1) single piece of equipment used in a cooling or heating system.

.2 Notwithstanding the previous paragraphs, the Contractor shall, in emergency situation, receive an oral guarantee of isolation of the Manager in Charge of Worksite and immediately countersign the request of electrical isolation.

.3 The procedure requested at paragraph 1 must comply with the principles listed in the “Le cadenassage” pamphlet published by the Association paritaire pour la santé et la sécurité du travail secteur construction (ASP Construction).

.4 Supervisors and all workers concerned must have followed ASP Construction’s “*Les techniques de cadenassage”* course [(514 355-6190 or 1 800 361-2061)] or an equivalent course given by another firm.

.5 Identify every work that must absolutely be done on live equipment and establish the safety measures that will be applied, including the personal protective equipment and complete a work permit for live equipment.

1.17 SILICA

.1 Preventive measures to apply to the work site

- .1 Source reduction methods
  - .1 Work in wet environment or use tools with inflow of water in order to reduce dustiness, if not, collect dust at the source and retain it with a high efficiency filter not to propagate dust in the environment.
  - .2 Clean surfaces and tools with water, never with compressed air.
  - .3 Sand and pickle surfaces by using an abrasive containing less than 1 % of silica (also called amorphous silica).
  - .4 When required, install shields or other containment device to prevent silica dust from migrating toward other workers or the public.
- .2 Individual protection equipments
  - .1 Wear individual respiratory protection equipments (mask) during all the operations that could generate silica dust. Select respiratory protection in accordance with the « *Guide des appareils de protection respiratoire utilisés au Québec* » http://www.prot.resp.csst.qc.ca/Guid_APR.pdf
  - .2 Wear an ocular protection (glasses or visors).
  - .3 Wear a coveralls to prevent contamination outside the worksite.
- .3 Personal hygiene
  - .1 Do not eat, drink, or smoke in a dusty environment.
  - .2 Wash the hands and the face before drinking, eating or smoking.

1.18 LIFTING MATERIAL

.1 Lifting devices shall be positioned in such a way that loads are not carried over workers, occupants or the public.

.2 The Contractor must transmit to Departmental Representative a work procedure, signed and sealed by an engineer, including inter alia the position of the crane, a sketch of the trajectory of the transported loads, the length of the mast and a plan of lifting for the handling of loads above occupied buildings. The Departmental Representative can, if judge necessary, impose work of evening and weekend.

.3 All mobile cranes manufactured after January 1st 1980 must be equipped with a safety device against overload.

.4 All mobile cranes with cables manufactured after January 1st 1970, except if they are used for other end than lifting loads, must be provided with a safety device against two-blocking. Regarding mobile cranes with cables manufactured before January 1st 1970, they will have to be equipped with the device at the latest on December 31, 2006.

.5 The Contractor shall provide the Departmental Representative with a mechanical service inspection certificate for each lifting device. Inspections must be carried out just prior to the delivery of the equipment to the work site.

.6 For all winch installations, the Contractor shall provide the Departmental Representative with the installation method recommended by the manufacturer. If unavailable, the Contractor shall then provide an installation procedure signed and sealed by an engineer. The installation procedure must take into account load bearing capacity, the amount, weight and location of counterweight and any other detail that may affect the capacity and stability of the device.

.7 In addition to the mechanical service inspection certificate, the annual inspection certificate and the crane logbook must be aboard all crane and crane-truck cabs.

.8 The entire lifting area shall be closed off to prevent non-authorized people from entering it.

.9 The Contractor shall obtain all of the permits at his own expense, in the event the thoroughfare must be temporarily closed off to meet the requirement stipulated in the preceding paragraph or for any other reason pertaining to the safety of workers, occupants or the public.

.10 The Contractor shall carefully inspect all of the slings and lifting accessories and make sure that those in poor condition are destroyed or scrapped.

.11 Compressed-gas cylinders shall be lifted with a basket specially designed for this purpose.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES AND CODES

.1 Perform Work in accordance with National Building Code of Canada (NBC) including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.

.2 Meet or exceed requirements of :
- .1 Contract documents.
- .2 Specified standards, codes and referenced documents.

1.2 HAZARDOUS MATERIAL DISCOVERY

.1 Asbestos : demolition of spray or trowel-applied asbestos is hazardous to health. Stop work immediately when material resembling spray or trowel-applied asbestos is encountered during demolition work. Notify Ministry Representative. Wait for a written instruction in this regard of the Departmental Representative before resuming the work.

.2 PCB : Polychlorinated Biphenyl: stop work immediately when material resembling Polychlorinated Biphenyl is encountered during demolition work. Notify Ministry Representative.

.3 Mold : stop work immediately when material resembling mold is encountered during demolition work. Notify Ministry Representative.

1.3 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions and municipal by-laws.

.2 Comply to Building Orientation Guides (Annex A).

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.1 INSPECTION

.1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.

.3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

.4 Departmental Representative may order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

1.2 MOCK-UPS

.1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.

.2 Construct mock-ups in locations acceptable to Departmental Representative as specified in specific Section.

.3 Prepare mock-ups for Departmental Representative's review with reasonable promptness and in orderly sequence, to not cause delays in Work.

.4 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.5 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

1.3 MILL TESTS

.1 Submit mill test certificates as required in specification Sections.

1.4 MATERIAL, EQUIPMENT AND SYSTEMS

.1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

.1 Not used.

1.2 TEMPORARY HEATING AND VENTILATION

.1 The Departmental Representative will assume the costs associated to the necessary ventilation and heating for the work.

1.3 TEMPORARY POWER AND LIGHT

.1 Departmental Representative will provide and pay for temporary power during construction for temporary lighting and operating of power tools. The electrical supply available on site is 120/208 v, 3 phases, 4 f, 30 A.

.2 Arrange for connection with appropriate connection to the existing electrical services in accordance with the Canadian Electrical Code and provide for communication equipment. Assume cost for installation, maintenance and disconnection.

.3 Provide and maintain temporary lighting throughout project. Ensure level of illumination on all floors and stairs is not less than 162 lux.

.4 Electrical power and lighting systems installed under this Contract may be used for construction requirements only with prior approval of Monistry Representative provided that guarantees are not affected. Make good damage to electrical system caused by use under this Contract. Replace lamps which have been used for more than 3 months.

1.4 TEMPORARY COMMUNICATION FACILITIES

.1 Provide and pay for temporary telephone and data hook up, lines equipment necessary for own use and use of Departmental Representative.

1.5 FIRE PROTECTION

.1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.

.2 Burning rubbish and construction waste materials is not permitted on site.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.
- .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.

.2 Canadian Standards Association (CSA International)
- .1 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .2 CSA-0121-M1978(R2003), Douglas Fir Plywood.
- .3 CAN/CSA-S269.2-M1987(R2003), Access Scaffolding for Construction Purposes.
- .4 CAN/CSA-Z321-96(R2001), Signs and Symbols for the Occupational Environment.

1.2 INSTALLATION AND REMOVAL

.1 Provide, put in place and build necessary construction facilities necessary for carrying out Work as soon as possible. Refer to section 01 14 00 – Work Restrictions.

.2 Remove from site all such work after use.

.3 Prepare an overall plan indicating the proposed location for the site office and storage and show the path of circulation for the workers and materials. Refer to section 01 14 00 – Work Restrictions.

1.3 SCAFFOLDING

.1 Scaffolding in accordance with CAN/CSA-S269.2.

.2 Provide and maintain scaffolding, ladders, swing staging and platforms necessary for carrying out Work.

1.4 LIFTING EQUIPMENT

.1 Supply, install, maintain and maneuver the winches to be used by construction personnel and for transporting of materials and equipment. Take necessary financial arrangements with subcontractors for the use of lifting equipment.

.2 Operation of winches to be entrusted to skilled workers.

1.5 SITE STORAGE/LOADING

.1 Use storage space provided for that purpose and as shown on the drawings and according to requirements prescribed in section 01 14 00 – Work Restrictions.

.2 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.

.3 Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.6 OFFICES

.1 Set up office in space as prescribed in section 01 14 00 – Work Restrictions.

.2 Provide marked and fully stocked first-aid case in a readily available location.

1.7 SANITARY FACILITIES

.1 Use of public sanitary facilities as prescribed in section 01 14 00 – Work Restrictions.

1.8 CONSTRUCTION SIGNAGE

.1 No other signs or advertisements, other than warning signs, are permitted on site.

1.9 CLEAN-UP

.1 Remove construction debris, waste materials, packaging material from work site daily.

.2 Clean dirt or mud tracked onto paved or surfaced roadways.

.3 Store materials resulting from demolition activities that are salvageable.

.4 Do not store new or salvaged material within construction facilities.

1.10 CONTAINERS

.1 Contractor may install a garbage container at the location provided for that purpose on the mobilization plan.

.2 Refer to section 01 74 21 – Construction/Demolition waste management and disposal.

1.11 PARKING HEIGHT CLEARANCE

.1 Take note that the public parking maximum clearance height is 2,1 meters.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

.1 Within text of each specifications section, reference may be made to reference standards. List of standards reference writing organizations is contained in pertinent sections.

.2 Conform to these reference standards, as specifically requested in specifications.

.3 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.

.4 Cost for such testing will be borne by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

1.2 QUALITY

.1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

.2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.

.3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.4 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.

.5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

.6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.3 AVAILABILITY

.1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

.2 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.4 STORAGE, HANDLING AND PROTECTION

.1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.

.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

.3 Store products subject to damage from weather in weatherproof enclosures.

.4 Store cementitous products clear of earth or concrete floors, and away from walls.

.5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

.6 Store sheet and panel materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.

.7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

.8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

.9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.5 TRANSPORTATION

.1 Pay costs of transportation of products required in performance of Work.

.2 Transportation cost of products supplied by Owner will be paid for by Departmental Representative. Unload, handle and store such products.

1.6 MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

.2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that he will establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.7 QUALITY OF WORK

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.

.3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

1.8 COORDINATION

.1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.

.2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.9 CONCEALMENT

.1 In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.

.2 Before installation inform Departmental Representative if there is interference. Install as directed by Departmental Representative.

1.10 REMEDIAL WORK

.1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.

.2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.11 LOCATION OF FIXTURES

.1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.

.2 Inform Departmental Representative of conflicting installation. Install as directed.

1.12 FASTENINGS

.1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.

.2 Prevent electrolytic action between dissimilar metals and materials.

.3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.

.4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.

.5 Keep exposed fastenings to a minimum, space evenly and install neatly.

.6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.13 FASTENINGS – EQUIPMENT

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.

.3 Bolts may not project more than one diameter beyond nuts.

.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.14 PROTECTION OF WORK IN PROGRESS

.1 Prevent overloading of parts of building. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval of Departmental Representative.

1.15 EXISTING UTILITIES

.1 When breaking into or connecting to existing services or utilities, execute Work at times directed in Building Orientation Guide with minimum of disturbance to Work, and/or building occupants.

.2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

.1 Not used.

1.2 EXISTING SERVICES

.1 Before commencing work, establish location and extent of service lines in area of Work and notify Departmental Representative of findings. The Contractor must coordinate at least 48 hours in advance a visit to verify the installations with the building's maintenance personnel during the day, between 8:00 am and 16:00 pm.

1.3 LOCATION OF EQUIPMENT AND FIXTURES

.1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.

.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.

.3 Inform Departmental Representative of impending installation and obtain approval for actual location.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.1 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submittals : in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit written request in advance of cutting or alteration which affects :
- .1 Structural integrity of elements of project.
- .2 Integrity of weather-exposed or moisture-resistant elements.
- .3 Efficiency, maintenance, or safety of operational elements.
- .4 Visual qualities of sight-exposed elements.
- .5 Work of Owner or separate contractor.

.3 Include in request :
- .1 Identification of project.
- .2 Location and description of affected Work.
- .3 Statement on necessity for cutting or alteration.
- .4 Description of proposed Work, and products to be used.
- .5 Alternatives to cutting and patching.
- .6 Effect on Work of Owner or separate contractor.
- .7 Written permission of affected separate contractor.
- .8 Date and time work will be executed.

1.2 MATERIALS

.1 Required for original installation.

.2 Change in Materials : Submit request for substitution in accordance with Section 01 33 00 – Submittal Procedures.

1.3 PREPARATION

.1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.

.2 After uncovering, inspect conditions affecting performance of Work.

.3 Beginning of cutting or patching means acceptance of existing conditions.

.4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.

.5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

1.4 EXECUTION

.1 Execute cutting, fitting, patching, excavation and fill, to complete Work.

.2 Fit several parts together, to integrate with other Work.

.3 Uncover Work to install ill-timed Work.

.4 Remove and replace defective and non-conforming Work.

.5 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.

.6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.

.7 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.

.8 Restore work with new products in accordance with requirements of Contract Documents.

.9 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

.10 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material.

.11 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

.12 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction/Renovation/Demolition (CRD) Waste Management and Disposal.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

.1 The Workplace Hazardous Materials Information System (WHMIS) / Health Canada.
  .1 Material Safety Data Sheet (MSDS).

1.2 PROJECT CLEANLINES

.1 Proceed to daily cleaning of public spaces that have been soiled consecutively to the execution of work.

.2 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Owner or other Contractors.

.3 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.

.4 Make necessary arrangements and obtain required permits from the relevant authorities in order to eliminate debris and waste materials.
  .1 For recycling refer to section 01 74 21 – Construction/Renovation/Demolition (CRD) waste management and disposal.
  .2 Eliminate debris and waste materials outside of work site.

.5 On site, provide for only one container for debris and waste material evacuation. The container shall be installed at the delivery dock, as prescribed in the Building Orientation Guide.

.6 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.

.7 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.8 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

.9 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

.10 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.3 CLEANING WORK

.1 The Contractor shall conform to the Workplace Hazardous Materials Information System (WHMIS) legislation and assure that the Material Safety Data Sheet of all dangerous products that he uses be permanently kept in the building where such products are stored, that they are kept up to date when he buys his products and that each container be properly labelled. The Contractor shall demonstrate to the Departmental Representative, to his satisfaction, that all employees have completed with satisfaction the WHMIS training.

.2 The Contractor must ensure that non compatible chemical products be stored in a way that they don’t get in contact with one another.

.3 Ensure that workers wear appropriate gloves when using cleaning products.

.4 Ensure protection to public from slipping on wet floors when they are being washed.

1.4 FINAL CLEANING

.1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

.3 Prior to final review remove surplus products, tools, construction machinery and equipment.

.4 Remove waste products and debris.

.5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative.

.6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.7 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.

.8 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and ceilings, elevator cab, floors as well as any other material and equipment incorporated in the work.

.9 Clean lighting reflectors, lenses, and other lighting surfaces.

.10 .Vacuum clean and dust building interiors, behind grilles, louvres and screens.

.11 .Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.

.12 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

.13 Remove dirt and other disfiguration from exterior surfaces.

.14 Broom clean and wash hard surfaces affected by the work.

.15 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment affected by the work.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse/recycling in accordance with Section 01 74 21 – Construction/Renovation/Demolition (CRD) Waste Management and Disposal.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.1 RESIDUAL MATERIAL MANAGEMENT GOALS

.1 PWGSC's Residual Material Management Goal is to reduce total construction/renovation/demolition (CRD) residual materials sent to landfill sites by 75%. Provide the Departmental Representative with documentation certifying that CRD residual material management has been extensively practiced (recycling, reuse of recyclable and reusable materials).

1.2 STORAGE, HANDLING AND PROTECTION

.1 Store, materials to be reused, recycled and salvaged in locations as directed by the Departmental Representative.

.2 Unless specified otherwise, materials for removal become the Contractor's property.

.3 Protect, stockpile, store and catalogue salvaged items.

.4 Separate waste from salvaged items. Transport and deliver waste to licensed disposal facility.

.5 Protect structural components not removed for demolition from movement or damage.

.6 Support affected structures. If safety of building is endangered, cease operations and immediately notify the Departmental Representative.

.7 Protect surface drainage, mechanical and electrical facilities from damage and blockage.

.8 Separate and store materials produced during dismantling of structures in designated areas.

.9 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
- .1 On-site source separation is recommended.
- .2 Provide waybills for separated materials.

1.3 DISPOSAL OF WASTES

.1 Do not bury rubbish or waste materials.

.2 Remove materials on-site as Work progresses.

1.4 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference with, or disturbance to, normal use of premises.

.2 Maintain security measures established by existing facility.

1.5 SCHEDULING

.1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

1.6 CLEANING

.1 Separate at source residual materials to be reused or recycled and put them in the locations indicated.

.2 Clean-up work area as work progresses.

.3 Remove tools and residual and waste materials on completion of Work, and leave work area in a clean and orderly condition.

1.7 JOB SITE WASTE STATEMENT (JSWS)

.1 Annex A – Job Site Waste Statement (JSWS) for construction/renovation/demolition projects.

Materials	Rerouted actual weight (tons)		Destination and final use of rerouted materials	Total buried weight (tons)	TOTAL WEIGHT (tons)	Rerouted rate
	Reused	Recycled				
Masonry and pavement						
Walls and ceilings						
Metals						
Mechanics						
HVAC						
Plumbing						
Sanitary equipment						
Others						
Doors and windows						
Wood						
Woodwork and millwork						
Floor covering						
Electricity						
Wiring						
Lighting						
Others						
Roofing						
Specialties and miscellaneous items						
Cardboard						
Other packaging						
Mixed recycling						
General Waste						
Others						
TOTAL						

END OF SECTION

PART 1 GENERAL

1.1 ADMINISTRATIVE REQUIREMENTS

.1 Partial acceptance of phases and of Work Procedures :
- .1 Contractor must present and submit the list of incorporated work at each phase and integrate it in the schedule of cost breakdown.
- .2 Contractor's Inspection : Contractor must conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
  - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
  - .2 Request Departmental Representative's inspection.
- .3 Departmental Representative's Inspection :
  - .1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.
  - .2 Contractor to correct Work as directed.
- .4 Completion Tasks : submit written certificates in English and French that tasks have been performed as follows:
  - .1 Work : completed and inspected for compliance with Contract Documents.
  - .2 Defects : corrected and deficiencies completed.
  - .3 Equipment and systems : tested, adjusted and balanced and fully operational.
  - .4 Certificates required by Utility companies : submitted.
  - .5 Operation of systems : demonstrated to Departmental Representative.
  - .6 Commissioning of mechanical systems : completed in accordance with 01 91 13 – General Commissioning (Cx) Requirements and copies of final Commissioning Report submitted to Departmental Representative.
  - .7 Work : complete and ready for final inspection.
- .5 Final Inspection :
  - .1 When completion tasks are done, request final inspection of Work by Departmental Representative, and Contractor.
  - .2 When Work incomplete according to Departmental Representative, complete outstanding items and request re-inspection.
- .6 Declarations of Substantial Performances : when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.
- .7 Commencement of Lien and Warranty Periods : date of Departmental Representative's acceptance of submitted declaration of Substantial Performance to be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
- .8 Final Payment :
  - .1 When Departmental Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.
- .9 Payment of Holdback : after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

1.2 FINAL CLEANING

.1 Clean in accordance with Section 01 74 00 – Cleaning.
- .1 Remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Waste Management : separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction/Renovation/Demolition (CRD) Waste Management and Disposal.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

.1 Not used.

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Pre-warranty Meeting :
- .1 Convene meeting two (2) weeks prior to partial substantial contract completion of each phase with contractor's representative and Departmental Representative, in accordance with Section 01 31 19 – Project Meetings to :
  - .1 Verify Project requirements.
  - .2 Review manufacturer's installation instructions and warranty requirements.
- .2 Departmental Representative to establish communication procedures for:
  - .1 Notifying construction warranty defects.
  - .2 Determine priorities for type of defects.
  - .3 Determine reasonable response time.
- .3 Contact information for bonded and licensed company for warranty work action : provide name, telephone number and address of company authorized for construction warranty work action.
- .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Two (2) weeks prior to Substantial Performance of the Work, submit to the Departmental Representative four (4) final copies of operating and maintenance manuals in English and French.

.3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.

.4 Provide evidence, if requested, for type, source and quality of products supplied.

.5 Fill and supply form for : re-routed final waste for construction projects, renovation and demolition.

1.4 FORMAT

.1 Organize data as instructional manual.

.2 Binders : vinyl, hard covered, 3 " D " ring, loose leaf 219 x 279 mm with spine and face pockets.

.3 When multiple binders are used correlate data into related consistent groupings.
- .1 Identify contents of each binder on spine.

.4 Cover : identify each binder with type or printed title " Project Record Documents "; list title of project and identify subject matter of contents.

.5 Arrange content by systems, under Section numbers and sequence of Table of Contents.

.6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.7 Text : manufacturer's printed data, or typewritten data.

.8 Drawings : provide with reinforced punched binder tab.
.1 Bind in with text; fold larger drawings to size of text pages.

.9 Provide 1:1 scaled CAD files in dwg format on CD.

1.5 CONTENTS - PROJECT RECORD DOCUMENTS

.1 Table of Contents for Each Volume : provide title of project.
.1 Date of submission; names.
.2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
.3 Schedule of products and systems, indexed to content of volume.

.2 For each product or system :
.1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.3 Product Data : mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.

.4 Drawings : supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

.5 Typewritten Text : as required to supplement product data.
.1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 – Quality Control.

.6 Training : refer to Section 01 91 41 – Commissioning training.

1.6 AS – BUILT DOCUMENTS AND SAMPLES

.1 Maintain, at site for Departmental Representative one record copy of :
.1 Contract Drawings.
.2 Specifications.
.3 Addenda.
.4 Change Orders and other modifications to Contract.
.5 Reviewed shop drawings, product data, and samples.
.6 Field test records.
.7 Inspection certificates.
.8 Manufacturer's certificates.
.9 Site Directives.
.10 Minutes of meetings.
.11 SST file.

.2 Store record documents and samples in field office apart from documents used for construction.
.1 Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
.1 Label each document " PROJECT RECORD " in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition.
.1 Do not use record documents for construction purposes.

.5 Keep record documents and samples available for inspection by Departmental Representative.

1.7 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

.1 Record information on set of black line opaque drawings, and in copy of Project Manual, provided by Departmental Representative.

.2 Use felt tip marking pens, maintaining separate colors for each major system, for recording information.

.3 Record information concurrently with construction progress.
- .1 Do not conceal Work until required information is recorded.

.4 Contract Drawings and shop drawings: mark each item to record actual construction, including :
- .1 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
- .2 Field changes of dimension and detail.
- .3 Changes made by change orders.
- .4 Details not on original Contract Drawings.
- .5 References to related shop drawings and modifications.

.5 Specifications : mark each item to record actual construction, including :
- .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
- .2 Changes made by Addenda and change orders.

.6 Other Documents : maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

.7 Provide digital photos, if requested, for site records.

1.8 EQUIPMENT AND SYSTEMS

.1 For each item of equipment and each system include description of unit or system, and component parts.
- .1 Give function, normal operation characteristics and limiting conditions.
- .2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Panel board circuit directories : provide electrical service characteristics, controls, and communications.

.3 Include installed color coded wiring diagrams.

.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences.
- .1 Include regulation, control, stopping, shut-down, and emergency instructions.
- .2 Include summer, winter, and any special operating instructions.

.5 Maintenance Requirements : include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

.6 Provide servicing and lubrication schedule, and list of lubricants required.

.7 Include manufacturer's printed operation and maintenance instructions.

.8 Include sequence of operation by controls manufacturer.

.9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

.10 Provide installed control diagrams by controls manufacturer.

.11 Provide Contractor's co-ordination drawings, with installed color coded piping diagrams.

.12 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

.13 Include test and balancing reports as specified in Section 01 45 00 – Quality Control and 01 91 13 – General Commissioning (Cx) Requirements.

.14 Additional requirements : as specified in individual specification sections.

1.9 MATERIALS AND FINISHES

.1 Building products, applied materials, and finishes : include product data, with catalogue number, size, composition, and color and texture designations.
- .1 Provide information for re-ordering custom manufactured products.

.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.3 Additional requirements : as specified in individual specifications sections.

1.10 MAINTENANCE MATERIALS

.1 Spare Parts :
- .1 Provide spare parts, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Deliver to site; place and store.
- .4 Receive and catalogue items.
  - .1 Submit inventory listing to Departmental Representative.
  - .2 Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

.2 Extra Stock Materials :
- .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Deliver to location as directed by Departmental Representative; place and store.
- .4 Receive and catalogue items.
  - .1 Submit inventory listing to Departmental Representative.
  - .2 Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

.3 Special Tools :
- .1 Provide special tools, in quantities specified in individual specification section.
- .2 Provide items with tags identifying their associated function and equipment.
- .3 Deliver to site; place and store.
- .4 Receive and catalogue items.
  - .1 Submit inventory listing to Departmental Representative.
  - .2 Include approved listings in Maintenance Manual.

1.11 DELIVERY, STORAGE AND HANDLING

.1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.

.2 Store in original and undamaged condition with manufacturer's seal and labels intact.

.3 Store components subject to damage from weather in weatherproof enclosures.

.4 Store paints and freezable materials in a heated and ventilated room.

.5 Remove and replace damaged products at own expense and for review by Departmental Representative.

1.12 WARRANTIES AND BONDS

.1 The twelve (12) months warranty period will enter into force on the date stated for the partial substantial completion date.

.2 For maintenance service for the elevator, refer to sections 14 20 06 – Hydraulic elevator and 14 90 00 – Elevator and freight elevator maintenance.

.3 Develop warranty management plan to contain information relevant to Warranties.

.4 Submit warranty management plan, thirty (30) days before planned pre-warranty conference, to Departmental Representative's approval.

.5 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which it is entitled.

.6 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.

.7 Submit, warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.

.8 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows :

- .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
- .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
- .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
- .4 Verify that documents are in proper form, contain full information, and are notarized.
- .5 Co-execute submittals when required.
- .6 Retain warranties and bonds until time specified for submittal.

.9 Leave date of beginning of time of warranty until Date of Substantial Performance is determined.

.10 Four (4) months warranty inspections to be planned, measured from time of partial acceptance, to be made together with Departmental Representative.

.11 Include information contained in warranty management plan as follows :

- .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.

.2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include notably the elevators and freight elevator, the pumps, motors, transformers and commissioning services.

.3 Provide list for each warranted equipment, item, feature of construction or system indicating :

.1 Name of item.
.2 Model and serial numbers.
.3 Location where installed.
.4 Name and phone numbers of manufacturers or suppliers.
.5 Names, addresses and telephone numbers of sources of spare parts.
.6 Warranties and terms of warranty : include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
.7 Cross-reference to warranty certificates as applicable.
.8 Starting point and duration of warranty period.
.9 Summary of maintenance procedures required to continue warranty in force.
.10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
.11 Organization, names and phone numbers of persons to call for warranty service.
.12 Typical response time and repair time expected for various warranted equipment.

.4 Contractor's plans for attendance at ten (10) months post-construction warranty inspections.

.5 Procedure and status of tagging of equipment covered by extended warranties.

.6 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

.12 Respond in timely manner to oral or written notification of required construction warranty repair work.

.13 Written verification to follow oral instructions.

.1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.1 ADMINISTRATIVE REQUIREMENTS

.1 Demonstrate operation and maintenance of equipment and systems to Owner's personnel two weeks prior to date of final inspection.

.2 Owner: provide list of personnel to receive instructions, and co-ordinate their attendance at agreed-upon times.

.3 Preparation:
- .1 Verify conditions for demonstration and instructions comply with requirements.
- .2 Verify designated personnel are present.
- .3 Ensure equipment has been inspected and put into operation in accordance with Section 01 91 13.
- .4 Ensure testing, adjusting, and balancing has been performed in accordance with Section 01 91 13 - GENERAL COMMISSIONING REQUIREMENTS and equipment and systems are fully operational.

.4 Demonstration and Instructions:
- .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at scheduled times, at the designated location.
- .2 Instruct personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction.
- .3 Review contents of manual in detail to explain aspects of operation and maintenance.
- .4 Prepare and insert additional data in operations and maintenance manuals when needed during instructions.

.5 Time Allocated for Instructions: ensure amount of time required for instruction of each item of equipment or system.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit schedule of time and date for demonstration of each item of equipment and each system two weeks prior to designated dates, for Departmental Representative's approval.

.3 Submit reports within two weeks after completion of demonstration, that demonstration and instructions have been satisfactorily completed.

.4 Give time and date of each demonstration, with list of persons present.

.5 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

1.3 QUALITY ASSURANCE

.1 When specified in individual Sections requiring manufacturer to provide authorized representative to demonstrate operation of equipment and systems:
- .1 Instruct Owner's personnel.
- .2 Provide written report that demonstration and instructions have been completed.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.1 TRAINEES

.1 Trainees: personnel selected for operating and maintaining this facility. Includes Property Manager, building operators, maintenance staff, security staff, and technical specialists as required.

.2 Trainees will be available for training during later stages of construction for purposes of familiarization with systems.

1.2 INSTRUCTORS

.1 Consultant will provide:
- .1 Descriptions of systems.
- .2 Instruction on design philosophy, design criteria, and design intent.

.2 Contractor and certified factory-trained manufacturers' personnel: to provide instruction on the following:
- .1 Start-Up, operation, shut-down of equipment, components and systems.
- .2 Control features, reasons for, results of, implications on associated systems of, adjustment of set points of control and safety devices.
- .3 Instructions on servicing, maintenance and adjustment of systems, equipment and components.

.3 Contractor and equipment manufacturer to provide instruction on:
- .1 Start-up, operation, maintenance and shut-down of equipment they have certified installation, started up and carried out PV tests.

1.3 TRAINING OBJECTIVES

.1 Training to be detailed and duration to ensure:
- .1 Safe, reliable, cost-effective, energy-efficient operation of systems in normal and emergency modes under all conditions.
- .2 Effective on-going inspection, measurements of system performance.
- .3 Proper preventive maintenance, diagnosis and trouble-shooting.
- .4 Ability to update documentation.
- .5 Ability to operate equipment and systems under emergency conditions until appropriate qualified assistance arrives.

1.4 TRAINING MATERIALS

.1 Instructors to be responsible for content and quality.

.2 Training materials to include:
- .1 "As-Built" Contract Documents.
- .2 Operating Manual.
- .3 Maintenance Manual.
- .4 Management Manual.
- .5 TAB and PV Reports.

.3 Project Manager, Commissioning Manager and Property Manager will review training manuals.

.4 Training materials to be in a format that permits future training procedures to same degree of detail.

.5 Supplement training materials:
- .1 Transparencies for overhead projectors.
- .2 Multimedia presentations.
- .3 Manufacturer's training videos.
- .4 Equipment models.

1.5 SCHEDULING

.1 Include in Commissioning Schedule time for training.

.2 Deliver training during regular working hours, training sessions to be 3 hours in length.

.3 Training to be completed prior to acceptance of facility.

1.6 RESPONSIBILITIES

.1 Be responsible for:
- .1 Implementation of training activities,
- .2 Coordination among instructors,
- .3 Quality of training, training materials,

.2 Departmental Representative will evaluate training and materials.

.3 Upon completion of training, provide written report, signed by Instructors, witnessed by Departmental Representative.

1.7 TRAINING CONTENT

.1 Training to include demonstrations by Instructors using the installed equipment and systems.

.2 Content includes:
- .1 Review of facility and occupancy profile.
- .2 Functional requirements.
- .3 System philosophy, limitations of systems and emergency procedures.
- .4 Review of system layout, equipment, components and controls.
- .5 Equipment and system start-up, operation, monitoring, servicing, maintenance and shut-down procedures.
- .6 System operating sequences, including step-by-step directions for starting up, shut-down, operation of valves, dampers, switches, adjustment of control settings and emergency procedures.
- .7 Maintenance and servicing.
- .8 Trouble-shooting diagnosis.
- .9 Inter-Action among systems during integrated operation.
- .10 Review of O&M documentation.

.3 Provide specialized training as specified in relevant Technical Sections of the construction specifications.

1.8 VIDEO-BASED TRAINING

.1 Manufacturer's videotapes to be used as training tool with Departmental Representative's review and written approval 1 month prior to commencement of scheduled training.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL

.1 Acronyms:
- .1 BMM - Building Management Manual.
- .2 Cx - Commissioning.
- .3 EMCS - Energy Monitoring and Control Systems.
- .4 O&M - Operation and Maintenance.
- .5 PI - Product Information.
- .6 PV - Performance Verification.
- .7 TAB - Testing, Adjusting and Balancing.

.2 Cx is a planned program of tests, procedures and checks carried out systematically on systems and integrated systems of the finished Project. Cx is performed after systems and integrated systems are completely installed, functional and Contractor's Performance Verification responsibilities have been completed and approved. Objectives:
- .1 Verify installed equipment, systems and integrated systems operate in accordance with Contract Documents and design criteria and intent.
- .2 Ensure appropriate documentation is compiled into the BMM.
- .3 Effectively train O&M staff.

.3 Contractor assists in Cx process, operating equipment and systems, troubleshooting and making adjustments as required.
- .1 Systems to be operated at full capacity under various modes to determine if they function correctly and consistently at peak efficiency. Systems to be interactively with each other as intended in accordance with Contract Documents and design criteria.
- .2 During these checks, adjustments to be made to enhance performance to meet environmental or user requirements.

.4 Design Criteria: as per client's requirements or determined by designer. To meet Project functional and operational requirements.

1.2 COMMISSIONING OVERVIEW

.1 Section 01 91 13.13 - Commissioning Plan.

.2 For Cx responsibilities refer to Section 01 91 13.13 - Commissioning Plan.

.3 Cx to be a line item of Contractor's cost breakdown.

.4 Cx activities supplement field quality and testing procedures described in relevant technical sections.

.5 Cx is conducted in concert with activities performed during stage of project delivery. Cx identifies issues in Planning and Design stages which are addressed during Construction and Cx stages to ensure the built facility is constructed and proven to operate satisfactorily under weather, environmental and occupancy conditions to meet functional and operational requirements. Cx activities includes transfer of critical knowledge to facility operational personnel.

.6 Consultant will issue Interim Acceptance Certificate when:
.1 Completed Cx documentation has been received, reviewed for suitability and approved by Departmental Representative.
.2 Equipment, components and systems have been commissioned.
.3 O&M training has been completed.

1.3 NON-CONFORMANCE TO PERFORMANCE VERIFICATION REQUIREMENTS

.1 Should equipment, system components, and associated controls be incorrectly installed or malfunction during Cx, correct deficiencies, re-verify equipment and components within the unfunctional system, including related systems as deemed required by Departmental Representative, to ensure effective performance.

.2 Costs for corrective work, additional tests, inspections, to determine acceptability and proper performance of such items to be borne by Contractor. Above costs to be in form of progress payment reductions or hold-back assessments.

1.4 PRE-CX REVIEW

.1 Before Construction:
.1 Review Contract Documents, confirm by writing to Departmental Representative.
.1 Adequacy of provisions for Cx.
.2 Aspects of design and installation pertinent to success of Cx.

.2 During Construction:
.1 Co-ordinate provision, location and installation of provisions for Cx.

.3 Before start of Cx:
.1 Have completed Cx Plan up-to-date.
.2 Ensure installation of related components, equipment, sub-systems, systems is complete.
.3 Fully understand Cx requirements and procedures.
.4 Have Cx documentation shelf-ready.
.5 Understand completely design criteria and intent and special features.
.6 Submit complete start-up documentation to Departmental Representative.
.7 Have Cx schedules up-to-date.
.8 Ensure systems have been cleaned thoroughly.
.9 Complete TAB procedures on systems, submit TAB reports to Departmental Representative for review and approval.
.10 Ensure "As-Built" system schematics are available.

.4 Inform Departmental Representative in writing of discrepancies and deficiencies on finished works.

1.5 CONFLICTS

.1 Report conflicts between requirements of this section and other sections to Departmental Representative before start-up and obtain clarification.

.2 Failure to report conflict and obtain clarification will result in application of most stringent requirement.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
.1 Submit no later than 4 weeks after award of Contract:
.1 Name of Contractor's Cx agent.
.2 Draft Cx documentation.
.3 Preliminary Cx schedule.

.2 Request in writing to Departmental Representative for changes to submittals and obtain written approval at least 3 weeks prior to start of Cx.
.3 Submit proposed Cx procedures to Departmental Representative where not specified and obtain written approval at least 3 weeks prior to start of Cx.
.4 Provide additional documentation relating to Cx process required by Departmental Representative.

1.7 COMMISSIONING DOCUMENTATION

.1 Refer to Section 01 91 13.16 - Commissioning Forms: Installation Check Lists and Product Information (PI)/Performance Verification (PV) Forms for requirements and instructions for use.

.2 Departmental Representative to review and approve Cx documentation.

.3 Provide completed and approved Cx documentation to Departmental Representative.

1.8 COMMISSIONING SCHEDULE

.1 Provide detailed Cx schedule as part of construction schedule in accordance with Section 01 32 16.19 - Construction Progress Schedule - Bar (GANTT) Chart.

.2 Provide adequate time for Cx activities prescribed in technical sections and commissioning sections including:
.1 Approval of Cx reports.
.2 Verification of reported results.
.3 Repairs, retesting, re-commissioning, re-verification.
.4 Training.

1.9 COMMISSIONING MEETINGS

.1 Convene Cx meetings following project meetings: Present section and as specified herein.

.2 Purpose: to resolve issues, monitor progress, identify deficiencies, relating to Cx.

.3 Continue Cx meetings on regular basis until commissioning deliverables have been addressed.

.4 At 60 % construction completion stage.. Departmental Representative to call a separate Cx scope meeting to review progress, discuss schedule of equipment start-up activities and prepare for Cx. Issues at meeting to include:
.1 Review duties and responsibilities of Contractor and subcontractors, addressing delays and potential problems.
.2 Determine the degree of involvement of trades and manufacturer's representatives in the commissioning process.

.5 Thereafter Cx meetings to be held until project completion and as required during equipment start-up and functional testing period.

.6 Meeting will be chaired by Departmental Representative, who will record and distribute minutes.

.7 Ensure subcontractors and relevant manufacturer representatives are present at 60 % and subsequent Cx meetings and as required.

1.10 STARTING AND TESTING

.1 Contractor assumes liabilities and costs for inspections. Including disassembly and re-assembly after approval, starting, testing and adjusting, including supply of testing equipment.

1.11 WITNESSING OF STARTING AND TESTING

.1 Provide 14 days notice prior to commencement.

.2 Departmental Representative to witness of start-up and testing.

.3 Contractor's Cx Agent to be present at tests performed and documented by sub-trades, suppliers and equipment manufacturers.

1.12 PROCEDURES

.1 Verify that equipment and systems are complete, clean, and operating in normal and safe manner prior to conducting start-up, testing and Cx.

.2 Conduct start-up and testing in following distinct phases:
- .1 Included in delivery and installation:
  - .1 Verification of conformity to specification, approved shop drawings and completion of PI report forms.
  - .2 Visual inspection of quality of installation.
- .2 Start-up: follow accepted start-up procedures.
- .3 Operational testing: document equipment performance.
- .4 System PV: include repetition of tests after correcting deficiencies.
- .5 Post-substantial performance verification: to include fine-tuning.

.3 Correct deficiencies and obtain approval from Departmental Representative after distinct phases have been completed and before commencing next phase.

.4 Document require tests on approved PV forms.

.5 Failure to follow accepted start-up procedures will result in re-evaluation of equipment by an independent testing agency selected by Departmental Representative. If results reveal that equipment start-up was not in accordance with requirements, and resulted in damage to equipment, implement following:
- .1 Minor equipment/systems: implement corrective measures approved by Departmental Representative.
- .2 Major equipment/systems: if evaluation report concludes that damage is minor, implement corrective measures approved by Departmental Representative.
- .3 If evaluation report concludes that major damage has occurred, Departmental Representative shall reject equipment.
  - .1 Rejected equipment to be remove from site and replace with new.
  - .2 Subject new equipment/systems to specified start-up procedures.

1.13 START-UP DOCUMENTATION

.1 Assemble start-up documentation and submit to Departmental Representative for approval before commencement of commissioning.

.2 Start-up documentation to include:
- .1 Factory and on-site test certificates for specified equipment.
- .2 Pre-start-up inspection reports.
- .3 Signed installation/start-up check lists.
- .4 Start-up reports,
- .5 Step-by-step description of complete start-up procedures, to permit Departmental Representative to repeat start-up at any time.

1.14 OPERATION AND MAINTENANCE OF EQUIPMENT AND SYSTEMS

.1 After start-up, operate and maintain equipment and systems as directed by equipment/system manufacturer.

.2 With assistance of manufacturer develop written maintenance program and submit Departmental Representative for approval before implementation.

.3 Operate and maintain systems for length of time required for commissioning to be completed.

.4 After completion of commissioning, operate and maintain systems until issuance of certificate of interim acceptance.

1.15 TEST RESULTS

.1 If start-up, testing and/or PV produce unacceptable results, repair, replace or repeat specified starting and/or PV procedures until acceptable results are achieved.

.2 Provide manpower and materials, assume costs for re-commissioning.

1.16 START OF COMMISSIONING

.1 Notify Departmental Representative at least 21 days prior to start of Cx.

.2 Start Cx after elements of building affecting start-up and performance verification of systems have been completed.

1.17 INSTRUMENTS/EQUIPMENT

.1 Submit to Departmental Representative for review and approval:
- .1 Complete list of instruments proposed to be used.
- .2 Listed data including, serial number, current calibration certificate, calibration date, calibration expiry date and calibration accuracy.

.2 Provide the following equipment as required:
- .1 2-way radios.
- .2 Ladders.
- .3 Equipment as required to complete work.

1.18 COMMISSIONING PERFORMANCE VERIFICATION

.1 Carry out Cx:
- .1 Under actual operating conditions, over entire operating range, in all modes.
- .2 On independent systems and interacting systems.

.2 Cx procedures to be repeatable and reported results are to be verifiable.

.3 Follow equipment manufacturer's operating instructions.

.4 EMCS trending to be available as supporting documentation for performance verification.

1.19 WITNESSING COMMISSIONING

.1 Departmental Representative to witness activities and verify results.

1.20 AUTHORITIES HAVING JURISDICTION

.1 Where specified start-up, testing or commissioning procedures duplicate verification requirements of authority having jurisdiction, arrange for authority to witness procedures so as to avoid duplication of tests and to facilitate expedient acceptance of facility.

.2 Obtain certificates of approval, acceptance and compliance with rules and regulation of authority having jurisdiction.

.3 Provide copies to Departmental Representative within 5 days of test and with Cx report.

1.21 COMMISSIONING CONSTRAINTS

.1 Since access into secure or sensitive areas will be very difficult after occupancy it is necessary to complete Cx of occupancy, weather, and seasonal sensitive equipment and systems in these areas before issuance of the Interim Certificate, using, if necessary, simulated thermal loads.

1.22 EXTRAPOLATION OF RESULTS

.1 Where Cx of weather, occupancy, or seasonal-sensitive equipment or systems cannot be conducted under near-rated or near-design conditions, extrapolate part-load results to design conditions when approved by Departmental Representative in accordance with equipment manufacturer's instructions, using manufacturer's data, with manufacturer's assistance and using approved formulae.

1.23 EXTENT OF VERIFICATION

.1 Laboratory areas:
  .1 Provide manpower and instrumentation to verify up to 100 % of reported results.

.2 Number and location to be at discretion of Departmental Representative.

.3 Conduct tests repeated during verification under same conditions as original tests, using same test equipment, instrumentation.

.4 Review and repeat commissioning of systems if inconsistencies found in more than 20 % of reported results.

.5 Perform additional commissioning until results are acceptable to Departmental Representative.

1.24 REPEAT VERIFICATIONS

.1 Assume costs incurred by Departmental Representative for third and subsequent verifications where:
  .1 Verification of reported results fail to receive Departmental Representative's approval.
  .2 Repetition of second verification again fails to receive approval.
  .3 Departmental Representative deems Contractor's request for second verification was premature.

1.25 SUNDRY CHECKS AND ADJUSTMENTS

.1 Make adjustments and changes which become apparent as Cx proceeds.

.2 Perform static and operational checks as applicable and as required.

1.26 DEFICIENCIES, FAULTS, DEFECTS

.1 Correct deficiencies found during start-up and Cx to satisfaction of Departmental Representative.

.2 Report problems, faults or defects affecting Cx to Departmental Representative in writing. Stop Cx until problems are rectified. Proceed with written approval from Departmental Representative.

1.27 COMPLETION OF COMMISSIONING

.1 Upon completion of Cx leave systems in normal operating mode.

.2 Except for warranty and seasonal verification activities specified in Cx specifications, complete Cx prior to issuance of Interim Certificate of Completion.

.3 Cx to be considered complete when contract Cx deliverables have been submitted and accepted by Departmental Representative.

1.28 ACTIVITIES UPON COMPLETION OF COMMISSIONING

.1 When changes are made to baseline components or system settings established during Cx process, provide updated Cx form for affected item.

1.29 TRAINING

.1 In accordance with Section 01 79 00.13 - Demonstration and Training for Building Commissioning.

1.30 MAINTENANCE MATERIALS, SPARE PARTS, SPECIAL TOOLS

.1 Supply, deliver, and document maintenance materials, spare parts, and special tools as specified in contract.

1.31 OCCUPANCY

.1 Cooperate fully with Departmental Representative during stages of acceptance and occupancy of facility.

1.32 INSTALLED INSTRUMENTATION

.1 Use instruments installed under Contract for TAB and PV if:
- .1 Accuracy complies with these specifications.
- .2 Calibration certificates have been deposited with Departmental Representative.

.2 Calibrated EMCS sensors may be used to obtain performance data provided that sensor calibration has been completed and accepted.

1.33 PERFORMANCE VERIFICATION TOLERANCES

.1 Application tolerances:
- .1 Specified range of acceptable deviations of measured values from specified values or specified design criteria. Except for special areas, to be within +/- 10 % of specified values.

.2 Instrument accuracy tolerances:
- .1 To be of higher order of magnitude than equipment or system being tested.

.3 Measurement tolerances during verification:
- .1 Unless otherwise specified actual values to be within +/- 2 % of recorded values.

1.34 OWNER'S PERFORMANCE TESTING

.1 Performance testing of equipment or system by Departmental Representative will not relieve Contractor from compliance with specified start-up and testing procedures.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCE STANDARDS

.1 Public Works and Government Services Canada (PWGSC)
- .1 PWGSC - Commissioning Guidelines CP.4 -3rd edition.

1.2 GENERAL

.1 Provide a fully functional facility:
- .1 Systems, equipment and components meet user's functional requirements before date of acceptance, and operate consistently at peak efficiencies and within specified energy budgets under normal loads.
- .2 Facility user and O&M personnel have been fully trained in aspects of installed systems.
- .3 Optimized life cycle costs.
- .4 Complete documentation relating to installed equipment and systems.

.2 Term "Cx" in this section means "Commissioning".

.3 Use this Cx Plan as master planning document for Cx:
- .1 Outlines organization, scheduling, allocation of resources, documentation, pertaining to implementation of Cx.
- .2 Communicates responsibilities of team members involved in Cx Scheduling, documentation requirements, and verification procedures.
- .3 Sets out deliverables relating to O&M, process and administration of Cx.
- .4 Describes process of verification of how built works meet Owner/Investor's requirements.
- .5 Produces a complete functional system prior to issuance of Certificate of Occupancy.
- .6 Management tool that sets out scope, standards, roles and responsibilities, expectations, deliverables, and provides:
  - .1 Overview of Cx.
  - .2 General description of elements that make up Cx Plan.
  - .3 Process and methodology for successful Cx.

.4 Acronyms:
- .1 Cx - Commissioning.
- .2 BMM - Building Management Manual.
- .3 EMCS - Energy Monitoring and Control Systems.
- .4 WHMIS Safety Data Sheets (SDS).
- .5 PI - Product Information.
- .6 PV - Performance Verification.
- .7 TAB - Testing, Adjusting and Balancing.
- .8 WHMIS - Workplace Hazardous Materials Information System.

.5 Commissioning terms used in this Section:
- .1 Bumping: short term start-up to prove ability to start and prove correct rotation.
- .2 Deferred Cx - Cx activities delayed for reasons beyond Contractor's control due to lack of occupancy, weather conditions, need for heating/cooling loads.

1.3 DEVELOPMENT OF 100% CX PLAN

.1 Cx Plan to take into account:
- .1 Approved shop drawings and product data.
- .2 Approved changes to contract.
- .3 Contractor's project schedule.
- .4 Cx schedule.
- .5 Contractor's, sub-contractor's, suppliers' requirements.
- .6 Project construction team's and Cx team's requirements.

.2 Submit completed Cx Plan to Departmental Representative and obtain written approval.

1.4 REFINEMENT OF CX PLAN

.1 During construction phase, revise, refine and update Cx Plan to include:
- .1 Changes resulting from Client program modifications.
- .2 Approved design and construction changes.

.2 Revise, refine and update every if needed during construction phase. At each revision, indicate revision number and date.

.3 Submit each revised Cx Plan to Departmental Representative for review and obtain written approval.

.4 Include testing parameters at full range of operating conditions and check responses of equipment and systems.

1.5 COMPOSITION, ROLES AND RESPONSIBILITIES OF CX TEAM

.1 Departmental Representative to maintain overall responsibility for project and is sole point of contact between members of commissioning team.

.2 Project Manager will select Cx Team consisting of following members:
- .1 PWGSC Design Quality Review Team: during construction, will conduct periodic site reviews to observe general progress.
- .2 PWGSC Quality Assurance Commissioning Manager: ensures Cx activities are carried out to ensure delivery of a fully operational project including:
  - .1 Review of Cx documentation from operational perspective.
  - .2 Review for performance, reliability, durability of operation, accessibility, maintainability, operational efficiency under conditions of operation.
  - .3 Protection of health, safety and comfort of occupants and O&M personnel.
  - .4 Monitoring of Cx activities, training, development of Cx documentation.
  - .5 Work closely with members of Cx Team.
- .3 Departmental Representative is responsible for:
  - .1 Organizing Cx.
  - .2 Monitoring operations Cx activities.
  - .3 Witnessing, certifying accuracy of reported results.
  - .4 Performing verification of performance of installed systems and equipment.
  - .5 Implementation of Training Plan.
- .4 The Consultant has the following responsibilities:
  - .1 drafting of MES estimate and MES requirements in the applicable divisions
  - .2 drafting and updating the MES plan
  - .3 monitoring of commissioning activities;
  - .4 assistance and advice in carrying out the MES and finding solutions to the problems identified;
  - .5 presence during balancing tests and / or analysis of results

.6 verification of the training plan
.7 verification of documents making up the Operations manual

.5 Construction Team: contractor, subcontractors, suppliers and support disciplines, is responsible for construction/installation in accordance with Contract Documents, including:
.1 carrying out the tests;
.2 execution of ERE operations;
.3 execution of commissioning activities;
.4 demonstration of the operation of equipment and systems;
.5 training and provision of support documents;
.6 Designation of the Consultant's contact point and the PWGSC Commissioning Manager, for administrative and coordination matters.

.6 Contractor's Cx agent implements specified Cx activities including:
.1 Implementation of the final MS plan;
.2 Implementation of the training plan.
.3 Attendance at tests and certification of declared results;
.4 Presence in ERA operations and related tests, and certification;
.5 Preparation and submission of test reports.
.6 Preparation and submission of components of the Operation and maintenance manual

.7 Property Manager: represents lead role in Operation Phase and onwards and is responsible for:
.1 Receiving facility.
.2 Day-To-Day operation and maintenance of facility.

1.6 CX PARTICIPANTS

.1 Employ the following Cx participants to verify performance of equipment and systems:
.1 Installation contractor/subcontractor:
.1 Equipment and systems except as noted.

.2 Equipment manufacturer: equipment specified to be installed and started by manufacturer.
.1 To include performance verification.

.3 Specialist subcontractor: equipment and systems supplied and installed by specialist subcontractor.

.4 Client: responsible for intrusion and access security systems.

.5 Ensure that Cx participant:
.1 Could complete work within scheduled time frame.
.2 Available for emergency and troubleshooting service during first year of occupancy by user for adjustments and modifications outside responsibility of O&M personnel, including:
.1 Modify ventilation rates to meet changes in off-gassing.
.2 Changes to heating or cooling loads beyond scope of EMCS.
.3 Changes to EMCS control strategies beyond level of training provided to O&M personnel.
.4 Redistribution of electrical services.
.5 Modifications of fire alarm systems.
.6 Modifications to voice communications systems.

.6 Provide names of participants to Departmental Representative and details of instruments and procedures to be followed for Cx 1 month prior to starting date of Cx for review and approval.

1.7 EXTENT OF CX

.1 Cx Structural and Architectural Systems:
- .1 Architectural and structural:
- .1 Non applicable.

.2 Commission mechanical systems and associated equipment:
- .1 Plumbing systems.
- .2 Fire and life safety systems.
- .3 Seismic restraint and control measures.

.3 Commission electrical systems and equipment:
- .1 Security/Access control

1.8 DELIVERABLES RELATING TO O&M PERSPECTIVES

.1 General requirements:
- .1 Compile French documentation.
- .2 Documentation to be computer-compatible format ready for inputting for data management.

.2 Provide deliverables:
- .1 Warranties.
- .2 Project record documentation.
- .3 Inventory of spare parts, special tools and maintenance materials.
- .4 Maintenance Management System (MMS) identification system used.
- .5 WHMIS information.
- .6 WHMIS Safety Data Sheets (SDS).
- .7 Electrical Panel inventory containing detailed inventory of electrical circuitry for each panel board. Duplicate of inventory inside each panel.

1.9 DELIVERABLES RELATING TO THE CX PROCESS

.1 General:
- .1 Start-up, testing and Cx requirements, conditions for acceptance and specifications form part of relevant technical sections of these specifications.

.2 Definitions:
- .1 Cx as used in this section includes:
  - .1 Cx of components, equipment, systems, subsystems, and integrated systems.
  - .2 Factory inspections and performance verification tests.
  - .3 Process documentation.

.3 Deliverables: provide:
- .1 Cx Specifications.
- .2 Startup, pre-Cx activities and documentation for systems, and equipment.
- .3 Completed installation checklists (ICL).
- .4 Completed product information (PI) report forms.
- .5 Completed performance verification (PV) report forms.
- .6 Results of Performance Verification Tests and Inspections.
- .7 Description of Cx activities and documentation.
- .8 Description of Cx of integrated systems and documentation.
- .9 Tests of following witnessed by PWGSC Design Quality Review Team:
  - .1 Heatpumps (quantity to be determined).
- .10 Training Plans.
- .11 Cx Reports.
- .12 Prescribed activities during warranty period.

.4 Departmental Representative to witness and certify tests and reports of results provided to Departmental Representative.

.5 Departmental Representative to participate.

1.10 PRE-CX ACTIVITIES AND RELATED DOCUMENTATION

.1 Items listed in this Cx Plan include the following:
- .1 Pre-Start-Up inspections: by General Contractor prior to permission to start up and rectification of deficiencies to Departmental Representative's satisfaction.
- .2 General Contractor to use approved check lists.
- .3 Consultant will monitor some of these pre-start-up inspections.
- .4 Include completed documentation with Cx report.
- .5 Conduct pre-start-up tests: conduct pressure, static, flushing, cleaning, and "bumping" during construction as specified in technical sections. To be witnessed and certified by General Contractor and does not form part of Cx specifications.
- .6 Consultant will monitor some of these inspections and tests.
- .7 Include completed documentation in Cx report.

.2 Pre-Cx activities - ARCHITECTURAL AND STRUCTURAL:
- .1 Non applicable.

.3 Pre-Cx activities - MECHANICAL:
- .1 Non applicable.

.4 Pre-Cx activities - LIFE SAFETY SYSTEMS
- .1 Non applicable.

.5 Pre-Cx activities - ELECTRICAL:
- .1 Non applicable.

1.11 START-UP

.1 Start up components, equipment and systems.

.2 Equipment manufacturer, supplier, installing specialist sub-contractor, as appropriate, to start-up, under Contractor's direction, following equipment, systems:
- .1 Heatpumps. Units are existing (replacement is required). Manufacturer’s implication could be limited: to be determined on unit startup.
- .2 Lighting systems with scenarios.

.3 Consultant to monitor some of these start-up activities.
- .1 Rectify start-up deficiencies to satisfaction of Departmental Representative.

.4 Performance Verification (PV):
- .1 Approved Cx Agent to perform.
  - .1 Repeat when necessary until results are acceptable to Departmental Representative.
- .2 Use procedures modified generic procedures to suit project requirements.
- .3 Manager to witness and certify reported results using approved PI and PV forms.
- .4 Consultant to approve completed PV reports and provide to Departmental Representative.
- .5 Departmental Representative reserves right to verify up to 30 % of reported results at random.
- .6 Failure of randomly selected item shall result in rejection of PV report or report of system startup and testing.

1.12 CX ACTIVITIES AND RELATED DOCUMENTATION

.1 Perform Cx by specified Cx agency using procedures developed by General Contractor and approved by Departmental Representative.

.2 Consultant to monitor Cx activities.

.3 Upon satisfactory completion, Cx agency performing tests to prepare Cx Report using approved PV forms.

.4 General Contractor to witness, certify reported results of, Cx activities and forward to Departmental Representative.

.5 Departmental Representative reserves right to verify a percentage of reported results at no cost to contract.

1.13 CX OF INTEGRATED SYSTEMS AND RELATED DOCUMENTATION

.1 Cx to be performed by specified Cx specialist, using procedures developed by General Contractor and approved by Departmental Representative.

.2 Tests to be witnessed by Departmental Representative and documented on approved report forms.

.3 Upon satisfactory completion, Cx specialist to prepare Cx Report, to be certified by Contractor and submitted to Departmental Representative for review.

.4 Departmental Representative reserves right to verify percentage of reported results.

.5 Integrated systems to include:

.1 HVAC and associated systems forming part of integrated HVAC systems.

.6 Identification:

.1 In later stages of Cx, before hand-over and acceptance Departmental Representative, Contractor, and Cx Manager to co-operate to complete inventory data sheets and provide assistance to PWGSC in full implementation of MMS identification system of components, equipment, sub-systems, systems.

1.14 INSTALLATION CHECK LISTS (ICL)

.1 Refer to Section 01 91 13.16 - Commissioning Forms: Installation Check Lists and Product Information (PI)/Performance Verification (PV) Forms.

1.15 PRODUCT INFORMATION (PI) REPORT FORMS

.1 Refer to Section 01 91 13.16 - Commissioning Forms: Installation Check Lists and Product Information (PI)/Performance Verification (PV) Forms.

1.16 PERFORMANCE VERIFICATION (PV) REPORT

.1 Refer to Section 01 91 13.16 - Commissioning Forms: Installation Check Lists and Product Information (PI)/Performance Verification (PV) Forms.

1.17 DELIVERABLES RELATING TO ADMINISTRATION OF CX

.1 General:

.1 Because of risk assessment, complete Cx of occupancy, weather and seasonal-sensitive equipment and systems in these areas before building is occupied.

1.18 CX SCHEDULES

.1 Prepare detailed Cx Schedule and submit to Departmental Representative for review and approval same time as project Construction Schedule. Include:
- .1 Milestones, testing, documentation, training and Cx activities of components, equipment, subsystems, systems and integrated systems, including:
  - .1 Design criteria, design intents.
  - .2 Pre-TAB review: 28 days after contract award, and before construction starts.
  - .3 Cx agents' credentials: 30 days before start of Cx.
  - .4 Cx procedures: 1 month after award of contract.
  - .5 Cx Report format: 1 month after contract award.
  - .6 Discussion of heating/cooling loads for Cx: 1 month before start-up.
  - .7 Submission of list of instrumentation with relevant certificates: 21 days before start of Cx.
  - .8 Notification of intention to start TAB: 21 days before start of TAB.
  - .9 TAB: after successful start-up, correction of deficiencies and verification of normal and safe operation.
  - .10 Notification of intention to start Cx: 14 days before start of Cx.
  - .11 Notification of intention to start Cx of integrated systems: after Cx of related systems is completed 14 days before start of integrated system Cx.
  - .12 Implementation of training plans.
  - .13 Cx reports: immediately upon successful completion of Cx.
- .2 Detailed training schedule to demonstrate no conflicts with testing, completion of project and hand-over to Property Manager.
- .3 6 months in Cx schedule for verification of performance in all seasons and wear conditions.

.2 After approval, incorporate Cx Schedule into Construction Schedule.

.3 Consultant, Contractor, Contractor's Cx agent, and Departmental Representative will monitor progress of Cx against this schedule.

1.19 CX REPORTS

.1 Submit reports of tests, witnessed and certified by Departmental Representative to Departmental Representative who will verify reported results.

.2 Include completed and certified PV reports in properly formatted Cx Reports.

.3 Before reports are accepted, reported results to be subject to verification by Departmental Representative.

1.20 PRELIMINARY AND FINAL CX

.1 Non applicable.

1.21 ACTIVITIES DURING WARRANTY PERIOD

.1 Cx activities must be completed before issuance of Interim Certificate, it is anticipated that certain Cx activities may be necessary during Warranty Period, including:
- .1 Fine tuning of HVAC systems.
- .2 Adjustment of ventilation rates to promote good indoor air quality and reduce deleterious effects of VOCs generated by off-gassing from construction materials and furnishings.
- .3 Full-scale emergency evacuation exercises.

1.22 TESTS TO BE PERFORMED BY OWNER/USER

.1 None is anticipated on this project.

1.23 FINAL SETTINGS

.1 Upon completion of Cx to satisfaction of Departmental Representative lock control devices in their final positions, indelibly mark settings marked and include in Cx Reports.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

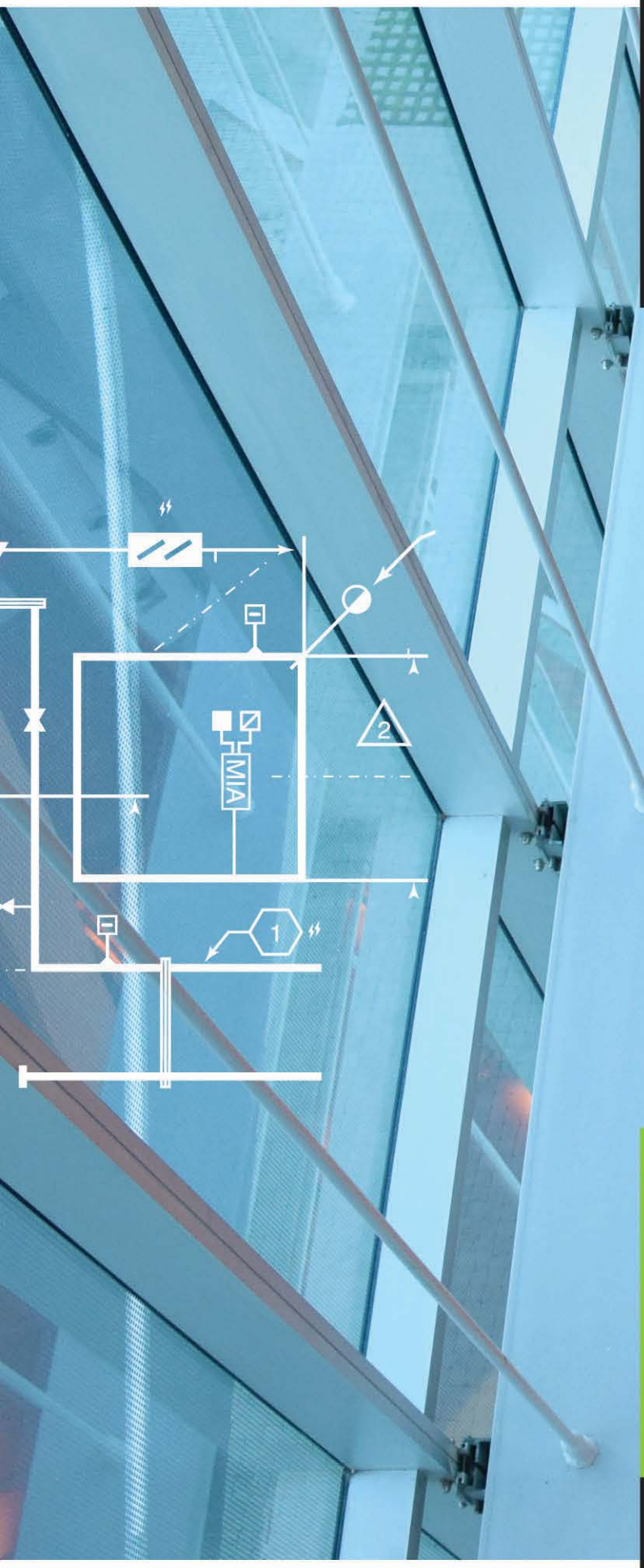
.1 Not Used.

END OF SECTION

ANNEXE
COMMISSIONING PLAN

PAGEAU MOREL

UN ENGAGEMENT DURABLE | A SUSTAINABLE COMMITMENT



TPSGC | Établissement Port-Cartier Portes de cellule

Plan de mise en service

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Établissement Port-Cartier Portes de cellule

Plan de mise en service

Révision 0.1 – SR4-100%

Le 16 décembre 2020 2682-001-SR8
R.106617.001

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Mise en service
(Membre OIQ 144294)

Table des matières

Abréviations

BEÉFP	Bureau d'examen des édifices fédéraux du patrimoine
C	Consultant
CP	Contrôle de performance
EC	Équipe de construction
ERE	Essai, réglage et équilibrage
GMAO	Gestion de maintenance assistée par ordinateur
LI	Listes d'installation et démarrage
N/A	Non applicable
MES	Mise en service
RBQ	Régie du bâtiment du Québec
RM	Représentant du Ministère
RMS	Responsable de la mise en service de l'entrepreneur
RP	Renseignements sur les produits
SCC	Service Correctionnel Canada
SPAC	Services publics et approvisionnement Canada (anciennement TPSGC)
TPSGC	Travaux publics et Services gouvernementaux Canada (maintenant SPAC)

Introduction

L'Établissement Port-Cartier, situé dans la région de la Côte-Nord de la province de Québec, est le pénitencier fédéral le plus à l'est de la région par rapport aux autres établissements de la région centre de la province. L'Établissement Port-Cartier, un établissement autonome à sécurité maximale, est basé sur un modèle de conception triangulaire avec logement d'observation directe. Les réaménagements compris dans le présent projet touchent seulement le secteur de l'isolement.

Dans ce mandat, l'équipe d'experts-conseils est coordonnée par la firme d'architecture Bisson Fortin Architecture et Design (BFAD). Pageau Morel et associés inc. (Pageau Morel) s'implique en tant que concepteur en électromécanique et exerce aussi la surveillance de chantier pour ces disciplines.

Le présent plan de mise en service est publié au moment de la conception (SR4). En réponse aux exigences du devis, il précise notamment les activités associées à la mise en service durant la construction. Le plan décrit le processus, les rôles des différents intervenants ainsi que les documents associés à la mise en service du projet, de manière à l'intégrer efficacement à la construction. Le plan met aussi en la place la mise en service de l'installation en tant que telle, dont les phases clés se déroulent en fin de projet.

1 Objectif de la mise en service

La mise en service (MES) a été introduite depuis quelques décennies chez TPSGC. En fonction de leur importance, elle est requise dans tous les projets, tel que stipulé dans la Politique de mise en service datée de 2011.

La MES est un effort commun de l'ensemble des intervenants dont l'objectif est de s'assurer que le projet est conçu, construit et étalonné de façon à fonctionner tel que requis. Au terme du processus, le client a en mains tous les outils (documentation, formation) pour maintenir les performances de manière optimale.

La MES va plus loin qu'une surveillance traditionnelle. Elle implique un niveau accru de documentation et de démonstration et comprend notamment l'évaluation de la performance des systèmes sur une base individuelle et dans l'ensemble des interactions.

2 Portée de la mise en service

Les systèmes généralement visés peuvent être regroupés en trois (3) catégories. Dans le cadre du réaménagement de l'espace locatif, les items suivants sont cités au devis de MES :

2.1 Systèmes architecturaux et structuraux :

- Non inclus

2.2 Systèmes mécaniques :

- Protection incendie (modifications mineures à l'existant) ;
- Plomberie et drainage (modifications mineures à l'existant) ;
- Contrôle et régulation (intégration à l'existant – Voir contrôle d'accès) ;

2.3 Systèmes électriques :

- Contrôle d'accès;

3 Rôles et responsabilités

3.1 Principaux intervenants

Le présent plan de mise en service s'adresse avant tout aux membres de l'équipe de mise en service. Le rôle des membres de cette équipe est décrit dans cette section.

Le Représentant du Ministère (RM)

Le Gestionnaire de projet TPSGC détient la responsabilité générale de la gestion du projet. Il est la personne-ressource du client, des consultants et de tous les autres membres de l'équipe du projet. En tant que Représentant du Ministère, il peut déléguer une partie de ses responsabilités. Le RM coordonne les réunions de MES et en rédige le procès-verbal. Il approuve les documents de MES, incluant les manuels et plans de formation et assiste aux essais critiques.

Le consultant (C)

Il conçoit l'installation en respectant les exigences fonctionnelles et opérationnelles et prépare les documents de construction, incluant le devis et le plan de MES. Il réalise la surveillance de chantier et dans ce contexte, assiste comme témoin aux démonstrations et essais critiques. Le consultant exerce aussi une surveillance des activités de mise en service. Il vérifie et commente les divers rapports d'essai et le plan de formation. Le consultant participe à la résolution des problèmes relatifs à la MES, révise les manuels et plans de formation et valide les plans « tel que construit », et transmet la documentation de fin de projet et la documentation de mise en service soumise par l'Entrepreneur afin de constituer le Manuel d'Exploitation et d'entretien.

L'équipe de construction (EC)

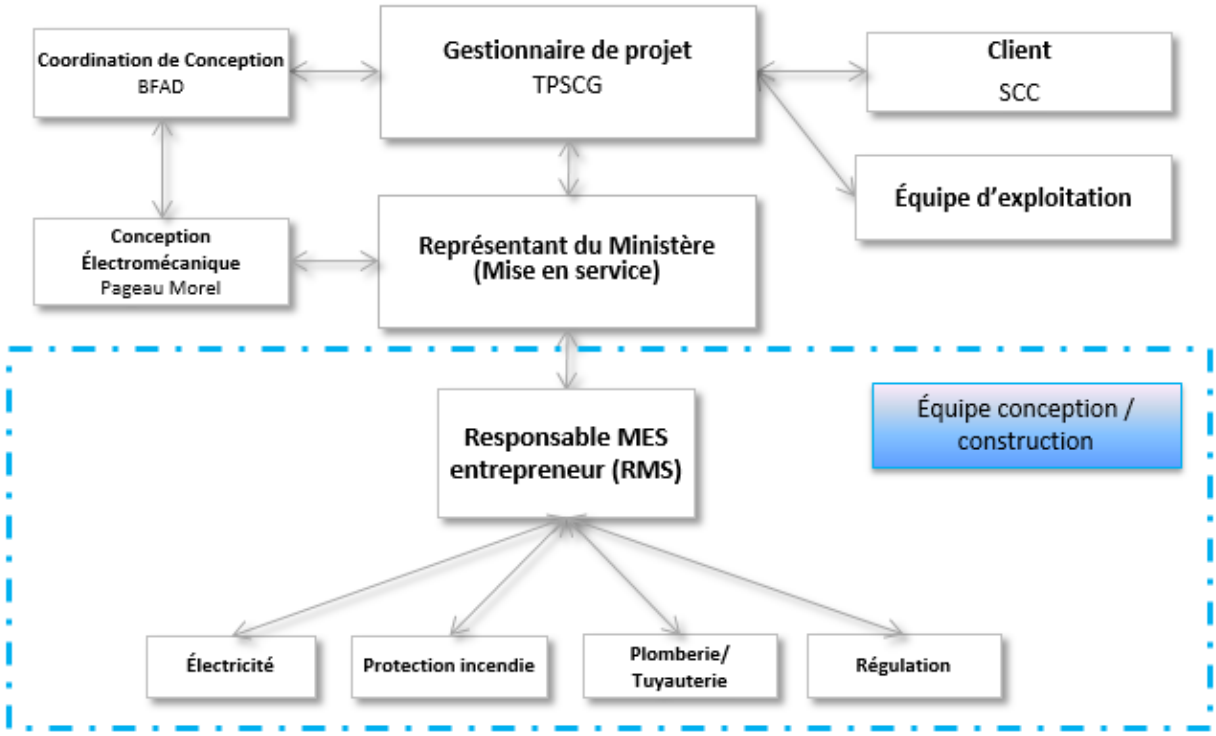
Elle est composée de l'entrepreneur, de ses fournisseurs et des divers corps de métier qui réalisent la construction conformément aux documents contractuels. Sous la coordination du responsable de la mise en service de l'entrepreneur (RMS) l'équipe accomplit aussi toutes les activités de la MES, notamment les essais et la documentation, à la satisfaction du Représentant du Ministère. L'équipe réalise la mise au point, dispense la formation et assemble les manuels et participe à la résolution des problèmes relatifs à la mise en service.

Le responsable de la mise en service de l'entrepreneur (RMS)

Il est désigné par l'entrepreneur en fonction de sa compréhension du processus de MES, dont il assure la planification et la coordination. Il révise le plan de mise en service et les formulaires pour s'assurer de leur compréhension par les sous-traitants et de leur validité. Il fournit le calendrier de MES, et s'assure de l'exécution de toutes les activités de MES exigées. Il complète ou contresigne les fiches de mise en service pour tous les systèmes visés. Il reçoit et analyse les documents d'ERE avant de les transmettre au Consultant et au Représentant du Ministère. Il rassemble et vérifie les manuels et voit à la mise en œuvre du plan de formation. Le RMS se rend aussi disponible pour offrir un service d'urgence et de dépannage pendant la première année d'occupation pour effectuer des réglages et des modifications qui ne font pas partie des responsabilités du personnel d'exploitation et d'entretien.

3.2 Organigramme des intervenants

L'organigramme ci-dessous est la représentation graphique des différents membres de l'équipe de mise en service énoncée au point 3.1.



Les flèches représentent les canaux de communications. En cours de projet, les moyens de communication seront principalement les comptes rendus de réunions, les rapports de visites, et le courrier électronique.

4 Phases de la mise en service

La mise en service fait idéalement partie de toutes les étapes d'un projet. La subdivision présentée ici résume les principales activités et livrables des diverses phases.

4.1 Préconception et conception

Le devis présente la MES aux sections suivantes

- 01 79 00.13 - Démonstration et formation - MES de bâtiment
- 01 91 13 - Mise en service, exigences générales
- 01 91 13.13 - Mise en service, plan de MES
- 01 91 13.16 - Mise en service, documents de MES

De plus, des procédures et critères MES sont inclus aux sections de devis des différentes disciplines par les concepteurs.

4.2 Construction

Une rencontre de démarrage de la mise en service est à prévoir le plus tôt possible. Elle permet notamment aux membres de l'équipe de mise en service de valider leur interprétation des tâches, de confirmer la liste des documents attendus et de bâtir le calendrier de MES, dont la fourniture relève du RMS. Les réunions ultérieures pourront être combinées aux réunions de chantier.

La section 01 91 13.16 du devis liste les documents de mise en service normalement applicables aux projets de TPSGC. Ils seront requis à l'achèvement des travaux (voir 01 78 00).

1. Les renseignements sur les produits sont consignés dans des fiches de RP. Il s'agit notamment des informations de la plaque signalétique.
2. Les essais statiques - ou de démarrage préliminaire - sont consignés dans une liste d'installation et de démarrage (LI). Les listes fournies par le manufacturier sont généralement acceptées ; valider auprès du RM. Pour la tuyauterie et les conduites de ventilation, là où des essais d'étanchéité et de pression sont prévus au devis, le rapport de test suffit à documenter l'installation/démarrage.
3. L'atteinte des critères d'acceptabilité des équipements décrits dans les plans et devis est validée lors d'essais de performance. Pour un équipement visé, ceci est documenté dans les formulaires de contrôle de performance (CP).

Finalement, les résultats des essais pour les systèmes intégrés sont documentés dans des formulaires de mise en service des systèmes intégrés. Ceux-ci sont produits par les concepteurs et utilisés par le RM lors des démonstrations de fonctionnalités. La forme générique est présentée en annexe du présent plan de MES.

4.2.1 Fourniture, installation et démarrage des composantes

L'objectif est de s'assurer que chaque système est complet et conforme (RP), d'utilisation sûre et prêt pour son amorçage lorsque les listes d'installation et démarrage (LI) sont complétées. Les données rassemblées à cette phase permettent aussi d'amorcer les procédures de GMAO. Cette phase statique de la mise en route est suivie par les essais de performances des équipements et sous-systèmes qui en requièrent sont ensuite réalisés et documentés (CP).

> Note : Dans le cas d'appareils existants réinstallés ou modifiés, les fiches LI et CP pourraient être exigées afin d'assurer qu'ils sont bien réinstallés et pour définir leur performance actuelle. La portion RP sera à compléter si requis, en fonction des procédures de GMAO en place. Selon les résultats initiaux obtenus (échantillon mentionné au Tableau 1, paragraphe 5), le processus pourra cependant être simplifié en cours de route. Vérifier auprès des responsables de la MES.

Il est à noter que les rapports d'essai, réglage et équilibrage (ERE) font partie des documents de performance puisqu'ils permettent de confirmer les débits et pressions spécifiés au devis.

4.2.2 Mise en service des systèmes intégrés

Cette étape vise les systèmes complexes, composés de plusieurs équipements. Avant de débuter cette phase, le RP, LI et CP doivent avoir été documentés, c'est-à-dire que les fiches sont complètes, transmises et approuvées. La complétion de l'équilibrage est aussi requise.

Les essais sur les systèmes intégrés sont réalisés par le responsable MES de l'Entrepreneur, en présence de l'Ingénieur et du RM, et documentés dans des formulaires de mise en service des systèmes intégrés.

4.3 Manuels

Le manuel d'opération et entretien est présenté au concepteur aux fins de révision et d'acceptation. Des renseignements sur ces manuels sont données dans la section 01 92 00 du devis. Valider cette formulation auprès du Représentant du Ministère.

Le manuel d'opération et entretien est présenté au concepteur aux fins de révision et d'acceptation. Se référer à la section 01 78 00 pour les la structure générale du manuel et aux exigences de MES applicables au manuel.

Les sections du manuel devraient être utilisées lors des formations. De cette manière, elles pourront faire l'objet d'une mise au point en fonction des commentaires des personnes suivant ces formations.

4.4 Formation

Des séances de formation à l'intention de l'équipe d'exploitation sont à prévoir pour les items sélectionnés ; se référer à la section 01 79 00.13 pour les exigences en matière de formation. Le calendrier et le contenu de ces séances doivent être transmis au Consultant et au RM.

4.5 Complétion significative et occupation

Le Représentant du Ministère est le destinataire final de l'ensemble des documents de MES durant la construction. L'approbation du matériel de MES par le RM est un des prérequis à l'achèvement substantiel. Le RM sera aussi responsable du suivi durant l'occupation et de la coordination d'essais saisonniers si requis, auquel cas l'Entrepreneur et le Consultant pourront être appelés à collaborer.

4.6 Fermeture de la mise en service

La dernière étape de la MES est la revue du projet à la fin de la première année d'opération sous garantie, au moment du suivi des déficiences et de leur correction.

5 Mise en service prévue

Les documents de mise en service pour les systèmes visés sont résumés dans le tableau suivant.

Tableau 1 : Résumé des livrables MES

	Fiche de MES	Test au devis	MES intégrée
5.1 Systèmes architecturaux			
Autre	(si applicable)	N/A	N/A
5.2 Systèmes mécaniques			
Composants de protection incendie	non	selon NFPA	non
Composants de plomberie	non	non	non
Autre	(si applicable)	N/A	N/A
5.3 Systèmes électriques			
Contrôle d'accès	Oui	Non	non
Autre	(si applicable)	N/A	N/A

N/A : non applicable

ANNEXE 1

MES des systèmes intégrés

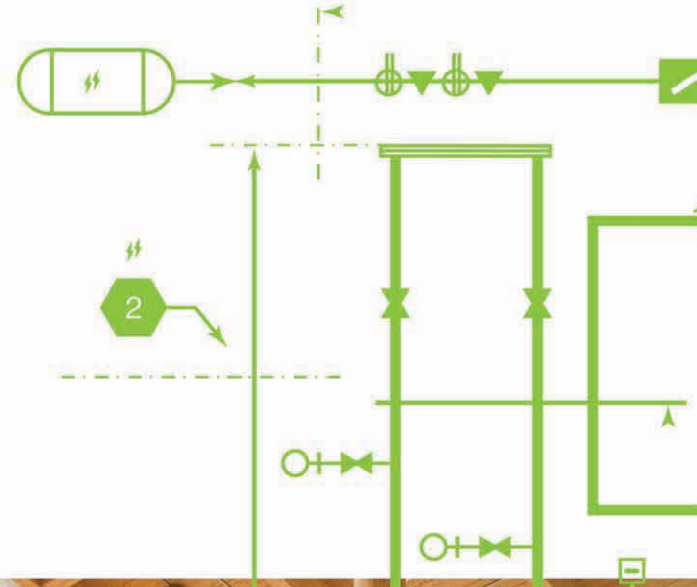
Système de contrôle d'accès						

	Vérifications préfonctionnelles complétées de manière adéquate	Installation documentée	Performance des composantes	ERE Documenté	Contrôles validés (point à point)	
Notes						

	Opération	Programmation complétée	Simulation / Essai réel	Résultat adéquat	Vérifié par	Note #

Notes

	Points divers					
	Des points seront ajoutés au besoin					
	Préalables complétés et documentés de manière satisfaisante :	**Installation documentée**	**Performance des composantes**	**ERE Documenté**	**Contrôles validés (point à point)**	
Notes						
	Séquence	**Programmation complétée**	**Simulation / Essai réel**	**Résultat adéquat**	**Accepté par**	**Note #**
Communication données BACnet						
Notes						



PAGEAU MOREL

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PART 1 GENERAL

1.1 INSTALLATION/START-UP CHECK LISTS

.1 Include the following data:
- .1 Product manufacturer's installation instructions and recommended checks.
- .2 Special procedures as specified in relevant technical sections.
- .3 Items considered good installation and engineering industry practices deemed appropriate for proper and efficient operation.

.2 Equipment manufacturer's installation/start-up check lists are acceptable for use. As deemed necessary by Consultant supplemental additional data lists will be required for specific project conditions.

.3 Use check lists for equipment installation. Document check list verifying checks have been made, indicate deficiencies and corrective action taken.

.4 Installer to sign check lists upon completion, certifying stated checks and inspections have been performed. Check lists will be required during Commissioning and will be included in Building Maintenance Manual (BMM) at completion of project.

.5 Use of check lists will not be considered part of commissioning process but will be stringently used for equipment pre-start and start-up procedures.

1.2 PRODUCT INFORMATION (PI) REPORT FORMS

.1 Product Information (PI) forms compiles gathered data on items of equipment produced by equipment manufacturer, includes nameplate information, parts list, operating instructions, maintenance guidelines and pertinent technical data and recommended checks that is necessary to prepare for start-up and functional testing and used during operation and maintenance of equipment. This documentation is included in the BMM at completion of work.

.2 Prior to Performance Verification (PV) of systems complete items on PI forms related to systems and obtain Departmental Representative's approval.

1.3 PERFORMANCE VERIFICATION (PV) FORMS

.1 PV forms to be used for checks, running dynamic tests and adjustments carried out on equipment and systems to ensure correct operation, efficiently and function independently and interactively with other systems as intended with project requirements.

.2 PV report forms include those developed by Contractor records measured data and readings taken during functional testing and Performance Verification procedures.

.3 Prior to PV of integrated system, complete PV forms of related systems and obtain Consultant's approval.

1.4 SAMPLES OF COMMISSIONING FORMS

.1 Consultant will develop and provide to Contractor required project-specific Commissioning forms in electronic format complete with specification data.

.2 Revise items on Commissioning forms to suit project requirements.

.3 Samples of Commissioning forms and a complete index of produced to date will be attached to this section.

1.5 CHANGES AND DEVELOPMENT OF NEW REPORT FORMS

.1 When additional forms are required, but are not available from Consultant develop appropriate verification forms and submit to Departmental Representative for approval prior to use.

.1 Additional commissioning forms to be in same format as provided by Consultant

1.6 COMMISSIONING FORMS

.1 Use Commissioning forms to verify installation and record performance when starting equipment and systems.

.2 Strategy for Use:

.1 Consultant provides Contractor project-specific Commissioning forms with Specification data included.
.2 Contractor will provide required shop drawings information and verify correct installation and operation of items indicated on these forms.
.3 Confirm operation as per design criteria and intent.
.4 Identify variances between design and operation and reasons for variances.
.5 Verify operation in specified normal and emergency modes and under specified load conditions.
.6 Verify reported results.
.7 Form to bear signatures of recording technician and reviewed and signed off by Contractor.
.8 Submit immediately after tests are performed.
.9 Reported results in true measured SI unit values.
.10 Provide Consultant with originals of completed forms.
.11 Maintain copy on site during start-up, testing and commissioning period.
.12 Forms to be both hard copy and electronic format with typed written results in Building Management Manual in accordance with Section 01 78 00.

1.7 LANGUAGE

.1 To suit the language profile of the awarded contract.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

ANNEXE
COMMISSIONING FORMS

TABLE DES MATIÈRES

COMMISSIONING FORMS

To be furnished upon request.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Acronyms:
- .1 BMM - Building Management Manual.
- .2 Cx - Commissioning.
- .3 HVAC - Heating, Ventilation and Air Conditioning.
- .4 PI - Product Information.
- .5 PV - Performance Verification.
- .6 TAB - Testing, Adjusting and Balancing.
- .7 WHMIS - Workplace Hazardous Materials Information System.

1.2 GENERAL REQUIREMENTS

.1 Standard letter size paper 216 mm x 279 mm.

.2 Methodology used to facilitate updating.

.3 Drawings, diagrams and schematics to be professionally developed.

.4 Electronic copy of data to be in a format accepted and approved by Departmental Representative.

1.3 APPROVALS

.1 Prior to commencement, co-ordinate requirements for preparation, submission and approval with Departmental Representative.

1.4 GENERAL INFORMATION

.1 Provide the Contractor's MES manager with the following information to be incorporated into the appropriate parts and sections of the Operation and Maintenance Manual.
- .1 Exhaustive list of names, addresses and telephone and fax numbers of the contractor and subcontractors who participated in carrying out the work - Tab A of the manual.
- .2 Letters of Guarantee - Tab B
- .3 Approved shop drawings - Tab C
- .4 Test reports, including ERE, commissioning checklists, duly completed, including Product Information Report (RP) and Performance Control (CP) forms, reviewed and accepted by the Contractor's MES manager and / or the Consultant. Tab D.
- .5 Definitive sequences of operations of these systems after their commissioning - Tab E.
  - .1 The consultant may, if necessary, attach brief descriptions of the mechanical, electrical and fire protection systems installed and put into service.
- .6 Information on the operation and maintenance of systems installed and put into service, including preventive and corrective maintenance and maintenance schedules - Tab F.
- .7 Post-execution drawings - Tab G.
- .8 Duly completed EMIS forms by the owner's staff in collaboration with the Contractor's MES manager - Tab H.
- .9 Inspection reports - Tab I.
- .10 Commissioning reports. - Tab J.

1.5 SUPPORTING DOCUMENTATION FOR INSERTION INTO SUPPORTING APPENDICES

.1 Provide Departmental Representative supporting documentation relating to installed equipment and system, including:
- .1 General:
  - .1 Finalized commissioning plan.
  - .2 WHMIS information manual.
  - .3 Procedures used during commissioning.
  - .4 Cross-Reference to specification sections.
- .2 Fire prevention, suppression and protection:
  - .1 Test reports.
- .3 Mechanical:
  - .1 Piping pressure test certificates.
- .4 Electrical:
  - .1 TAB and PV reports.
  - .2 Electrical work log book.
  - .3 Charts and schedules.
  - .4 Locations of cables and components.
  - .5 Copies of posted instructions.

.2 Assist Consultant with preparation of BMM.

1.6 LANGUAGE

.1 English and French Language to be in separate binders.

1.7 IDENTIFICATION OF FACILITY

.1 When submitting information to Departmental Representative for incorporation into BMM, use following system for identification of documentation:
- .1 See Section 23 05 53 - Identification.

1.8 USE OF CURRENT TECHNOLOGY

.1 Use current technology for production of documentation. Emphasis on ease of accessibility at all times, maintain in up-to-date state, compatibility with user's requirements.

.2 Obtain Departmental Representative's approval before starting Work.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 Notice to contractor

1. All biding documents, contract clauses, applicable conditions of the general and supplementary clauses refer to this section.

2. The Contractor will read the specifications and take account of all different works. The Contractor will plan and execute, at is charge, all works needed to complete the entire demolition, even if not described in specifications.

1.2 Similar works

1. Structural works. See Ministry representative's documents.

1.3 State of works to be demolished

1. Demolish existing works in the condition they appear.

1.4 Security measures

1. Take all necessary measures to prevent any movement or sagging of works, services, facing and trees. Supply and install all pieces necessary for reinforcing and shoring. Repair all damaged works and assume responsibility for any injuries caused by demolition works.

2. Shore and monitor works. If building to be demolished represents any danger, stop demolition work and warn Ministry representative.

3. Make sure that demolition works don't block surface water evacuation system as well as electrical and mechanical systems that must remain operational.

4. Unless otherwise noted, execute demolition works in accordance with following prescriptions:

    1. Apply and respect security measures for construction works as dictated by the Code Canadien du Bâtiment (1980) Tome 8, the provincial Government, the Commission de la Santé et de la Sécurité as well as the municipal authorities.

    2. In case of conflict between dispositions of authorities mentioned above, apply most strict one.

    3. Apply and respect measures dictated by the Norme pour Construction d'Édifices CFI 301-1975, issued by the Commissaire fédéral des incendies.

1.5 Security measures (cont'd)

1. cont'd

    1. Do not apply a load on any part of the works that will compromise the security or inflict a permanent deformation.

    2. Design and build false structures in accordance with CSA S269.1, 2016 standard.

    3. Design and build scaffolds in accordance with CSA S269.2, 2016 standard.

PART 2 - SCOPE OF WORKS

2.1 Extent of works

1. The present section concerns the supply and installation of all elements shown on plan, described in this section or necessary to complete all partial demolition works.

2. The Contractor will supply all materials, labor, scaffolds, accessories, installations and necessary services to complete the following works:

    1. Protection of existing buildings.

    2. Waterproofing of temporary works.

    3. Demolition and evacuation of all debris coming from arrangements, equipment, parapets and roof, as indicated on plan, such as:

        Architectural works:
            Roofing
            Gravel, membranes and parapets.
        Mechanical:
            Take apart and reinstall (after installation of new steel deck) all drains, ventilators, etc.
            Protect equipment situated in roof space.
        Structural:
            Demolish all lightweight concrete slabs.
        Electrical:
            Protect existing installations situated in roof space.

PARTIE 3 - PRODUCTS

3.1 Materials

Not applicable

PARTIE 4 – EXECUTION

4.1 Access roads

1. Arrange and maintain suitable roads to permit access to work site.

2. Arrange and maintain temporary roads at indicated locations. Take necessary measures to ensure removal of snow during length of works.

3. If existing roads are allowed to be used during length of works, these roads must be maintained and repaired if damages are the results of such usage.

4. The Contractor will be allowed to use the West side alley but without completely or partially blocking its access.

5. Clean all roads used by Contractor's vehicles.

4.2 Demolition works

1. Unless otherwise noted, haul away from work site all demolition debris with respect to specifications of competent authorities.

4.3 Preparatory works

1. Disconnect all electrical and telephone lines going to building to be demolished with respect to laws and specifications of competent authorities. Install warning signs on all equipment and energized lines going to other buildings during the length of works.

2. Disconnect and block all specified mechanical lines with respect to specifications of competent authorities.

3. Do not disconnect energized lines specified to remain intact.

4.4 Demolition

1. Partially demolish works as indicated on plan.

2. At the end of each day, make certain no work can fall or sag. Protect works against weather and intrusion.

3. Demolish in such way to minimize dust. Use water on dusty materials.

4. Take out and store mechanical installations on rooftop as dictated by Ministry representatives. Temporary closure of all mechanical openings to prevent dust and water infiltration.

5. It is forbidden to sell or burn demolition materials on site.

6. Gather all contaminated or hazardous materials and evacuate them with all necessary precautions.

7. All usable and unusable demolition debris are property of Contractor.

8. If works must be stopped, protect and waterproof all opened surfaces in order to prevent water infiltration and damages to the building.

9. The Contractor will be able to use sites North and South of pool to install waste containers.

10. The Contractor is responsible to restore sites to their original condition. All fees in doing so will be paid by the Contractor.

4.5 Precautions

1. Realize works during hours fixed by governing authorities. Minimize obstruction to pedestrians and vehicles in west alley.

2. Submit for approval by Ministry representative dates scheduled for temporary shutdown of existing services. Warn in advance concerned authorities and execute shut downs on set dates.

3. If ever non identified services are discovered, immediately warn Ministry representative and provide written report on findings.

4. Disturbance to public and occupants must be kept to a minimum. Other than the pool, all quarters are to remain operational, if possible. Make arrangements with Ministry representative in order to facilitate demolition works.

4.6 Precautions (cont'd)

1. The Contractor will have to visit the sites before submitting his price.

   Roof slabs to be demolished are in many places heavily damaged. In consequence, they have no structural capacity.

   The Contractor must plan for supports, shoring and reinforced passageway necessary.

   Before start of work, the Contractor will submit for approval by the Ministry representative all shop drawings indicating methods, security measures and sequences of works.

   These shop drawings must be stamped and signed by a Ministry representative member of the Ordre des Ingénieurs du Québec.

   Dropping of objects or debris on ceiling of pool is strictly forbidden.

End of section

PART 1 - GENERAL

1.1 General clauses

1. General Clauses and Complementary General Clauses apply to works described in this section.

1.2 Related works

1. Cast-in-place concrete Section 03 30 00

1.3 Reference standards

1. Do reinforcing work in accordance with A23.1, 2019, A23.3, 2019 et ACI 315, 2018 and welding of reinforcing with, except where specified otherwise.

1.4 Substitutes

1. Substitution of different size bars permitted only upon written approval of Ministry representative.

1.5 Scope of work

1. Work will include all execution, materials, fabrication, equipment, tools, installation and services required to complete work related to concrete reinforcement (including work shown on mechanical/electrical drawings), as established by drawings and defined in the present document.

PART 2 – PRODUCTS

2.1 Materials

1. Reinforcing steel: billet steel, grade 400, deformed bars to CSA G30.18, 2009-R2019 unless indicated otherwise.

2. Welded steel wire fabric: to CSA G30.5, 1983-R1998.

3. Chairs, bolsters, bar supports, spacers: to A23.1, 2019. Chairs and supports as well as spacers to be plastified in apparent concrete.

4. Mechanical splices to be approved by the Ministry representative.

5. Shrinkage reinforcement in slabs and reinforcement walls to be spliced with length specified in A23.3, 2019 but no shorter than 24 bar diameter.

6. Epoxy coating for non prestressing steel: to ASTM A775 / A775M, 2019.

2.2 Fabrication

1. Fabricate reinforcing in accordance with CAN3-A23.1, 2019. Bending of reinforcing bars shall be done according to the typical bending indicated on drawings.

2. Reinforcing steel shall be fabricated within tolerances as defined by "Reinforcing Steel Manual of Standard Practice".

3. Obtain the Ministry representative's approval for locations of reinforcement splices other than shown on steel placing drawings.

4. Ship bundles of bar reinforcement, clearly identified in accordance with barlist.

PART 3 - EXECUTION

3.1 Field bending

1. Do not field bend reinforcing steel except where indicated or authorized by the Ministry representative.

2. When field bending is authorized, bend without heat, applying a slow and steady pressure.

3. Replace bars which develop cracks or splits.

3.2 Placing reinforcement

1. Place reinforcing steel as indicated on examined shop drawings and in accordance with CAN3-A23.1, 2019.

2. Obtain Ministry representative's approval of reinforcing steel and position.

3. Clean all reinforcing steel prior to concreting.

4. Maintain reinforcing steel at 100 mm from edges and undowelled joints or as indicated in the general notes on structural drawings.

5. Reinforcing steel shall be placed exactly as shown on plans and indicated in these specifications. It shall be supported by enough chairs, bar supports or spacers and shall be firmly fastened so as to prevent any displacement until and during concrete placement in the formwork.

6. Footing and slab-on-grade reinforcing steel shall be supported by concrete blocks or other material approved by the Ministry representative.

7. Permissible divergence in the reinforcing steel position are:

   - Transversely: Beams, columns, slabs, walls less than 600 mm deep: $\pm$ 5 mm
     Beams, columns, slabs, walls more than 600 mm deep: $\pm$ 10 mm
   - Longitudinaly: $\pm$ 10 mm

End of section

PART 1 - GENERAL

1.1 General clauses

1. General Clauses and Complementary General Clauses apply to works described in this section.

1.2 Related works

1. Concrete reinforcement Section 03 20 00

1.3 Reference standards

1. Do cast-in-place concrete work in accordance with CSA/CAN-A23.1, 2019, and testing in accordance with CSA/CAN-A23.2, 2019, except where specified otherwise.

1.4 Quality control

1. Submit proposed quality control procedures for Ministry representative's approval.

1.5 Scope of work

1. Provide all necessary labour, materials, equipment and tools for supply, transport, pouring cast-in-place, curing and protection of concrete, as prescribed on drawings and defined in these specifications, including: concrete, chemical admixtures, curing compound, protection, heating and cooling.

1.6 Coordination

1. Obtain from other trades all necessary information and instructions concerning surface finishing, materials and anchors which could affect work under this section.

1.7 Inspection

1. Collaborate with inspector and laboratory representative to facilitate their work.

PART 2 - PRODUCTS

2.1 Materials

1. Portland cement: type GU and GU-SF, to CSA A3001, according to the latest edition.

2. Water: to CSA/CAN-A23.1, 2019.

3. Aggregates: to CSA/CAN-A23.1, 2019. Coarse aggregates to be normal density.

4. Air entraining admixture: to CSA/CAN-A3000, 2018 and A23.1/A23.2, 2019.

5. Chemical admixtures: to CSA/CAN-A3000, 2018 and A23.1/A23.2, 2019. Ministry representative to approve accelerating or set retarding admixtures during cold and hot weather placing.

6. Dry pack: premixed or non-premixed composition of nonmetallic aggregate, Portland cement with sufficient water for the mixture to retain its shape when made into a ball by hand and capable of developing compression strength of 50 MPa at 28 days.

7. Curing compound: to CSA/CAN-A23.1, 2019.

2.2 Mixing and delivery

1. Except with special authorization from Ministry representative, all concrete used for this project shall be the product of an approved ready-mix-plant.

   Each load of concrete shall be accompanied by a delivery ticket stating the strength of mix of the concrete, the slump, the maximum size of the coarse aggregate, the admixtures and the time when the ready-mixed concrete was loaded into the delivery truck.

   Measuring, mixing and shipment practices shall conform to the latest CSA A23.1, 2019 and ASTM C94, 2019 specifications.

   Each class of concrete shall have the required compressive strength at 28 days as specified on structural drawings.

2. The water-cement ratio must be determined by taking into consideration the compressive strength at 28 days, the grading of the aggregates, the slump as well as the amount of entrained air. However, unless otherwise noted or approved by Ministry representative, the water-cement ratio for each class of concrete shall conform to the values recommended in sections 14 and 15 of the latest A23.1, 2019 specification. In no case, shall the water-cement ratio exceed 0,60.

   The average of all tests for compressive strength at 28 days for each class of concrete must be greater than or equal to the required strength and not more than 10 per cent of the tests shall have values of less than the required strength.

   The average of any five consecutive strength tests, must be equal to or greater than the specified strength.

   If the concrete should fail to meet these requirements, the Ministry representative shall have the right to order changes in the mix proportions.

   In addition, he may require at the Contractor's expense, the following tests:

   - A core specimen drilled from the structure and tested in accordance with good practice to verify the compressive strength.

   - Load testing of the structural element in accordance with the National Building Code to ascertain if it can carry the load it was designed for.

- Except where otherwise noted on the drawings or in these specifications, the concrete shall have the following slump:

Type of elements	Slump in mm
Massive works:	40
Others:	80

The slumps specified above are these obtained by the standard slump test as described in specification A23.2-5C, 2019.

Permissible tolerances in slump are 20 mm more or less than the specified value. Concrete not satisfying these standards shall be refused.

- No addition of water to ready-mix concrete will be tolerated at the building-site. All concrete to which water has been added, shall be refused.

- Concrete submitted to conditions of severe weathering such as exterior walls, slabs or stairs, shall contain an amount of 5 to 8% of entrained air.

An air entraining agent shall be added to the mix in a manner that the concrete will reach the required air content at the building-site.

- A set retarding admixture may be added to the mix only when specified on the drawings or in this specification or with the Ministry representative's approval. However, when the ambient temperature is warm or when the placing of concrete conditions are difficult or delicate, the Ministry representative may require that a set-retarding agent be added to the mix in order to ease the placing of concrete.

2.3 Concrete mix proportions

1. Submit for approval, at least two weeks beforehand, mix proportions for each class of concrete.

2. Approvals will not free Contractor from responsibility for manageability and final strength of each class of concrete.

3. Contractor must change concrete mix proportions if strength, slump, air content or/and hardening do not conform to establish values.

4. All mix proportions will provide a uniform, malleable concrete with strength, slump, air content and hardening that conform to limits indicated in the present document.

5. Aggregates maximum size shall conform to A23.1, 2019.

6. Strength shall be as indicated on structural drawings.

7. Reducing water admixture, if required, will be added to mix, according to approved percentage.

PART 3 - EXECUTION

3.1 Workmanship

1. Concrete placing shall conform to this specification and the latest CSA/CAN-A23.1, 2019 and ACI specifications. Concrete placing shall be done by qualified and experienced workmen.

2. Do not start concrete placing before formwork and reinforcing steel have been inspected by the Ministry representative. Notify Ministry representative at least 24 hours in advance.

3. Place concrete with adequate mechanical equipment, in order to control the concreting sessions.

4. Flush all equipment used in transporting and placing of the concrete with water before and after each use. Discharge water used for this purpose outside the forms.

5. Deposit concrete in the forms in layers not exceeding 450 mm and as near as possible to its final position to avoid segregation.

6. Free dropping of concrete for heights exceeding 1.5 m will not be permitted. Use chutes for heights exceeding 1.5 m.

   Chute length shall not exceed 4.5 m. The slope shall range between 1 vertical in 3 horizontals to 1 vertical in 1 horizontal.

7. Perform concrete placing continuously between any two construction joints. Prepare a concreting program for the day. Execute construction joints at the locations shown on the structural drawings.

   Obtain Ministry representative's approval to add or remove one or several construction joints. When concreting is finished, level the surface of the joint and clean protruding reinforcing.

   Construction joints in visible concrete shall be straight, level will coincide with formwork joint and with details shown on structural drawings. In cases where joints are not shown in drawings, check with Ministry representative for appropriate location.

   At Ministry representative's request, Contractor to supply and install, at Contractor's expense, keys and dowels in construction joints not indicated on drawings.

8. Compact concrete with internal vibrators as soon as the concrete is placed.

   At least one vibrator will be required for each ready-mix truck delivering concrete. One spare vibrator shall be kept at hand in case of breakdown.

   Internal vibrator should be operated at a minimum frequency of 7000 cycles per minute and should be operated by skilled and experienced men. Insert vibrators vertically in the fresh concrete at intervals of about 300 mm and shall penetrate a few inches in the previous layer.

   Compact concrete with internal vibrators as soon as the concrete is placed (cont’d).

   Execute consolidation of concrete at a regular rate and each square meter of concrete surface shall receive a minimum of 4 minutes of vibration, taking into account the overlapping influence of vibrators.

   In no case shall vibrators be used to move concrete horizontally in the forms or in the chutes.

   Exercise care to avoid excessive vibration, disturbing reinforcing steel, segregation or vibration of concrete that has already started its initial set.

9. Finish horizontal surfaces such as floors, sidewalks and stairs as specified on the Ministry Representative's drawings and specifications.

Level and brush surfaces that are to receive a concrete topping to remove excess water, laitance and impurities and to provide a rough surface ("wooden trowel surface").

10. Cure all concrete for at least 7 days. Cover exposed concrete surfaces with tarpaulins or wetted burlap and formwork shall be sprinkled frequently. For curing of slabs, Contractor may use a polyethylene membrane installed as soon as concreting is finished with a minimum of 250 mm overlap at joints.

    Use curing compounds with the Ministry representative's approval. Do not use curing compound on slabs to be finished with a concrete topping or other finishing product.

    Start curing treatment as soon as possible after concrete has sufficiently set, generally 4 hours after the end of the pouring session.

11. The pouring of concrete, placing of expansion or sawed joints as well as the finish of walks shall conform to the Ministry representatives' drawings and specifications.

12. Cold weather concreting

    When the surrounding temperature is at or below 5^{o} C, heat mixing water and aggregates so that the concrete temperature is between 15^{o} C and 27^{o} C on its arrival at the site.

    Before concreting, remove all ice and snow on the forms or on the reinforcing, using steam if necessary. Using de-icing salt will not be permitted for this purpose. Heat the formwork and the reinforcing steel for at least one hour prior to concrete placing.

    The following steps shall be taken to maintain the concrete temperature above 10^{o} C for at least 7 days after placing:

    - When the outside temperature is between -5^{o} C and 5^{o} C, cover concrete surfaces with tarpaulins or insulation and keep heaters at hand in case the temperature should drop below -5^{o} C during the 7 day-period after concrete placing.

    - When the temperature is between -5^{o} C and -12^{o} C, provide adequate heating inside the shelters described above, for a period of 7 days.

    - Should the temperature fall below -12^{o} C, do not perform any concrete placing unless the whole structure is covered and adequate heating is provided.

    Heaters shall be of a type approved by the Ministry representative. Install heaters so that no combustion gases come in contact with the concrete surface.

    Use an accelerating admixture in concrete placed in cold weather as stipulated in precedent article. Do not use calcium chloride or any other chemical product for the purpose of lowering the concrete freezing point.

    Conform to A23, 2019 specifications and obtain Ministry representative's approval before performing any cold weather concrete placing. Otherwise, the Ministry representative may command the complete work to stop.

13. Hot weather concrete placing

    The temperature of fresh concrete placed when the outside temperature is above 27^{o} C shall not exceed 30^{o} C.

    Concrete shall not stay in the ready-mix trucks for more than one hour. All concrete with an initial set shall be rejected.

    Place concrete as fast as possible to avoid cold joints, honeycombing and other defects.

    Start curing as soon as the concrete can support the weight of a man to avoid the drying of the concrete and shrinkage cracks. During the first 24 hours, the only acceptable method will be water curing.

Loosen forms and allow water to run between concrete and form.

Avoid drying of concrete between water applications. Cover all exposed concrete surfaces with tarpaulins or burlap.

Use a set-retarding admixture in the concrete only when specified or allowed by the Ministry representative.

3.2 Inserts

1. Set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere. Sleeves and openings not indicated on structural drawings must be approved by Ministry representative.

2. Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain approval of all modifications from Ministry representative before placing of concrete.

3. Check locations and sizes of sleeves and openings shown on structural drawings with architectural, mechanical and electrical drawings.

4. Anchor bolts:
Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete.

3.3 Dry packing

1. Grout underside of steel column and beam bearing plates with dry packing. Place grout to cover steel shims left in place.

3.4 Finishing

1. Finish concrete in accordance with CSA/CAN-A23.1, 2019 and with architect Ministry representatives' specifications.

2. "Non visible" concrete finishing

In case of "non visible" concrete, finishing will be smooth and uniform. If case arises, execute work as following:

- Repair cavities and honeycombs according to the state of the art and considering safety of structure.

- Cut and break surfaces to be repaired up to sound concrete.

- Flood surfaces to be repaired and spread mortar in successive layers.

- In case of 25 mm deep holes and more, use a mortar with same color and composition as concrete for repairs.

- Fill cavities with mortar and repair surfaces.

- Do not begin concrete finishing before permitting initial shrinkage.

- Fill formwork tie holes with mortar, after washing surface with detergent and water.

3.5 Slab on grade

1. Uniformly wet all sub-foundation of slab on grade before pouring concrete.

2. Except where otherwise noted, slabs on grade shall be made of 25 MPa concrete. Thickness and reinforcing shall be as indicated on structural drawings. Reinforcing steel will be placed at position indicated on drawings.

3. Isolation joints made of 12 mm Kb board, will be placed along foundation walls and around columns. Except where otherwise noted on structural drawings, control joints, 25 mm deep, shall be sawn at 8 m maximum spacing, as indicated on drawings or as indicated by Ministry representative. Control joints shall be executed as soon as possible without damaging concrete finishing and within 24 hours after concrete placing.

3.6 Slab tolerance

1. Maximum variation in slabs will be 8 mm in 3 m. Eliminate too high or too low spots. Check surface of the slab with a steel strip.

3.7 Field quality control

1. Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by Ministry representative.

2. Submit to the laboratory for testing small and coarse aggregate samples as well as the mixing formulae as per CSA/CAN-A23.2, 2019.

3. For each pouring and for each class of concrete used, a series of three (3) standard 150 x 300 mm cylinders will be sampled as per the following table:

1 to 50 m^3:	1 series
1 to 100 m^3:	2 series
More than 100 m^3:	2 series plus one series for each additional 100 m^3 or fraction of 100 m^3.

Sample will be carried out in accordance with specification A23.2-1C and 3C, 2019.

4. Compression test shall be performed according to specification A23.2-9C, 2019. One specimen will be tested at 7 days and the two others at 28 days. One supplementary cylinder per series shall be taken during cold weather concrete placing. This cylinder shall be kept in construction site conditions and shall be tested at 7 days. The report for the compression tests shall be submitted directly and with as little delay as possible to the Ministry representative.

5. For each set of 3 samples taken, one slump test will be performed according to specification A23.2-5C, 2019. The concrete used for this test shall not be used in the cylinders.

6. When air-entrained concrete is specified, one air content test will be performed for each series of 3 cylinders taken.

This test shall conform to specification A23.2-4C, 2019.

The concrete used for this purpose shall not be used in the cylinders.

7. Ministry Representative will pay costs of tests.

End of section

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 02 41 00.08 – Demolition – For minor work.

.2 Section 05 50 00 – Metal fabrications.

.3 Section 08 11 00 – Metal doors and frames.

.4 Section 07 92 00 – Joint sealants : Sealant products and application.

1.2 REFERENCES

.1 ASTM International
- .1 ASTM A 496/A 496M-07, Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
- .2 ASTM C 73-17 Standard Specification for Calcium Silicate Face Brick (Sand-Lime Brick).

.2 CSA International
- .1 CAN/CSA-A82-06, Fired Masonry Brick Made From Clay or Shale.
- .2 CAN/CSA-A165 SERIES-04(R2009), CSA Standards on Concrete Masonry Units covers: A165.1, A165.2, A165.3.
- .3 CAN/CSA-A179-04(R2009), Mortar and Grout for Unit Masonry.
- .4 CAN/CSA-A370-04(R2009), Connectors for Masonry.
- .5 CAN/CSA A371-04(R2009), Masonry Construction for Buildings.
- .6 CSA G30.18-09, Carbon Steel Bars for Concrete Reinforcement.
- .7 CSA S304.1-04(R2009), Design of Masonry Structures.

.3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
- .1 Material Safety Data Sheets (MSDS).

.4 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
- .1 SCAQMD Rule 1113-A2007, Architectural Coatings.

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 masonry products and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Submit 1 copie of WHMIS MSDS in accordance with Section 01 35 29.06 – Health and Safety Requirements.
  - .1 Indicate VOC's in g/L for epoxy coatings and galvanized protective coatings and touch-up products to be applied within building envelope.

.3 Samples :
- .1 Submit for review and acceptance of each unit.
- .2 Samples will be returned for inclusion into work.
- .3 Submit duplicate full size samples of each type masonry units, mortar, connector, anchorage and reinforcing, and accessory.

.4 Sustainability Standards Certification
.1 Submit manufacturer's certificates indicating conformity with specified product sustainability characteristics.

1.4 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 indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Store and protect masonry products from nicks, scratches, and blemishes.
.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management : remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan Waste Reduction Workplan in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

1.5 COLD WEATHER REQUIREMENTS

.1 Supplement requirements of CAN3-A371 as follows :
.1 Maintain temperature of mortar between -5oC and 50oC until used.

1.6 HOT WEATHER REQUIREMENTS

.1 Supplement requirements of CAN3-A371 as follows :
.1 Protect freshly laid masonry from drying too rapidly by means of waterproof, non-staining coverings.

PART 2 PRODUCTS

2.1 MASONRY UNITS

.1 Standard concrete block units: to CAN/CSA-A165 Series (CAN/CSA-A165.1).
.1 Classification : H / 15 / C / 0.
.2 Size : modular.
.3 Dimensions : 190 mm wide x 190 mm long x 390 mm high.
.4 Percentage of full % : 190 mm block 100 % width.
.5 Texture(s) / Profile(s) : smooth.

2.2 MORTAR AND GROUT

.1 Materials :
.1 Use materials of the same brands and aggregates from the same source for all work, so as to promote uniformity of coloring and other mixing characteristics.
.2 Aggregate : in accordance with CSA A179-14 standard.
.3 Water : potable, clean and free of ice, oils, acids, alkalis, organic materials, sediments or any other harmful materials and in accordance with CSA standard A179-14.
.4 Portland GU cement (formerly type 10) : in accordance with CSA A3000-13 standard.
.5 Hydrated lime type S : in accordance with ASTM C207-06 (2011).
.6 Dyes : metallic oxide pigment in accordance with ASTM C979-16.

.1 The use of mortar or grout composed exclusively of masonry cement as a binder is prohibited.
.2 Adjuvants must not be added to mortar or grout. Do not add to mortar or grout or antifreeze, calcium chloride, calcium chloride-based antifreeze, salts or other similar materials to lower the freezing point or speed up setting time. The use of calcium chloride is prohibited.
.3 When joints less than 6 mm thick are prescribed: use aggregates passing through a 1,18 mm sieve.
.4 Grout cannot be replaced by concrete or mortar.

.2 Mortar : to CAN/CSA-A179.
.1 Use aggregate passing 1,18 mm sieve where 6 mm thick joints are indicated.
.2 Colour : ground coloured natural aggregates or metallic oxide pigments.

.3 Following applies regardless of mortar types and uses specified above :
.1 Mortar for grouted reinforced masonry : type S based on property specifications.

.4 Grout : to AN/CSA-A179, Table 3.
.1 Mortar Type : S based on property specifications
.2 Fill with mortar the following masonry elements : reinforced masonry by filling with concrete vertically all cells over the entire eight of the concrete block wall every block at 800 mm between axis and each of the blocks at the extremities of the wall.

2.3 ACCESSORIES

.1 Nailing Inserts : 0,5 mm minimum thickness, galvanized.

.2 Bolts : 12 mm diameter x 150 mm long with ends bent 50 mm at 90 degrees.

.3 Bottom seam for contraction joints : Special manufactured elastomer. Proper hardness in accordance with ASTM D2240, sizes and shapes prescribed.

.4 Buffers : 0,6 mm thick galvanized steel strips, manufactured for this purpose, embedded in the mortar joints.

.5 Welded closure plate for structural lintel.

.6 Primers and paint : VOC limit 50 g/L maximum to SCAQMD Rule 1113.

.7 Coatings : VOC limit 100 g/L maximum to SCAQMD Rule 1113.

.8 Anchor Bolts : 12 mm diameter x 150 mm long with embedded ends bent 50 mm at 90 degrees, exposed ends.

.9 Embedded Flexible Flashings : Self-adhering sheet 1,0 mm thick consisting of rubberized asphalt compound banded to high density cross laminated polyethylene film, complete with manufacturer's recommended primer.

.10 Loose steel lintels: in accordance with National Building Code of Canada (NBC) 2015 and Section 05 50 00, prime painted for interior.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

.1 Do masonry work in accordance with CAN/CSA-A371 except where specified otherwise.
- .1 Bond : running stretcher bond with vertical joints in perpendicular alignment and centred on adjacent stretchers above and below.
- .2 Coursing height : 200 mm for one block and one joint for three bricks and three joints.
- .3 Jointing : tool where exposed or where paint or other finish coating is specified to provide smooth compressed.

.2 Build masonry plumb, level, and true to line, with vertical joints in alignment.

.3 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

3.3 CONSTRUCTION

.1 Exposed masonry :
- .1 Remove chipped, cracked, and otherwise damaged units, in exposed masonry and replace with undamaged units.
- .2 Cut out for electrical switches, outlet boxes, and other recessed or built-in objects. Make cuts straight, clean, and free from uneven edges.

.2 Building-in :
- .1 Install masonry connectors and reinforcement where indicated on drawings.
- .2 Build in items required to be built into masonry.
- .3 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.
- .4 Brace door jambs to maintain plumb. Fill spaces between jambs and masonry with mortar.
- .5 Install loose steel lintels over openings where indicated.

.3 Concrete block lintels :
- .1 Install reinforced concrete block lintels over openings in masonry where steel or reinforced concrete lintels are not indicated.
- .2 End bearing : not less than 200 mm as indicated on drawings.

.4 Support of loads :
- .1 Use grout to CAN/CSA-A179 where grout is used in lieu of solid units.
- .2 Install building paper below voids to be filled with concrete or grout; keep paper 25 mm back from faces of units.

.5 Provision for movement :
- .1 Leave 3 mm space below shelf angles.
- .2 Leave 6 mm space between top of non-load bearing walls and partitions and structural elements. Do not use wedges.
- .3 Built masonry to tie in with stabilizers, with provision for vertical movement.

.6 Interface with other work :
- .1 Cut openings in existing work as indicated.
- .2 Openings in walls : approved Departmental Representative.
- .3 Make good existing work. Use materials to match existing.
- .4 Lap joints 150 mm and seal with adhesive or mastic.

.7 Install weep hole vents in vertical joints immediately over flashings, in exterior wythes of cavity wall and masonry veneer wall construction, at maximum horizontal spacing of 600 mm on center.

.8 Place drainage mesh in cavity as indicated as construction progresses.

3.4 REINFORCING AND CONNECTING

.1 Install masonry connectors and reinforcement in accordance with CAN/CSA-A370, CAN/CSA- A371 and CSA S304.1 unless indicated otherwise.

.2 Prior to placing concrete, mortar or grout, obtain Departmental Representative's approval of placement of reinforcement and connectors.

3.5 BONDING AND TYING

.1 Bond walls of two or more wythes using metal connectors in accordance with CAN/CSA-A371, CSA S304.1 and as indicated.

.2 Tie masonry veneer to backing in accordance with NBC, CAN/CSA-A371, CSA S304.1 and as indicated.

3.6 MODIFICATIONS TO EXISTING MASONRY

.1 Match existing bond and coursing height of adjacent masonry to remain.

.2 Tooth new masonry into existing masonry in run of wall and at intersections with existing partitions.

.3 At new openings in masonry walls, remove units, clean and re-install rotated to conceal cut and expose finish surface.

.4 Clean bond areas of adjacent masonry to remain, remove loose material and prepare masonry to receive new masonry toothed in.

.5 Install reinforcement as necessary to provide continuity of reinforcing and stability between existing and new masonry work.

.6 Provide repair anchors as necessary to stabilize existing masonry adjacent to and affected by the Work.

3.7 REINFORCED LINTELS AND BOND BEAMS

.1 Reinforce masonry lintels and bond beams as indicated, refer to structural.

.2 Place and grout reinforcement in accordance with CAN/CSA-A179, CAN/CSA-A371 and CSA S304.1. Refer to structural engineer documents.

3.8 GROUTING

.1 Grout masonry in accordance with CAN/CSA-A179, CAN/CSA-A371 and CSA S304.1 and as indicated. Refer to structural engineer documents.

3.9 ANCHORS

.1 Supply and install metal anchors as indicated.

3.10 LATERAL SUPPORT AND ANCHORAGE

.1 Supply and install lateral support and anchorage in accordance with CSA S304.1 and as indicated.

3.11 SITE TOLERANCES

.1 Tolerances of CAN/CSA-A371 apply.

3.12 FIELD QUALITY CONTROL

.1 Inspection and testing will be carried out by Testing Laboratory designated by Departmental Representative.

3.13 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 :
- .1 Separate waste materials for reuse and/or recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .2 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.14 PROTECTION

.1 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect from wind-driven rain until masonry work is completed and protected by flashings or other permanent construction.

.2 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.

.3 Repair damage to adjacent materials caused by masonry products installation.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 04 20 00 – Masonry for Minor Works.

.2 Section 07 92 00 – Joint Sealants.

.3 Section 12 50 00 – Furniture.

1.2 REFERENCE STANDARDS

.1 American Society for Testing and Materials International (ASTM)
- .1 ASTM A 53/A 53M-12, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
- .2 ASTM A 269M-15a, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- .3 ASTM A 307-14, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .4 ASTM A36/A36M-08 – Standard Specification for Carbon Structural Steel
- .5 A627-03 – Test Methods for Tool-Resisting Steel Bars, Flats, and Shapes for Detention and Correctional Facilities
- .6 A673/A673M-07 – Standard Specification for Sampling Procedure for Impact Testing of Structural Steel
- .7 F1450-05 – Test Methods for Hollow Metal Swinging Door Assemblies for Detention and Correctional Facilities
- .8 F1577-05 –Test Methods for Detention Locks for Swinging Doors
- .9 F1592–05 – Test Methods for Detention Hollow Metal Vision Systems
- .10 F1643-05 – Test Methods for Detention Sliding Door Locking Device Assembly
- .11 F1758-05 – Test Methods for Detention Hinges Used on Detention-Grade Swinging Doors
- .12 F1915-05 – Standard Test Methods for Glazing for Detention Facilities
- .13 F2322-03 –Test Methods for Physical Assault on Vertical Fixed Barriers for Detention and Correctional Facilities

.2 CSA Group
- .1 CSA G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .2 CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CSA S16-14, Design of Steel Structures.
- .4 CSA W48-14, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
- .5 CSA W59-13, Welded Steel Construction (Metal Arc Welding) Metric.

.3 American National Standard
- .1 A156.4-2019 – Doors Controls – Closers
- .2 A156.14-2019 – Sliding and Folding Door Hardware

.4 Normes NAAMM DEMA – National Association of Architectural Metal Manufacturers (NAAMM) – Detention material.
- .1 801-05 – Glossary of Terms for Hollow Metal Doors & Frames, 8d
- .2 802-07– Manufacturing of Hollow Metal Doors & Frames, 8d
- .3 803-08– Steel Tables, 8d
- .4 805-10– Recommended Selection and Usage Guide for Hollow Metal Doors & Frames, 8d
- .5 810-09 - Hollow Metal Doors, 8d
- .6 820-08 - Hollow Metal Frames, 8d

.7 830-02 -Hardware Selection for Hollow Metal Doors & Frames, 8d
.8 831-97 -Hardware Locations for Hollow Metal Doors & Frames, 8d
.9 841-07– Tolerances and Clearances for Commercial Hollow Metal Doors & Frames, 8d
.10 850-00– Fire-Rated Hollow Metal Doors & Frames, 8d
.11 861-06– Guide Specifications for Commercial Security Hollow Metal Doors & Frames, 8d
.12 862-03– Guide Specifications for Commercial Security Hollow Metal Doors & Frames, 8d
.13 863-04– Guide Specifications for Detention Security Hollow Metal Doors & Frames, 8d
.14 867-06– Guide Specifications for Commercial Laminated Core Hollow Metal Doors & Frames, 8d

.5 Green Seal Environmental Standards (GS)
.1 GS-11-2011, Paints and Coatings.

.6 The Master Painters Institute (MPI)
.1 Architectural Painting Specification Manual - current edition.

.7 ULC Standards
.1 UL 2768-2011, Architectural Surface Coatings.
.2 UL 2760-2011, Surface Coatings - Recycled Water-borne.

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 sections, plates, pipe, tubing, bolts 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.
.1 For finishes, coatings, primers, and paints applied on site : indicate VOC concentration in g/L.

.3 Shop Drawings :
.1 Submit drawings stamped and signed by professional engineer registered or licensed in Quebec, Canada and member of the OIQ.
.2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.4 CERTIFICATION OF WELDING COMPANIES

.1 Welding companies must be certified in accordance with section 2.1 of CSA W47.1 for fusion welding or CSA W55.3 for resistance welding. Submit certification proof from welding companies.

1.5 CALCULATION CRITERIA

.1 The steps, levels, and railing of metal staircase and all anchoring accessories must be designed to withstand the vertical and horizontal loads, depending on the NBC requirements.

.2 The subcontractor must design structural details and elements indicated in the plans to reproduce drawing intent as indicated in drawings. Subcontractor must provide workshop drawings including seal and signature of an engineer, member of the OIQ, to validate the design details.

.3 Provide all ribs, welds, hidden screws and plate anchorages required, quantities and dimensions as needed for metal fabrication components as indicated in drawings.

1.6 QUALITY ASSURANCE

.1 Test Reports : submit certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certifications : submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Meeting prior to installation : hold a meeting in which work requirements, manufacturer installation instructions and guarantee terms will be examined.

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, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Replace defective or damaged materials with new.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Steel sections and plates : to CSA G40.20/G40.21, Grade 300W.

.2 Stainless steel sections and plates : type-304, commercial grade.

.3 Steel pipes : to ASTM A53-99b, standard weight, galvanized finish, type E, grade A, seamless.

.4 Steel tubing : to CAN/CSA-G40.20/G40.21, Grade 300W, square or rectangular, configuration and dimensions in accordance to indications or to type of work.

.5 Welding :
- .1 Welding materials : to CSA W59.
- .2 Welding electrodes : to CSA W48 Series.

.6 Bolts, clips and anchors.
- .1 Bolts and anchor bolts : to ASTM A307.
- .2 High resistance bolts, as required : to ASTM A 325.
- .3 Exposed fastening devices to be compatible with used or subjected material, and of identical finish.
- .4 Provide all necessary clips required for proper fabrication assembly.

.7 Grout : non-shrink, non-metallic, flowable, 15 MPa reistance and 7,9 MPa attachment resistance after 24 hours.

.8 Embedded parts in concrete : Threaded shims or rods, galvanized ferrous metal, or insulated iron or steel. Provide bolts, washers, rods as required, hot-dip galvanized.

.9 All other steel components required for complete assembly.

2.2 METAL FABRICATIONS – GENERAL

.1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.

.2 Unless otherwise indicated, use self-tapping, shake-proof and/or self-locking flat headed screws on items requiring assembly by screws or as indicated.

.3 Where possible, fit and shop assemble work, ready for erection.

.4 Exposed welds continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 FINISHES

.1 Stainless steel : to ASTM ASTM A167-99A, type-304, commercial grade, brushed finish.

.2 Galvanizing : hot dipped galvanizing with zinc coating 600 g/m² to CAN/CSA-G164.

.3 Shop coat primer : MPI- accordance with chemical component limits and restrictions requirements and VOC.

2.4 ISOLATION COATING

.1 Isolate aluminum from following components, by means of bituminous paint :
- .1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
- .2 Concrete, mortar and masonry.
- .3 Wood.

2.5 SECURITY FASTENERS

.1 Anchor all equipment and accessories provided for this project with secure and tamper-proof fasteners.

.2 Fasten all accessories in concrete, with chemical anchors suitable for heavy or light work.

.3 Fasten all accessories in concrete blocks, with adhesive anchors suitable for masonry work.

2.6 SHOP PAINTING

.1 Primer : VOC limit 250 g/L maximum to GS-11.

.2 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.

.3 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Paint when temperature minimum 7 degrees C.

.4 Powder coated :
- .1 Provide (4) smooth finish color and gloss 17 ± 3 units out of 60, color at the choice of the Departmental Representative.
- .2 Minimum specifications :

.1	Density	1,48 approx.
.2	Hardness (ASTM D3363)	H-2H
.3	Humidity (ASTM D2247)	No blistering
.4	Flexibility (ASTM D522)	3/16 "
.5	Adhesion test (ASTM D3359)	5B

.3 The entire work must be cleaned, degreased and decontaminated with a cleaner in accordance with standard SSPC-SP1 and rinse thoroughly. Repeat the process as necessary, until a healthy, clean and contaminant-free surface is obtained.

.4 All steel structures will be subjected to mechanical cleaning in accordance with standard SSPC-SP5 : Remove all visible traces of oil, grease, dirt, rolling crust, rust, paint, oxidation, corrosion deposits and other foreign metals. Obtain a surface profile of 25µ.

.5 Clean surfaces to be field welded; do not paint.

2.7 ANGLE LINTELS

.1 Steel angles : prime painted, sizes indicated for openings. Provide 150 mm minimum bearing at ends.

.2 Weld or bolt back-to-back angles to profiles as indicated.

.3 Finish : shop painted.

.1 Primer : VOC limit 250 g/L maximum to GS-11 when applied onsite.

2.8 TRENCH COVERS AND FRAMES

.1 Steel plates trenches in accordance to Structural details.

.2 Finish : prime coat painted.

.1 Primer : maximum VOC limit 250 g/L to GS-11 when applied on site.

2.9 METAL ORNEMENTAL PANELS OR DOORS

.1 Fabricate frames from steel, sizes of channel and opening as indicated.

.2 Weld channels together to form continuous frame for jambs and head of openings, sizes as indicated.

.3 Flat anchors in steel of exact size such as the existing one, strap anchors to channel jamb frame at existing distance on centre.

.4 Finish : prime coat painted.

2.10 PRISON CELL DOOR JAMBS

.1 Provide and install folded steel plate door jambs, 1.9mm stainless steel, to cover concrete cut at cell door jamb, in accordance to plan details.

2.11 METAL S-141 FURNITURE

.1 Provide and install all anchors, stainless steel noses, stainless steels and fastening plates required to secure control panel. Coordinate reinforcement installation with furniture installation. Use 16 mm threaded rod and steel plate in accordance to information on plans and required dimensions for installation.

2.12 WINDOW PROTECTION SCREENS

.1 Build and install hot dipped galvanized steel protection screens, in front of each new window, profile as indicated on drawings, shaped according to shapes and dimensions indicated.
- .1 Protection screens to be made with galvanized steel tubes.
- .2 Exposed ends of protective security grilles to be sealed and welded.
- .3 End straps should be used to attach security grilles to walls.

.2 Once assembled, security screens to be galvanized.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 ERECTION – GENERAL

.1 Do welding work in accordance with CSA W59 unless specified otherwise.

.2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

.3 Provide suitable means of anchorage acceptable to Departmental Representative such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.

.4 Exposed fastening devices to match finish and be compatible with material through which they pass.

.5 Supply components for work by other trades in accordance with shop drawings and schedule.

.6 Field connection.

.7 Deliver items over for casting into concrete and building into masonry together with setting templates to appropriate location and construction personnel.

.8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces with primer after completion of :
- .1 Primer : maximum VOC limit 250 g/L to GS-11.

.9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.
- .1 Primer : maximum VOC limit 250 g/L to GS-11.

3.3 TRENCH COVERS

.1 Install trench covers in locations as indicated.

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 SECTIONS

.1 Section 08 11 00 – Metal Doors and Frames.

.2 Section 09 21 99 – Partitions for Minor Works.

.3 Section 12 50 00 – Furniture.

1.2 REFERENCES

.1 ASTM International
- .1 ASTM C 919-08, Standard Practice for Use of Sealants in Acoustical Applications.

.2 Canadian General Standards Board (CGSB)
- .1 CGSB 19-GP-5M-1984, Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).
- .2 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.
- .3 CGSB 19-GP-14M-1984, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).
- .4 CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.
- .5 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.

.3 General Services Administration (GSA) - Federal Specifications (FS)
- .1 FS-SS-S-200-E(2)1993, Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold Applied, for Portland Cement Concrete Pavement.

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
- .1 Material Safety Data Sheets (MSDS).

.5 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
- .1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

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 joint sealants and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Manufacturer's product to describe :
  - .1 Caulking compound.
  - .2 Primers.
  - .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.
- .3 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 – Health and Safety Requirements.

.3 Samples :
.1 Submit 2 samples of each type of material and colour.
.2 Cured samples of exposed sealants for each colour where required to match adjacent material.

.4 Manufacturer's Instructions :
.1 Submit instructions to include installation instructions for each product used.

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 incorporation into manual.

1.5 QUALITY ASSURANCE/COMPETENCE

.1 Installer Competence : specialized company to carry out work in the current section.

.2 In addition to manufacturer's requirements, ensure that sealing works meet requirements of sealant manual « Applicator Training Manual », Waterproofing & Restoration Institute (SWR Institute).

.3 On-site workers will be required to have competency certificates (training and CCQ card) required to execute work in the current section.

.4 Departmental Representative may refuse any worker who does not demonstrate the level of thoroughness and competence required for this type of work.

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, indoors, 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 and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

1.7 SITE CONDITIONS

.1 Ambient Conditions :
.1 Proceed with installation of joint sealants only when :
.1 Ambient and substrate temperature conditions are within limits permitted by joint sealant manufacturer or are above 4,4 degrees C.
.2 Joint substrates are dry.
.3 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

.2 Joint-Width Conditions :
.1 Proceed with installation of joint sealants only where joint widths are more than those allowed by joint sealant manufacturer for applications indicated.

.3 Joint-Substrate Conditions :
.1 Proceed with installation of joint sealants only after contaminants capable of interfering with adhesion are removed from joint substrates.

1.8 ENVIRONMENTAL REQUIREMENTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Health Canada.

.2 Departmental Representative will arrange for ventilation system to be operated on maximum outdoor air and exhaust during installation of caulking and sealants.

1.9 WARRANTY

.1 Provide a written warranty, in owner's name, certifying that the specified work in current section, will be exempt of all material and execution defects, in particular against waterproofing defects, cracking, crumbling, loss of consistency, contraction, leakage, loss of adherence and adjacent surface tarnishing, for a period of five (5) years beginning at final acceptance of work date.

.2 Warranty must cover repair cost of aforementioned defects and any other damage to building resulting from defects in work of the current section.

.3 Warranty forms must be approved by Departmental Representative.

PART 2 – PRODUCTS

2.1 SEALANT MATERIALS

.1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.

.2 When low toxicity caulks are not possible, confine usage to areas which off gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off gas time.

.3 Where sealants are qualified with primers use only these primers.

2.2 SEALANT MATERIAL DESIGNATIONS

.1 Type nº 1 :
.1 Polyurethane terpolymer sealing epoxy putty with three (3) components, with chemical polymerization. Choice of colour by Departmental Representative and complies with RCAN/ONGC-19.24-M90.
.2 Applications :
.1 Joints between exterior door frames, windows, curtain walls and shutters or other and external masonry walls.
.2 Joint between concrete structures.
.3 Joints between ceramic floor and ventilated bumper.
.4 All the various joints required on plans but not covered by other sections.

.2 Type nº 2 :
.1 One-component with high modulus silicone sealant, colour choice by Departmental Representative, with fungicide for plumbing fixtures and in accordance with CAN/CGSB-19.13-M87.
.2 Applications :
.1 Joints between counters and backsplash.
.2 Joints between backsplash and wall.
.3 Joints between plumbing equipment and other surfaces.
.4 Sealing of plumbing pipe piercings in gypsum work, under cleanliness snares.

.3 Type nº 3 :
.1 Fast drying latex acrylic sealant paintable with minimal shrinkage, colour choice by Departmental Representative.
.2 Applications :
.1 Joint sealant between interior door frames and glass partitions and gypsum board or plaster coated panels.
.2 Unless otherwise indicated, to be used inside where sealant is to be painted.

.4 Preformed compressible and non-compressible back-up materials :
.1 Polyethylene, urethane, neoprene or vinyl foam :
.1 Extruded closed cell foam backer rod.
.2 Size: oversize 30 to 50 %.
.2 Neoprene or butyl rubber :
.1 Round solid rod, Shore A hardness 70.
.3 High density foam :
.1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/mü density, or neoprene foam backer, size as recommended by manufacturer.
.4 Bond breaker tape :
.1 Polyethylene bond breaker tape which will not bond to sealant.

2.3 SEALANT SELECTION

.1 Perimeters of interior frames, as shown on details : sealant type : 3.

.2 Interior masonry vertical control joints (block-to-block, block-to-concrete, and intersecting masonry walls) : sealant type : 1.

.3 Joints at tops of non-load bearing masonry walls at the underside of poured concrete : sealant type : 1.

.4 Perimeter of integrated furniture : sealant type : 2.

.5 Exposed interior control joints in drywall : sealant type : 3.

2.4 JOINT CLEANER

.1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant in accordance with sealant manufacturer's written recommendations.

.2 Primer: in accordance with sealant manufacturer's written recommendations.

PART 3 – EXECUTION

3.1 EXAMINATION

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

3.2 SURFACE PREPARATION

.1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.

.2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.

.3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.

.4 Ensure joint surfaces are dry and frost free.

.5 Prepare surfaces in accordance with manufacturer's directions.

3.3 PRIMING

.1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.

.2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.4 BACKUP MATERIAL

.1 Apply bond breaker tape where required to manufacturer's instructions.

.2 Install joint filler to achieve correct joint depth and shape, with approximately 30 % compression.

3.5 MIXING

.1 Mix materials in strict accordance with sealant manufacturer's instructions.

3.6 APPLICATION

.1 Sealant :
- .1 Apply sealant in accordance with manufacturer's written instructions.
- .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
- .3 Apply sealant in continuous beads.
- .4 Apply sealant using gun with proper size nozzle.
- .5 Use sufficient pressure to fill voids and joints solid.
- .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.

.7 Tool exposed surfaces before skinning begins to give slightly concave shape.
.8 Remove excess compound promptly as work progresses and upon completion.

.2 Curing :
.1 Cure sealants in accordance with sealant manufacturer's instructions.
.2 Do not cover up sealants until proper curing has taken place.

3.7 CLEANING

.1 Progress Cleaning : clean in accordance with Section 01 74 00 – Cleaning.
.1 Leave Work area clean at end of each day.
.2 Clean adjacent surfaces immediately.
.3 Remove excess and droppings, using recommended cleaners as work progresses.
.4 Remove masking tape after initial set of sealant.

.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 and recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.8 PROTECTION

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

.2 Repair damage to adjacent materials caused by joint sealants installation.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 04 20 00.08 – Masonry for Minor Works.

.2 Section 05 50 00 – Metal Fabrications.

.3 Section 08 71 00 – Door hardware.

.4 Section 08 80 50 – Glazing.

.5 Section 09 91 99 – Painting for minor works.

.6 Electrical hardware refers to electrical specifications.

1.2 REFERENCE STANDARDS

.1 American Society for Testing and Materials International (ASTM)
- .1 ASTM A 653/A 653M-06a, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 ASTM B 29-03, Standard Specification for Refined Lead.
- .3 ASTM B 749-03, Standard Specification for Lead and Lead Alloy Strip, Sheet and Plate Products.
- .4 ASTM E 119-16a, Standard Test Methods for Fire Tests of Building Construction and Materials
- .5 ASTM A36/A36M-08 – Standard Specification for Carbon Structural Steel
- .6 A627-03 – Test Methods for Tool-Resisting Steel Bars, Flats, and Shapes for Detention and Correctional Facilities
- .7 A673/A673M-07 – Standard Specification for Sampling Procedure for Impact Testing of Structural Steel
- .8 F1450-05 – Test Methods for Hollow Metal Swinging Door Assemblies for Detention and Correctional Facilities
- .9 F1577-05 –Test Methods for Detention Locks for Swinging Doors
- .10 F1592–05 – Test Methods for Detention Hollow Metal Vision Systems
- .11 F1643-05 – Test Methods for Detention Sliding Door Locking Device Assembly
- .12 F1758-05 – Test Methods for Detention Hinges Used on Detention-Grade Swinging Doors
- .13 F1915-05 – Standard Test Methods for Glazing for Detention Facilities
- .14 F2322-03 –Test Methods for Physical Assault on Vertical Fixed Barriers for Detention and Correctional Facilities

.2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
- .2 CGSB 41-GP-19Ma-84, Rigid Vinyl Extrusions for Windows and Doors.

.3 CSA Group (CSA)
- .1 CSA-G40.20-04/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .2 CSA W59-03, Welded Steel Construction (Metal Arc Welding).

.4 Canadian Steel Door Manufacturers' Association (CSDMA)
- .1 CSDMA, Recommended Specifications for Commercial Steel Doors and Frames, 2000.
- .2 CSDMA, Selection and Usage Guide for Commercial Steel Doors, 1990.

.5 National Fire Protection Association (NFPA).

.1 NFPA 80-2016, Standard for Fire Doors and Fire Windows.
.2 NFPA 251-2006, Standard Methods of Tests of Fire Resistance of Building Construction and Materials
.3 NFPA 252-2017, Standard Method of Fire Tests of Door Assemblies.
.4 NFPA 257-2017, Standard Method of Fire Tests for windows and glass block assemblies.

.6 Underwriters' Laboratories of Canada (ULC)
.1 CAN/ULC-S701-01, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
.2 CAN/ULC-S702-97, Standard for Thermal Insulation, Mineral Fibre, for Buildings.
.3 CAN/ULC-S704-01, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
.4 CAN/ULC S101-14 (5th edition), Standard Method of Fire Endurance Tests of Building Construction and Materials.
.5 CAN/ULC S104-15 (4th edition), Standard Method for Fire Tests of Door Assemblies.
.6 CAN4-S105-M15, Standard Specification for Fire Door Frames Meeting the Performance Required by CAN4-S104.
.7 CAN/ULC S106-15 (4th edition), Standard Method for Fire Tests of Window and Glass Block Assemblies.

.7 South Coast Air Quality Management District (SCAQMD), California State
.1 SCAQMD Rule 1113-04, Architectural Coatings.
.2 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.

.8 ANSI/BHMA – American National Standard
.1 A156.4-2019 – Doors Controls – Closers
.2 A156.14-2019 – Sliding and Folding Door Hardware

.9 Normes NAAMM DEMA – National Association of Architectural Metal Manufacturers (NAAMM)
.1 801-05 – Glossary of Terms for Hollow Metal Doors & Frames, 8d
.2 802-07– Manufacturing of Hollow Metal Doors & Frames, 8d
.3 803-08– Steel Tables, 8d
.4 805-10– Recommended Selection and Usage Guide for Hollow Metal Doors & Frames, 8d
.5 810-09 - Hollow Metal Doors, 8d
.6 820-08 - Hollow Metal Frames, 8d
.7 830-02 -Hardware Selection for Hollow Metal Doors & Frames, 8d
.8 831-97 -Hardware Locations for Hollow Metal Doors & Frames, 8d
.9 841-07– Tolerances and Clearances for Commercial Hollow Metal Doors & Frames, 8d
.10 850-00– Fire-Rated Hollow Metal Doors & Frames, 8d
.11 861-06– Guide Specifications for Commercial Security Hollow Metal Doors & Frames, 8d
.12 862-03– Guide Specifications for Commercial Security Hollow Metal Doors & Frames, 8d
.13 863-04– Guide Specifications for Detention Security Hollow Metal Doors & Frames, 8d
.14 867-06– Guide Specifications for Commercial Laminated Core Hollow Metal Doors & Frames, 8d
.15 890-06– Technical Summary Hollow Metal
.16 111900-09 – Guide Specifications for Basic Detention Equipment Requirements

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide shop drawings : in accordance with Section 01 33 00 – Submittal Procedures.
.1 Submit drawings stamped and signed by professional engineer registered or licensed in Quebec, Canada.
.2 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, arrangement of hardware and and finishes.
.3 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings and reinforcing finishes.

.4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.
.5 Submit test and engineering data, and installation instructions.

.2 Submit one 300 x 300 mm corner sample of each type of frame.
.1 Show butt cutout to receive a hinge, glazing stops.

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 and recycling in accordance with Section 01 74 21 - Waste Management and Disposal.

1.5 WARRANTY

.1 Provide a written warranty, in the owner's name, certifying that the doors and frames in the current section are guaranteed against any wrongdoing or defect for a period of five (5) years, beginning at the work completion date.

1.6 MANUFACTURER

.1 All steel doors and frames must come from a single manufacturer.

1.7 HARDWARE

.1 Proper hardware integration in the work shall be the door and frame manufacturer's responsibility. Manufacturer shall ensure that the hardware supplier's requirements are satisfactory in all respects.

.2 Door and frame manufacturer is responsible for providing all necessary electrical installation reinforcements such as electromagnetic, and open or close mechanisms, etc. Manufacturer shall obtain Installation templates for these components, as specified in Section 08 71 00 – Door Hardware.

.3 Door and frame manufacturer shall provide two (2) copies of shop drawings to hardware consultant so that the latter may enter all hardware information and provide necessary templates for door production.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Hot dipped galvanized steel sheet: to ASTM A 653M, ZF75, minimum base steel thickness in accordance with CSDMA Table 1 - Thickness for Component Parts.

.2 Reinforcement channel: to CSA G40.20/G40.21, Type 44W, coating designation to ASTM A 653M, ZF75.

.3 Composites: balance of core materials used in conjunction with lead: in accordance with manufacturers' proprietary design.

2.2 DOOR CORE MATERIALS

.1 Insulated Core (internal use, intensive traffic)
  .1 Insulated core, for internal use, vertical reinforcements « Z » 10 to 150 mm c/c maximum gauge and welded to door faces. Spaces filled in with mineral wool insulation to CSA A101. Commercial grade steel, 14-gauge.

2.3 PRIMER

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

2.4 PAINT

.1 Field paint steel doors and frames in accordance with Section 09 91 99 – Painting for Minor Works. Provide final finish free of scratches or other blemishes.

2.5 ACCESSORIES

.1 Sealant : refer to Section 07 92 00 – Joint Sealants.

.2 Glazing : refer to Section 08 80 50 – Glazing.

.3 Make provisions for glazing as indicated and provide necessary glazing stops.
  .1 Provide removable stainless steel glazing beads as indicated in drawings.
  .2 Design exterior glazing stops to be tamperproof and fasten using rivets or security screws for prison application.

2.6 FRAMES FABRICATION – GENERAL

.1 Doors shall be flush, swing doors, and shall also have an opening for glazing, as indicated.

.2 Interior steel doors shall have an insulated core.

.3 Longitudinal door edges shall be welded. Longitudinal edge shall be grinded to reach a flat surface, filled with metal filler compound and sanded until smooth and even.

.4 Doors shall be of special construction, proven and/or designed to be part of a fully functional whole, that includes a door, frame, sealing and hardware components, to ASTM E 330.

.5 Doors shall be cut, reinforced and tapped as needed to receive mortised and templated hardware components as well as necessary electronic equipment.

.6 Openings with a 12,7 mm diameter or more shall be factory-pierced, except those to receive mounting bolts and through-bolts, once hardware components are to be installed.

.7 Doors shall be reinforced where hardware components are to be surface mounted. The superior portion of exterior doors shall be equipped with a steel contact slope. The superior and inferior portion of interior doors shall be equipped with a recessed inverted channel, spot welded.

Reinforcement :	**Minimum thickness (in mm)**
Hinge	3,4
Latch and strike	1,9
Surface mounted hardware	2,7
Flush bolt	1,9
Bottom and top of doors	1,9
Vertical door sides	1,2
Lintel	3,0

.8 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.

.9 Manufacturer's nameplates on frames and screens are not permitted.

2.7 MINERAL WOOL DOOR CORE

.1 Interior doors must be made of 1,8 mm thick steel cladding and the core in accordance with Article 2.2 requirements with mineral wool reinforcement.
- .1 Base metal thickness : 1,8 mm.
- .2 Interior reinforcement thickness for interior cell doors : 3,2 mm.

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 doors and frames to CSDMA Installation Guide.

3.3 DOOR INSTALLATION

.1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 00 – Door Hardware.

.2 Provide even margins between doors and jambs and doors and finished floor and thresholds as follows.
- .1 Hinge side : 1,0 mm.
- .2 Latchside and head : 1,5 mm.
- .3 Finished floor, and thresholds : 13 mm.

.3 Adjust operable parts for correct function.

3.4 FINISH REPAIRS

.1 Touch up with primer finishes damaged during installation.

.2 Fill exposed frame anchors and surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

3.5 GLAZING

.1 Install glazing for doors and frames in accordance with Section 08 80 50 – Glazing.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 08 11 00 – Metal doors and frames.

.2 Divisions 26 & 28 : For electrical wirings, including the conduits, electrical cables and connections of the automatic door operator and access controls devices.

1.2 REFERENCES

.1 American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA)
- .1 ANSI/BHMA A156.1-2000, American National Standard for Butts and Hinges.
- .2 ANSI/BHMA A156.2-2003, Bored and Preassembled Locks and Latches.
- .3 ANSI/BHMA A156.3-2001, Exit Devices.
- .4 ANSI/BHMA A156.4-2000, Door Controls - Closers.
- .5 ANSI/BHMA A156.5-2001, Auxiliary Locks and Associated Products.
- .6 ANSI/BHMA A156.6-2005, Architectural Door Trim.
- .7 ANSI/BHMA A156.8-2005, Door Controls - Overhead Stops and Holders.
- .8 ANSI/BHMA A156.10-1999, Power Operated Pedestrian Doors.
- .9 ANSI/BHMA A156.12-2005, Interconnected Locks and Latches.
- .10 ANSI/BHMA A156.13-2002, Mortise Locks and Latches Series 1000.
- .11 ANSI/BHMA A156.14-2002, Sliding and Folding Door Hardware.
- .12 ANSI/BHMA A156.15-2006, Release Devices - Closer Holder, Electromagnetic and Electromechanical.
- .13 ANSI/BHMA A156.16-2002, Auxiliary Hardware.
- .14 ANSI/BHMA A156.17-2004, Self-closing Hinges and Pivots.
- .15 ANSI/BHMA A156.18-2006, Materials and Finishes.
- .16 ANSI/BHMA A156.19-2002, Power Assist and Low Energy Power - Operated Doors.
- .17 ANSI/BHMA A156.20-2006, Strap and Tee Hinges and Hasps.

.2 National Fire Protection Association (NFPA).
- .1 NFPA 80-2016, Standard for Fire Doors and Fire Windows.
- .2 NFPA 252-2017, Standard Method of Fire Tests of Door Assemblies.
- .3 NFPA 257-2017, Standard Method of Fire Tests for windows and glass block assemblies.

.3 Laboratoire des assureurs du Canada (ULC).
- .1 CAN/ULC S104-15 (quatrième édition), Méthode normalisée des essais de comportement au feu des portes.
- .2 CAN/ULC S105-15 (quatrième édition), Spécification normalisée pour bâtis des portes coupe-feu satisfaisant aux exigences de rendement de la norme CAN4-S104.
- .3 CAN/ULC S106-15 (quatrième édition), Méthode normalisée des essais de comportement au feu des fenêtres et des assemblages en blocs de verre.

.4 Canadian Steel Door and Frame Manufacturers' Association (CSDMA)/Association Canadienne des fabricants de portes d'acier (ACFPA)
- .1 CSDMA/ACFPA, Recommended Dimensional Standards for Commercial Steel Doors and Frames - 2009.

.5 American Society for Testing and Materials International (ASTM) - Test Methods for hardware use for Detention
- .1 ASTM F1450-05 – Test Methods for Hollow Metal Swinging Door Assemblies for Detention Facilities
- .2 ASTM F1577-05 - Test Methods for Detention Locks for Swinging Doors

.3 ASTM F1643-05 - Test Methods for Detention Sliding Door Locking Device Assembly
.4 ASTM F1758-05 -Test Methods for Detention Hinges Used on Detention-Grade Swinging Doors

1.3 INCLUDED WORK

.1 Not necessarily limited to, this section includes the supply and installation of detention hardware items and electrified detention hardware components, described herein and in accordance with the Hardware List and drawings provided for doors, frames.

1.4 DOCUMENTS TO BE SUBMITED FOR APPROVAL / INFORMATION

.1 Technical sheet
.1 Provide maintenance sheet, the list of components and manufacturer's instructions for all the hardware used on the doors. The Technical sheet must indicate product characteristic, performance criteria, dimensions, limits, and finish.

.2 List of Hardware items.
.1 Submit List of hardware items for the doors.
.2 The list must enumerate all the required hardware items and show the brand, the model, the material, the function and the finish, as well as any other relevant information.

.3 Test Reports: submit test reports certifying that the products and materials / equipment comply with the requirements for physical characteristics and performance criteria.

.4 Manufacturer Instructions: provide the installations instructions provided by the manufacturer.

1.5 SHOP DRAWINGS AND TEMPLATES

.1 Provide to the trades that needs, all the templates, plan copies or information required. The shop drawings of each trade involved will be verified by the hardware supplier. The contractor must ensure that this verification is made and will notify the architect of any anomaly.

.2 All templates, copies of plan or necessary information will be provided to all other trades in need to complete its part of the work. The shop drawings for each specialty concerned will be verified by the hardware supplier, who will have to notify the architect of any anomaly.

.3 The specific templates for the various hinges, locks, etc., must be used to eliminate as much as possible the need to use shims.

.4 Provide the manufacturer of steel doors and frames as well as the manufacturer of aluminum inlets, the template for the openings to be machined in the reinforcement plates for the passage of the wiring of the electrified hinges or other need.

1.6 CLOSEOUT SUBMITTALS DOCUMENTS

.1 Submit in accordance with Section 01 78 00 – Closeout submittals Documents.

.2 Operation and maintenance Data : submit instructions for the operation and maintenance data for the door hardware which will be incorporated to the E&E manual.

1.7 MAINTENANCE MATERIALS SUBMITTALS

.1 Extra stock Materials
.1 Supply maintenance Materials in accordance 01 78 00 – Closeout Submittals

1.8 QUALITY ASSURANCE

.1 Regulatory Requirements
  .1 The hardware for the exterior emergency exits and for doors mounted in fire partitions must be certified by a Canadian certification body accredited by the Standards Council of Canada.

.2 Certificates : submit the documents signed by the manufacturer, certifying that the products and the materials comply with the prescriptions regarding physical characteristics and performance criteria.

1.9 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 Package items of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location

.4 Storage and Handling Requirements :
  .1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  .2 Store and protect door hardware from nicks, scratches, and blemishes.
  .3 Protect prefinished surfaces with wrapping and strippable coating.
  .4 Replace defective or damaged materials with new.

1.10 WARRANTY

.1 Provide the written warranty, issued in the owner’s name, certifying that the work specified in this section will be free of defects in material and installation for (1) year from the final acceptance.

.2 The warranty must cover the cost of any expenses arising from the repair of the defect or other damage to the building resulting from defect of the work.

.3 The warranty must be approved by the Departmental Representative and owner.

1.11 QUALIFICATIONS

.1 The Contractor shall mandate a hardware consultant (paid by the contractor) certified AHC (Architectural Hardware Consultant) in good standing with the DHI (Door and Hardware Institute) and having a minimum of 10 years of experience for the supply and installation of hardware. The hardware consultant must provide a detailed report for each door.

.2 All detention products from the manufacturer Southern Folger Adam (SFA) will be supplied and installed by a qualified firm accredited by the manufacturer who has undergone training given by the manufacturer and has obtained his certification, provide proof of support.

PART 2 PRODUCTS

2.1 GENERAL

.1 All items of the same type must come from the same manufacturer.

2.2 MANUFACTURIERS

PRODUCT	MANUFACTURER
• Carceral Motorized Sliding tracks and accessories	**Folger Adam (Southern Folger Adam)**

2.3 HARDWARE MATERIALS AND FINISHES CHART (ANSI / BHMA)

Code Description	Material	Canadian equivalent
600 Primer	Steel	CP

2.4 REQUIRMENTS

.1 Except for special cases prescribed in the hardware list, all hardware required for the work will be Carceral type and a robust quality standard. For finish, refer to the hardware list.

.2 Submit (3) copies of the hardware list as prescribed at article 5.0 of the door hardware schedule for coordination purposes. The hardware list will include the installation and the description of each item as specified in this document.

.3 The hardware schedule is provided to determine the type, function, quality, and minimum weight of the required items, but should not be interpreted as a quantity list. The contractor must make sure to provide any additional hardware that is not on the list but still needed to complete the installation of the doors.

.4 Fabricate hardware in accordance with the ANSI standard.

.5 In the absence of an ANSI standard, the hardware must be able to fulfill its function and be of a recognized use.

.6 Electric diagrams :

.1 Submit the Final Electrical diagrams for approval. These should be consistent with security and fire alarm systems.

.7 Submit for approval the Electrical Circuit Diagrams, prescribed in this document.

.8 Submit for approval six (6) copies, elevations of each door and electrified components, including circuit diagrams detailed point by point and their functioning method. These documents will be used by professionals during constructions work and two (2) copies will be provided for future reference.

2.5 FASTENINGS

.1 Use only fasteners provided by manufacturer. Failure to comply may void warranties and applicable licensed labels.

.2 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.

.3 Exposed fastening devices to match finish of hardware.

.4 Use fasteners compatible with material through which they pass.

2.6 KEYING

.1 All detention keys and cylinders to be detention grade of type paracentric. All locks and cylinders must be subject to path system established by the Ministry Representative.

.2 Provide four (4) copies of keys of each paracentric keys for every lock in this contract.

PART 3 EXECUTION

3.1 SUBSTITUTION AND EQUIVALENTS

.1 The Contractor is required to prepare his quote with the materials, accessories and devices specified in the hardware list and in the drawings, because he must, if the contract is awarded, provide exactly said materials, accessories and devices.

.2 The hardware part numbers listed in the legend groups for architectural hardware groups are standardized items and must meet certain quality criteria.

3.2 RESPONSIBILITY

.1 All detention hardware will serve the purpose and intent for which it was specified and will be suitable for the designated location. In the event that any hardware as indicated, specified or requested does not meet the planned or required requirements, the supplier of the hardware will promptly seek the necessary correction or modification well in advance in order to avoid a delay in manufacturing and delivery of hardware.

.2 All the written documents, supplies and services required under this section must be entrusted to a single subcontractor, except for the installation of the finishing hardware and the work of the firm specialized in electrified or electronically hardware items in electrified or electronified hardware which may be entrusted to other specialized subcontractors.

.3 At the beginning and at the end of the work site, a meeting will be organized with the hardware supplier, the installer, the general contractor, the electrician as well as a representative of each related work, in order to properly coordinate the installation and start up the placement of the hardware. The architect and consultant A.H.C. will chair these meetings.

.4 During construction, the subcontractor will make the necessary checks to ensure that the finishing hardware, he supplies is properly installed and he will inform the contractor.

3.3 INSTALLATION INSTRUCTIONS

.1 Manufacturer Instructions: must comply with the manufacturer's written requirements, recommendations and specifications, including the technical bulletins and installation instructions specified in the product catalogs and on the cardboard boxes, as well as the specifications in the technical sheets.

.2 Provide manufacturers of doors and metal frames with installation templates and complete instructions which will allow them to prepare their products to receive the hardware items prescribed in this section.

.3 Provide, with each hardware item, manufacturer's installation instructions.

.4 The installation will be done by qualified and experienced installers who have worked with this type of hardware. It includes adjusting and verifying the operation of the various elements during installation and before the consultant and / or architect's first inspection.

.5 Install the plumbing hardware, with the original screws, bolts and fasteners provided by the manufacturer and according to his instructions. The parts will be flush fitted with the faces of the doors and frames. Adjust the moving parts so that the doors operate smoothly. Unless otherwise advised by the architect, no self-tapping and / or self-drilling screws will be accepted.

.6 Any fixing such as screws, etc. will be installed perpendicular to the face of the part. Drill as required. The screws will be strictly those supplied by the manufacturer and they must be installed in accordance with best trade practices. Burr or damaged, misaligned, or broken screws should be replaced.

.7 Use only fasteners provided by the manufacturer.

.1 Quick attach devices (self-tapping screws), unless specifically provided by the manufacturer, will not be accepted

3.4 INSTALLATION OF HOLLOW METAL AND WOOD DOORS, INCLUDING HARWARE'S

.1 Install and adjust all the doors indicated in the Section 08 11 00 – Metal doors and frames, as well as their designated hardware, including all holes, mortises, etc., required by these works when not prepared. Install all items according to manufacturers' templates and instructions.

.2 Receive complete instructions and essential installation templates from door and frame manufacturers as prescribed.

.3 When not prepared, any drilling required for the installation of the hardware must be carried out by the installer of the hardware on site, according to the templates provided with each of the hardware items.

.4 All hardware parts will be installed using a manual or electric screwdriver with a clutch only; this in order to avoid crumbling of the wires and the imprint of the screw head. Any screws or screw heads with burrs or damaged, misaligned, or broken should be replaced.

.5 Installation steps : certain painting and / or staining and varnish and / or varnish work must be carried out in conjunction with the installation of the hardware, the installation must therefore follow the following steps for wooden doors and frames :

.1 The installer adjusts his door in the frame and performs all required drilling and cutting.
.2 The installer hangs the doors in the frame using the hinges.
.3 The painter applies the primer and the first finish coat on doors and frames while protecting the visible parts of the hinges.
.4 The installer completes the installation of all hardware parts and verifies operation.
The painter applies his last finishing coat to doors and frames.

.6 All hardware must be plumbed, securely anchored and adjusted according to the intended operation.

.7 Adjust moving parts so that doors operate smoothly.

3.5 ADJUSTING

.1 Adjust hardware, operating and control devices so that they operate flexibly and are safe.

.2 Lubricate hardware, operating and control devices as well as all moving parts.

.3 Adjust the door hardware items so that they ensure perfect contact between the doors and their frame.

3.6 CLEANING

.1 Cleaning during work : perform cleaning work in accordance with Section 01 74 00 – Cleaning.
- .1 Leave the premises clean at the end of each working day.
- .2 Clean hardware items with a damp cloth and non-abrasive cleaner, and polish in accordance with manufacturer's instructions.
- .3 Remove protective film covering hardware items, if applicable.
- .4 Final cleaning : remove surplus materials / materials, waste, tools and equipment from the site in accordance with Section 01 74 00 – Cleaning.

3.7 EXHIBIT

.1 Information given to maintenance personnel.
- .1 Given to maintenance personnel the necessary information on the following :
  - .1 Appropriate methods of cleaning and maintenance of hardware items.
  - .2 Characteristics, function, handling and storage of keys.

.2 Demonstrate the operation of the elements, as well as the adjustment and lubrication characteristics.

3.8 PROTECTION

.1 Protect equipment and installed components from damage during construction.

.2 Repair damage to adjacent materials and equipment by installing door hardware

3.9 INSPECTION

.1 At the end of the work, a verification will be made by the architect's consultant, to certify that the hardware delivered and installed is, as established in the estimate, and according to the approved list, which will have been verified by the consultant of the architect.

.2 Criteria to be respected for the consultant's inspection :
- .1 Before requesting an inspection of the hardware, the contractor must make his own verification and confirm it in writing upon request.
- .2 If in the opinion of the consultant, the work seems to have been carried out, the latter will systematically carry out the first verification and if necessary, a first list of works to correct will be issued.

.3 Once the contractor has certified that he has corrected all the deficiencies noted, these will be verified by the consultant.

.4 If the work is not completed and the consultant must issue other lists and carry out other verifications, these will be the responsibility of the Contractor, until the work is certified by the consultant.

.5 The Contractor must also provide the architect and the consultant with the assistance required during their inspections.

PART 4 LIST OF HARDWARE ITEMS

.1 Hardware set 01 / Cell doors of the odd corridor
(Doors S101, S103, S105, S107, S109, S111, S113, S115, S117, S119)

QTY	DESCRIPTION	FINI	MANUFACTURER
10	Set of Motorized sliding tracks for Prison and accessories *2B.3 x Simple x Door width x 120 VAC (60 HZ - 1/20 HP) x Plug-type connectors x Gang release x Interconnecting wire harness*	600	Folger Adam (SFA)
10	Security dress plate for the lower guide K0125-Z-CUST-DGP x Tork	630	Trimco/BBW
1	Lot of slope filler plate and housings to connect the slider systems from cell S119 up to the back of the slider from door S121.1 and from the front of the slider of door S121.1 up to the prescribed wall mount locking cabinet. All this to hide and concealed the interconnected cables between each units to the locking the locking cabinet and going thru perpendicularly the slider unit from door S121.1 *Lot of Filler housings as required, see plans*	600	Folger Adam (SFA)
10	Recessed door pull for sliding door 1111B-CUST-DETSLI x Tork (Install at 1050mm C/L from the floor and at 102mm C/L from the edge of the door)	630	Trimco/BBW
10	Food pass (less locking device) 262 x Prep only for FA number 17 latch (17 latch supply and install by the end user)	600	Southern Steel (SFA)
1	*Mechanical Control Cabinet x 2 levers for 10 doors x Deadlock keyed cover (Paracentric 5 tumblers)* *(1 lever for doors S101, S103, S105, S107, S109 and 1 lever for doors S111, S113, S115, S117, S119)*	600	Folger Adam (SFA)

Notes :

- The specified quantities are the require quantities for the 10 doors in references.
- Electric conduits, electric junction box, pull cords, 120v electric power source and unlocking desk console are all supply, installs, wires and program by **Electricity** and excluded from this section, see plans and specifications for coordination.
- The food pass locksets to be recuperate from the Ministry Representative and install by this section.
- Mechanical and electromechanical hardware components are supply and install by this section but all wires and wiring connections to be supply by **Electricity** and excluded from this section, see plans and specifications for coordination.

.2 Hardware set 02 / Cell doors of the pair corridor
(Doors S102, S104, S106, S108, S110, S112, S114, S116, S118, S120)

QTY	DESCRIPTION	FINI	MANUFACTURER
10	Set of Motorized sliding tracks for Prison and accessories *2B.3 x Simple x Door width x 120 VAC (60 HZ - 1/20 HP) x Plug-type connectors x Gang release x Interconnecting wire harness*	600	Folger Adam (SFA)
10	Security dress plate for the lower guide K0125-Z-CUST-DGP x Tork	630	Trimco/BBW
1	Lot of slope filler plate and housings to connect the slider systems from cell S120 up to the back of the slider from door S122.1 and from the front of the slider of door S122.1 up to the prescribed wall mount locking cabinet. All this to hide and concealed the interconnected cables between each units to the locking the locking cabinet and going thru perpendicularly the slider unit from door S122.1 *Lot of Filler housings as required, see plans*	600	Folger Adam (SFA)
10	Recessed door pull for sliding door 1111B-CUST-DETSLI x Tork (Install at 1050mm C/L from the floor and at 102mm C/L from the edge of the door)	630	Trimco/BBW
10	Food pass (less locking device) 262 x Prep only for FA number 17 latch (17 latch supply and install by the end user)	600	Southern Steel (SFA)
1	*Mechanical Control Cabinet x 2 levers for 10 doors x Deadlock keyed cover (Paracentric 5 tumblers)* *(1 lever for doors S102, S104, S106, S108, S110 and 1 lever for doors S112, S114, S116, S118, S120)*	600	Folger Adam (SFA)

Notes :

- The specified quantities are the require quantities for the 10 doors in references.
- Electric conduits, electric junction box, pull cords, 120v electric power source and unlocking desk console are all supply, installs, wires and program by **Electricity** and excluded from this section, see plans and specifications for coordination.
- The food pass locksets to be recuperate from the Ministry Representative and install by this section.
- Mechanical and electromechanical hardware components are supply and install by this section but all wires and wiring connections to be supply by **Electricity** and excluded from this section, see plans and specifications for coordination.

.3 Hardware set 03 / Doors and the end of odd and pair corridors
(Doors S121.1, S122.1)

QTY	DESCRIPTION	FINI	MANUFACTURER
2	*D2B.3 x Simple x Door width x 120 VAC (60 HZ - 1/10 HP) x Plug-type connectors x Local access emergency released port by key (Paracentric 5 tumblers) x Cover prep for to let thru perpendicular cables from the Mechanical locking cabinets, see plans*	600	Folger Adam (SFA)
1	Lot of slope filler plate and housings to connect the two slider systems from wall to wall Lot de couvercle à angle de remplissage pour relier les deux ensembles de rail coulissant mur à mur, voir détails aux plans *Lot of Filler housings as required, see plans*	600	Folger Adam (SFA)
Notes : • The specified quantities are the require quantities for the 2 doors in references. • Existing grill swing doors to be modified and fit-out for the new hardware components, see plans and specification for coordination. • Electric conduits, electric junction box, pull cords, 120v electric power source and unlocking desk console are all supply, installs, wires and program by **Electricity** and excluded from this section, see plans and specifications for coordination. • Mechanical and electromechanical hardware components are supply and install by this section but all wires and wiring connections to be supply by **Electricity** and excluded from this section, see plans and specifications for coordination.			

.4 Hardware set 04 / Not applicable

.5 Hardware set 05 / manual sliding door between pair and odd corridors
(Door 122.3)

QTY	DESCRIPTION	FINI	MANUFACTURER
1	Complete sliding door hardware kit including guide 102-_M	600	Folger Adam (SFA)
1	Self latching sliding detention lockset and accessories 36 + 30-4DB x G	600	Folger Adam (SFA)
Notes : • Grill swing door modify to a sliding door, see plans and specifications for all details.			

.6 Hardware set 06 / Electrical boxes at the control station (S141), release boxes in the corridor (S) and other required boxes (see section 28)

QTÉ	DESCRIPTION	FINI	MANUFACTURIER
***	Security lock for electrical boxes below the control panel, manual release boxes and other boxes. « L » Serie x Exact model to be validated by **Electricity** x CMK	626	Best
***	Permanent removable cylinder 1C7 x EMK x KD x 2 keys x control key		Best
Notes : • *** Required quantities (minimum 6) to be coordinated with the **Electricity**.			

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 08 11 00 – Metal Doors and Frames.

1.2 REFERENCE STANDARDS

.1 ASTM International
- .1 ASTM C 542-05, Standard Specification for Lock-Strip Gaskets.
- .2 ASTM D 790-07e1, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
- .3 ASTM D 1003-07e1, Standard Test Method for Haze and Luminous Transmittance of Plastics.
- .4 ASTM D 1929-96(R2001)e1, Standard Test Method for Determining Ignition Temperature of Plastics.
- .5 ASTM D 2240-05, Standard Test Method for Rubber Property - Durometer Hardness.
- .6 ASTM E 84-10, Standard Test Method for Surface Burning Characteristics of Building Materials.
- .7 ASTM E 119-16a, Standard Test Methods for Fire Tests of Building Construction and Materials
- .8 ASTM E 330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .9 ASTM F 1233-08, Standard Test Method for Security Glazing Materials and Systems.

.2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.
- .2 CAN/CGSB-12.2-M91, Flat, Clear Sheet Glass.
- .3 CAN/CGSB-12.12-M90, Plastic Safety Glazing Sheets.

.3 Environmental Choice Program (ECP)
- .1 CCD-045-95(R2005), Sealants and Caulking Compounds.

.4 Glass Association of North American (GANA)
- .1 GANA Glazing Manual - 2008.
- .2 GANA Laminated Glazing Reference Manual - 2009.

.5 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
- .1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings :
- .1 Convene pre-installation meeting prior to beginning work of this Section and on-site installation, with Departmental Representative in accordance with Section 01 31 19 – Project Meetings to :
  - .1 Verify project requirements.
  - .2 Review installation and substrate conditions.
  - .3 Co-ordination with other building subtrades.
  - .4 Review manufacturer's written installation instructions and warranty requirements.

.2 Arrange for site visit with Departmental Representative prior to start of Work to examine existing site conditions adjacent to demolition Work.

.3 Hold project meetings in accordance with prior agreement with Departmental Representative.

.4 Ensure key personnel, site supervisor, project manager and subcontractor representatives attend.

.5 Departmental Representative will submit written notification of change to meeting schedule established upon contract award 24 hours prior to scheduled meeting.

1.4 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 glass, sealants, and glazing accessories and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings :
- .1 Submit drawings stamped and signed by professional engineer registered or licensed in Quebec, Canada.

.4 Samples :
- .1 Submit for review and acceptance of each glazing unit.
- .2 Samples will be returned for inclusion into work.

.5 Certificates : submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.6 Test Reports : certified test reports showing compliance with specified performance characteristics and physical properties.
- .1 Submit testing and analysis of glass under provisions of Section 01 45 00 – Quality Control.
- .2 Submit shop inspection and testing for glass.

1.5 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 – Closeut Submittals.

.2 Operation and Maintenance Data : submit operation and maintenance data for glazing for incorporation into manual.

1.6 QUALITY ASSURANCE

.1 Certificates : product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.2 Mock-ups :
- .1 Construct mock-ups in accordance with Section 01 45 00 – Quality Control.
- .2 Construct mock-up to include glass and plastic glazing, and perimeter air barrier and vapour retarder seal.
- .3 Mock-up will be used :
  - .1 To judge quality of work, substrate preparation, operation of equipment and material application.
  - .2 For testing to determine compliance with performance requirements. Perform tests as follows.
- .4 Locate where directed by Departmental Representative.
- .5 Allow 24 hours for inspection of mock-up before proceeding with work.

.6 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work if not damaged. If necessary, remove mock-up and dispose of materials when no longer required and when directed by Department Representative.

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, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Store and protect glazing and frames from nicks, scratches, and blemishes.
- .3 Protect prefinished aluminum surfaces with wrapping.
- .4 Replace defective or damaged materials with new.

1.8 WARRANTY

.1 Provide a written warranty, in the Owner's name, certifying that the prison glass glazing specified in this Section will be free from material, component and workmanship defects, for a period of five (5) years and free from any material obstructing views for a period of ten (10) years, beginning at date of project delivery.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Flat Glass :
- .1 Sheet glass : to CAN/CGSB-12.2, glazing glass quality, 20 mm thick.
- .2 Safety glass: to CAN/CGSB-12.1, AINSI Z97.1-2015 and SPSC 16 CFR 1201, transparent and 20 mm thick.
  - .1 Type 2-tempered.
  - .2 Class B-float.

2.2 ACCESSORIES

.1 Setting blocks : neoprene 80-90 Shore A durometer hardness to ASTM D 2240, to suit glazing method, glass light weight and area.

.2 Spacer shims : neoprene, 50-60 Shore A durometer hardness to ASTM D 2240, to suit application, self adhesive.

.3 Glazing tape :
- .1 Preformed butyl compound with integral resilient tube spacing device, 10-15 Shore A durometer hardness to ASTM D 2240; coiled on release paper.

.4 Glazing clips : manufacturer's standard type.

.5 Lock-strip gaskets : to ASTM C 542.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance : comply to requirements, recommendations and specifications written by manufacturer, , including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 EXAMINATION

.1 Verification of Conditions : verify conditions of substrates previously installed under other Sections or Contracts are acceptable for glazing installation in accordance with manufacturer's written instructions.
- .1 Verify that openings for glazing are correctly sized and within tolerance.
- .2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.
- .3 Visually inspect substrate in presence of Departmental Representative.
- .4 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .5 Proceed with installation only after unacceptable conditions have been remedied [and after receipt of written approval to proceed from Departmental Representative.

3.3 PREPARATION

.1 Clean contact surfaces with solvent and wipe dry.

.2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.

.3 Prime surfaces scheduled to receive sealant.

3.4 INSTALLATION : INTERIOR – DRY METHOD (TAPE AND TAPE)

.1 Perform work in accordance with GANA Glazing Manual and GANA Laminated Glazing Reference Manual for glazing installation methods.

.2 Cut glazing tape to length and set against permanent stops, projecting 1,6 mm above sight line.

.3 Place setting blocks at 1/3 points, with edge block maximum 150 mm from corners.

.4 Rest glazing on setting blocks and push against tape for full contact at perimeter of light or unit.

.5 Place glazing tape on free perimeter of glazing in same manner described.

.6 Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

.7 Knife trim protruding tape.

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.
  - .1 Remove traces of primer, caulking.
  - .2 Remove glazing materials from finish surfaces.
  - .3 Remove labels.
  - .4 Clean glass using approved non-abrasive cleaner in accordance with manufacturer's instructions.

.2 Final Cleaning : upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 – Cleaning.

.2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 – 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 After installation, mark each light with an "X" by using removable plastic tape or paste.

.1 Do not mark heat absorbing or reflective glass units.

.3 Repair damage to adjacent materials caused by glazing installation.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 07 92 00 – Joints Sealants.

.2 Section 09 91 99 – Painting for minor works.

1.2 REFERENCE STANDARDS

.1 ASTM International
- .1 ASTM C 1396/C 1396M-09a, Standard Specification for Gypsum Wallboard.
- .2 ASTM C 475/C 475M-02(2007), Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
- .3 ASTM C 514-04(2009)e1, Standard Specification for Nails for the Application of Gypsum Board.
- .4 ASTM C 645-09a, Standard Specification for Nonstructural Steel Framing Members.
- .5 ASTM C 754-09a, Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
- .6 ASTM C 840-08, Standard Specification for Application and Finishing of Gypsum Board.
- .7 ASTM C 954-10, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.122 in. (2.84 mm) in Thickness.
- .8 ASTM C 1002-07, Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
- .9 ASTM C 1047-10, Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
- .10 ASTM C 1178/C 1178M-08, Standard Specification for Glass Mat Water-Resistant Gypsum Backing Board.

.2 Canada Green Building Council (CaGBC)
- .1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design) : Green Building Rating System Reference Package For New Construction and Major Renovations (including Addendum 2007).
- .2 LEED Canada-CI Version 1.0-2007, LEED (Leadership in Energy and Environmental Design) : Green Building Rating System Reference Guide For Commercial Interiors.

.3 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
- .1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

.4 Underwriters' Laboratories of Canada (ULC)
- .1 CAN/ULC-S102-07, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

.5 Seismic Design Category C : 2009 & 2006 IBC® International Building Code - Section 1613 (2007 CBC California Building Code)
- .1 American Society of Civil Engineers 7-05 : Minimum Design Loads for Buildings and Other Structures.
- .2 CISCA : Guidelines for Seismic Restraint Direct Hung Suspended Ceiling Assemblies Seismic Zones 0-2.

.6 Seismic Design Category C : 2012 IBC® International Building Code - Section 1613 (2010 CBC California Building Code)
.1 American Society of Civil Engineers 7-10 : Minimum Design Loads for Buildings and Other Structures.

.7 CISCA Ceiling Systems Installation Handbook.

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 gypsum, framing, sealants and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings :
.1 All shop drawings submitted for seismic bracing partition shall bear the seal and signature of a competent engineer recognized or qualified to practice in Quebec, Canada, and member of the OIQ.

.4 Samples :
.1 Submit for review and acceptance of each unit.
.2 Samples will be returned for inclusion into work.

.5 Test and Evaluation Reports: submit test reports in accordance with Section 01 45 00 – Quality Control from approved independent testing laboratory, certifying partition system complies with specifications.

1.4 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 indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Store materials inside, level, under cover. Protect from weather, damage from construction operations and other causes, in accordance with manufacturer's printed instructions.
.3 Handle materials to prevent damage to edges or surfaces. Protect metal accessories and trim from being bent or damaged.
.4 Store and protect partition materials from [nicks, scratches, and blemishes.
.5 Replace defective or damaged materials with new.

1.5 WARRANTY

.1 Provide a written warranty, in the owner's name, certifying that specified work in the current section is exempt of all material and execution defects, for a period of (1) year, beginning at the work completion date.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Aggregate Ceilings :

.2 Non-structural Metal Framing :
- .1 Non-load bearing channel stud framing : to ASTM C 645, roll formed from hot dipped galvanized steel sheet, for screw attachment of gypsum board. Knock-out service holes at 460 mm centres.
- .2 Floor and ceiling tracks: to ASTM C 645, in widths to suit stud sizes, 32 mm flange height.
- .3 Metal channel stiffener : 19 x 1,4 mm thick cold rolled steel, coated with rust inhibitive coating.

.3 Aggregate Board :
- .1 Glass mat water-resistant gypsum backing board: to ASTM C 1178/C 1178M, required thickness, 1 200 mm wide and maximum practical length.
- .2 Screws : to ASTM C1002, type S, for drywall on stud installation and steel runners. Screws must be long enough to allow a minimum 10 mm sinking into support.
- .3 Casing beads, corner beads, control joints and edge trim : to ASTM C 1047, galvanized steel, 0,5 mm base thickness, perforated flanges, one piece length per location.
- .4 Sealant : in accordance with Section 07 92 00 – Joint Sealants.
- .5 Joint paste : to ASTM C475, lead-free.
- .6 Jointing tape : perforated drywall Kraft paper joint tape, specially treated. Stagger bracing using metal channels every 2 400 mm c/c at a maximum, designed to brace partitions attached to suspended seismic ceiling system. Bracing must be calculated by a Structural Engineer, member of the OIQ.

2.2 ACCESSORIES

.1 Sealants : in accordance with Section 07 92 00 – Joint Sealants to ASTM C 475.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions : verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions prior to partition 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 receipt of written approval to proceed from Departmental Representative.

3.2 ERECTION OF FRAMING

.1 Install steel framing members to receive screw-attached gypsum board in accordance with ASTM C 754 except where specified otherwise.

.2 All gypsum board assembly manufacturer recommendations to be most recent and current, and shall be respected at all times, unless otherwise indicated in plans and specifications.

.3 Align partition tracks at floor and ceiling and secure at 600 mm on centre maximum.

.4 Place studs vertically at 400 mm on centre and maximum of 50 mm from abutting walls, and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.

.5 Erect metal studding to tolerance of 1:1000.

3.3 ERECTION OF GYPSUM BOARD AND ACCESSORIES

.1 Do application and finishing of gypsum board in accordance with ASTM C 840 except where specified otherwise.

.2 Erect hangers and runner channels for suspended gypsum board ceilings in accordance with ASTM C 840 except where specified otherwise.

.3 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.

.4 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers and grilles.

.5 Install 19 x 64 mm furring channels parallel to, and at exact locations of steel stud partition header track.

.6 Furr for gypsum board faced vertical bulkheads within and at termination of ceilings.

.7 Furr above suspended ceilings for gypsum board fire and sound stops and to form plenum areas as indicated.

.8 Install wall furring for gypsum board wall finishes in accordance with ASTM C 840, except where specified otherwise.

.9 Install gypsum boards in direction that will minimize number of end-butt joints. Stagger end joints 250 mm minimum.

3.4 INSTALLATION

.1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at 150 mm on centre using contact adhesive for full length.

.2 Install casing beads around perimeter of suspended ceilings.

.3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. Seal joints with sealant.

.4 Install insulating strips continuously at edges of gypsum board and casing beads abutting metal window and exterior door frames, to provide thermal break.

.5 Install access doors to electrical and mechanical fixtures specified in respective sections.
.1 Rigidly secure frames to furring or framing systems.

.6 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.

.7 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.

.8 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.

.9 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.

3.5 SUSPENDED CEILING INSTALLATION

.1 Begin suspended ceiling installation after Departmental Representative has verified and approved equipment and installations concealed in the ceiling plenum.

.2 Install mouldings for wall-ceiling joints that will delineate exact ceiling height.

.3 Once completed, the frame must be able to withstand all additional loads, such as lighting fixtures, air supply registers, access hatches, cameras, grilles and speakers.

.4 Provide additional suspension for lighting fixtures, air supply registers, access hatches, installed at no more than 150 mm from each angle and every 600 mm at most around equipment.

.5 Ensure that the finished ceiling is plumb an straight compared to its peripheral walls and its maximum deviation in plane does not exceed 1:1000.

.6 Frame access panels, lighting fixtures air supply registers and grille openings with furring channels.

3.6 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 and recycling in accordance with Section 01 74 21 – Waste Management and Disposal.
  .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.7 PROTECTION

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

.2 Repair damage to adjacent materials caused by partition installation.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 04 20 00.08 – Masonry for minor works.

1.2 REFERENCES

.1 Green Seal Environmental Standards (GS)
  .1 GS-11-2008, 2nd Edition, Paints and Coatings.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  .1 Material Safety Data Sheets (MSDS).

.3 The Master Painters Institute (MPI)
  .1 Architectural Painting Specification Manual - current edition.
  .2 Maintenance Repainting Manual - current edition.

.4 National Research Council Canada (NRC)
  .1 National Building Code of Canada 2015 (NBC).

.5 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
  .1 SCAQMD Rule 1113-A2007, Architectural Coatings.

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 paint and coating products and include product characteristics, performance criteria, physical size, finish and limitations. Identify each product in relation to the system in which it is used and provide the following information:
    .1 Designation of the paint system.
    .2 The type of product and its use.
    .3 The number of the relevant CGSB standard.
    .4 Manufacturer's product number.
    .5 The number (s) of the color (s).
    .6 Manufacturer's material safety data sheets.
    .7 Maximum VOC accepted: 0 (interior paint only)
  .2 Submit two (2) copies of WHMIS MSDS in accordance with Section 01 35 29.06 – Health and Safety Requirements.

.3 Samples :
  .1 Submit for review and acceptance of each unit.
  .2 Submit duplicate 200 mm x 300 mm sample panels of each with specified paint or coating in colors, gloss/sheen and textures required to MPI Painting Specification Manual standards.

.4 Certificates : submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.4 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 Provide and maintain dry, temperature controlled, secure storage.
- .2 Store painting materials and supplies away from heat generating devices.
- .3 Store materials and equipment in a well ventilated area with temperature as recommended by manufacturer.

.4 Fire Safety Requirements :
- .1 Supply one 9 kg Type ABC fire extinguisher adjacent to storage area.
- .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
- .3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.

.5 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 – Construction/Renovation/Demolition (CRD) Waste Management and Disposal.

1.5 FACTORY APPLIED ELEMENTS

.1 Unless otherwise indicated on the site or in the drawings and / or the finish slip, do not paint elements whose existing finish has been applied in the factory, such as exterior windows, aluminum entrances, lighting fixtures, stainless steel elements, pre-painted elements, pre-painted steel furniture, etc.

1.6 QUALITY ASSURANCE

.1 Keep purchase slips, invoices and other documents used to prove that the products and materials used for the execution of the work provided for in the contract comply with the prescriptions of this section. These documents must be produced at the request of the CDC Representative.

.2 The products used, either primary or printing products, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents and others, must appear on the latest version of the List of approved products of the MPI, and all the products forming the chosen paint system must come from the same manufacturer.

.3 Comply with the most recent requirements of the MPI regarding interior work on the refinishing of paint coatings, including those aimed at cleaning and preparing surfaces as well as the application of primer or printing paint.

.4 Quality standard : the surfaces examined must, under the final lighting provided, meet the following requirements.
- .1 Walls : no defect must be visible from a distance of 1 000 mm, at an angle of 90o to the surface.
- .2 Ceilings : no defect must be visible from the floor when looking at the ceiling from a 45o angle, in lighting provided by the final light source.
- .3 The color and gloss of the last coat must be uniform over the entire surface.

1.7 SITE CONDITIONS

.1 Heating, Ventilation and Lighting :
- .1 Ventilate enclosed spaces in accordance with Section 01 51 00 – Temporary Utilities.
- .2 Co-ordinate use of existing ventilation system with CDC Representative and ensure its operation during and after application of paint as required.
- .3 Provide minimum lighting level of 323 Lux on surfaces to be painted.

.2 Temperature, Humidity and Substrate Moisture Content Levels :
- .1 Apply paint finishes when ambient air and substrate temperatures at location of installation can be satisfactorily maintained during application and drying process, within MPI and paint manufacturer's prescribed limits.
- .2 Test concrete, masonry and plaster surfaces for alkalinity as required.
- .3 Apply paint to adequately prepared surfaces, when moisture content is below paint manufacturer's prescribed limits.

.3 Additional application requirements :
- .1 Apply paint in areas where construction activities are no longer likely to generate dust or where wind or ventilation conditions are not likely to result in transfer and deposit of particles that could compromise the quality of the surface finish.
- .2 In occupied facilities and buildings, paint during vacant hours only. Have work schedule approved by Departmental Representative and provide sufficient drying and curing time before occupants are reinstated.

.4 Interior application requirements :
- .1 Apply paint only if ambient temperature is within the limits prescribed in the relevant standard and by the manufacturer.
- .2 The substrate temperature and the ambient temperature must be within the limits prescribed in the relevant standard and by the manufacturer, to the satisfaction of the Consultant.
- .3 The substrate temperature and the ambient temperature must be at least 5°C in the case of alkyd resin paints, and at least 7°C in the case of emulsion paints (latex). The relative humidity should not exceed 85 %.
- .4 Use temporary heating means when there is no permanent means to maintain the minimum recommended temperature.
- .5 Paint only in areas where the ambient air is free of suspended particles generated by construction work and likely to alter painted surfaces.
- .6 Apply paint only on dry, sufficiently hardened and adequately prepared surfaces.
- .7 The surfaces to be painted must have a lighting of at least 270 lx.
- .8 Protect against stains and splashes all appliances, equipment, plumbing fixtures and piping having a permanent finish: glass surface, enameled cast iron, polished brass, nickel, copper, aluminum or stainless steel. During the painting work, remove the plates from the switches and sockets and all the hardware applied to the surface if installed.
- .9 Concrete block walls and concrete slabs must have cured at least twenty-eight (28) days by the time paint is applied.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Supply paint materials for paint systems from single manufacturer.

.2 Conform to latest MPI requirements for painting work including preparation and priming.

.3 Materials in accordance with MPI – Architectural Painting Specification Manual and MPI – Maintenance Repainting Manual "Approved Product" listing.
- .1 Use MPI listed materials having E3 rating where indoor air quality requirements exist.
- .2 Primer : VOC limit 100 g/L maximum to GS-11 and SCAQMD Rule 1113.
- .3 Paint : VOC limit 100 g/L maximum to GS-11 and SCAQMD Rule 1113.

.4 Colours :
- .1 Submit proposed Colour Schedule to CDC Representative.
- .2 Base color schedule on selection of 5 base colors and 3 accent colors.

.5 Mixing and tinting :
- .1 Perform color tinting operations prior to delivery of paint to site, in accordance with manufacturer's written recommendations. Obtain written approval from CDC Representative for tinting of painting materials.
- .2 Use and add thinner in accordance with paint manufacturer's recommendations.
  - .1 Do not use kerosene or similar organic solvents to thin water-based paints.
- .3 Thin paint for spraying in accordance with paint manufacturer's written recommendations.
- .4 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and color and gloss uniformity.

.6 Gloss/sheen ratings :
- .1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values :

Gloss Level-Category	Gloss at 60 degrees	Sheen at 85 degrees
Gloss Level 1 – Matte finish	Max. 5	Max. 10
Gloss Level 2 – Velvet	Max. 10	10 to 35
Gloss Level 3 - Eggshell	10 to 25	10 to 35
Gloss Level 4 – Satin	20 to 35	Min. 35
Gloss Level 5 – Semi-gloss	35 to 70	
Gloss Level 6 – Gloss	70 to 85	
Gloss Level 7 – High gloss	More than 85	

- .2 Gloss level ratings of painted surfaces as indicated and as noted on Finish Schedule.

.7 Interior painting – new work :
- .1 Structural Steel and Metal Fabrications : columns, beams, joists and miscellaneous metal.
  - .1 Prepare the surfaces according the article 3.3.
  - .2 Apply the manufacturer’s recommended primer and insure the compatibility with the substrate and the finish coat.
  - .3 INT 5.1E – Alkyd resin product, level 5 gloss level finish. Provide one (1) coat of primer and a minimum of two (2) coats finish, up to full color saturation.
- .2 Galvanized Metal : high contact/high traffic areas (doors, frames, railings and handrails, etc.).
  - .1 Prepare the surfaces according the article 3.3.
  - .2 Apply the manufacturer’s recommended primer and insure the compatibility with the substrate and the finish coat.
  - .3 INT 5.3C – Alkyd resin product, level 5 gloss level finish (on water base binder sealer). Provide one (1) coat of primer and a minimum of two (2) coats finish, up to full color saturation.

.3 Plaster and Gypsum Board : gypsum wallboard, drywall, " sheet rock " type material, etc.
.1 Prepare the surfaces according the article 3.3.
.2 Apply the manufacturer's recommended primer and insure the compatibility with the substrate and the finish coat.
.3 RIN 9.2A – Latex, level 5 gloss level finish, on latex sealer. Provide one (1) coat of primer and a minimum of two (2) coats finish, up to full color saturation.
.4 RIN 9.2C – Alkyd resin product, level 5 gloss level finish. Provide one (1) coat of primer and a minimum of two (2) coats finish, up to full color saturation.
.5 RIN 9.2M – Product for collective establishment, low odor emanation and low level of VOC, level 5 gloss level finish. Provide one (1) coat of primer and a minimum of two (2) coats finish, up to full color saturation.
.4 Concrete masonry elements : smooth or split-face brick and bloc.
.1 Prepare the surfaces according the article 3.3.
.2 Apply the manufacturer's recommended primer and insure the compatibility with the substrate and the finish coat.
.3 INT 4.2A – Latex, level 5 gloss level finish, on latex sealer. Provide one (1) coat of primer and a minimum of two (2) coats finish, up to full color saturation.

.8 Interior re-painting :
.1 Galvanized Metal : high contact/high traffic areas (doors, frames, railings and handrails, etc.).
.1 Prepare the surfaces according the article 3.3.
.2 Apply the manufacturer's recommended primer and insure the compatibility with the substrate and the finish coat.
.3 INT 5.3C – Alkyd resin product, level 5 gloss level finish (on water base binder sealer). Provide one (1) coat of primer and a minimum of two (2) coats finish, up to full color saturation.
.2 Plaster and Gypsum Board : gypsum wallboard, drywall, " sheet rock " type material, etc.
.1 Prepare the surfaces according the article 3.3.
.2 Apply the manufacturer's recommended primer and insure the compatibility with the substrate and the finish coat.
.3 RIN 9.2A – Latex, level 5 gloss level finish, on latex sealer. Provide one (1) coat of primer and a minimum of two (2) coats finish, up to full color saturation.
.3 Concrete masonry elements : smooth or split-face brick and bloc.
.1 Prepare the surfaces according the article 3.3.
.2 Apply the manufacturer's recommended primer and insure the compatibility with the substrate and the finish coat.
.3 INT 4.2A – Latex, level 5 gloss level finish, on latex sealer. Provide one (1) coat of primer and a minimum of two (2) coats finish, up to full color saturation.

PART 3 EXECUTION

3.1 GENERAL

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

.2 Perform preparation and operations for interior painting in accordance with MPI – Architectural Painting Specifications Manual and MPI – Maintenance Repainting Manual except where specified otherwise.

3.2 EXAMINATION

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to CDC Representative damages, defects, unsatisfactory or unfavorable conditions before proceeding with work.

.2 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple " cover patch test ". Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

3.3 PREPARATION

.1 Protection of in-place conditions :
- .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by CDC Representative.
- .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
- .3 Protect factory finished products and equipment.

.2 Surface Preparation :
- .1 Any existing damaged surface must be repaired before being painted; any surface must be free of any foreign material, loose paint, dirt, stains, grease or any material that does not offer perfect adhesion to the paint. **Wash and lightly sand all existing surfaces to be painted.** Remove the trademarks still in place on the materials. Clean all writing on the surfaces of ducts, conduits or other paint surfaces.
- .2 The finish of the gypsum surfaces must be primed and painted in accordance with document GA-214-96, “Recommended Levels of Gypsum Board Finish” in force.
  - .1 Level 4 (matt paint and eggshell) : No marks or bones. Ready to receive a primer followed by a wall covering, a matt or velvety paint.
    - .1 Joints and interior angles: Two distinct layers of compound on a level 2 finish. Ribbon embedded in the compound and any excess removed immediately so as to leave a thin layer of compound on the ribbon.
    - .2 Accessories and fixings: Three separate layers of compound.
    - .3 Surface: Joints filled and re-smoothed. Application of primer before painting.
  - .2 Level 5 (satin, semi-gloss, gloss paint) : Surface completely coated with a thin layer of joint compound, leaving the surface ready to receive a primer before painting.
    - .1 Joints and interior angles : Two distinct layers of compound on a level 2 finish. Ribbon embedded in the compound and any excess removed immediately so as to leave a thin layer of compound on the ribbon.
    - .2 Accessories and fixings : Three separate layers of compound.
    - .3 Surface : Surface completely coated with a thin layer of joint compound, leaving the surface ready for primer before painting.

.3 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.

.4 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.

.5 Place " WET PAINT " signs in occupied areas as painting operations progress. Signs to approval of CDC Representative.

.6 Clean and prepare surfaces in accordance with MPI – Architectural Painting Specification Manual and MPI – Maintenance Repainting Manual specific requirements and coating manufacturer's recommendations.
- .1 Touch up factory primed surfaces on structural steel with a product in accordance with standard CAN / CGSB-1.40-M89, in accordance with standard CGSB 85-GP-14M.
- .2 Prepare galvanized and galvanized steel surfaces in accordance with CGSB 85-GP-16M.
- .3 Prepare masonry, stucco and concrete surfaces in accordance with CGSB 85-GP-31M.
- .4 Prepare concrete floors in accordance with CGSB 85-GP-32M. Treat new concrete floors with muriatic acid; rinse with clear water and allow to dry completely.
- .5 Prepare plaster and gypsum board coatings and surfaces in accordance with CGSB 85-GP-33M. Fill small cracks with a leveling compound.

.7 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

.8 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
- .1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.
- .2 Apply wood filler to nail holes and cracks.
- .3 Tint filler to match stains for stained woodwork.

.9 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1 000 mm.

.10 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements.

.11 Touch up of shop primers with primer as specified.

3.4 APPLICATION

.1 Apply paint on prepared surfaces only after they have been accepted by the CDC Representative.

.2 The application method used must be accepted by the CDC Representative.
- .1 Apply product according to manufacturer's recommendations.

.3 Apply each layer of paint to obtain a continuous film, of uniform thickness.
- .1 Resume bare or covered surfaces with too thin film before applying the next layer.

.4 Allow surfaces to dry and harden adequately after cleaning and between each successive layer, waiting for the minimum time recommended by the manufacturer.

.5 Sand and dust surfaces between each layer to eliminate visible defects.

.6 Paint on walls and ceilings may be applied with a roller, but brush cutting will be required everywhere. Paint the ceilings of exposed steel and concrete frames may be applied to the gun after having protected all adjacent works. Cut ribbon or paint finish changes perfectly using tape.

.7 Finish the surfaces which are above and below the lines of vision in accordance with the prescriptions applicable to neighboring surfaces, including the top of the cupboards and storage and the projecting elements.

.8 Finish the top, the bottom, the edges and the door openings in accordance with the prescriptions relative to the facing surfaces of the doors, after these have been adjusted.

.9 All materials must be applied following exactly the manufacturer's directions for use as printed on the container; any necessary dilution must be made in the prescribed manner and exclusively with the type of thinner recommended by the manufacturer.

.10 All materials must be applied and cut carefully to dry uniformly and to give the specified color and finish, free from runners, glistening spots, irregularities or brush marks.

.11 Adequate ventilation must be provided all the times to avoid moisture above the dew point on the coldest wall. The contractor is responsible for maintaining temperatures, ventilation and ambient conditions.

.12 Repaint without additional remuneration after inspection by the CDC Representative, the works whose quality will have been judged by him to be unsatisfactory.

.13 Provide the application of a minimum of three coats of paint on each surface. Regardless of the number of coats specified, apply as many coats as necessary for complete coverage and a uniform appearance. Apply additional coats of paint until the shade and color intensity requested and approved as a sample is obtained. Each coat must be dry before applying the subsequent coat.

.14 Protect adjacent surfaces from splashes, etc., with polyethylene, masking tape or other suitable materials.

3.5 ELECTRICAL AND MECHANICAL MATERIALS

.1 Unless otherwise specified, apply the paint product to the piping, electrical conduits, ventilation ducts, supports / suspensions as well as other visible interior electrical and mechanical elements so that the color and finish of the painted surfaces harmonize with those of adjoining surfaces.

.2 Do not paint nameplates.

.3 Do not paint sprinkler heads.

.4 Before laying, paint the two sides and edges of the plywood mounting panels, intended to receive pieces of equipment.

.5 Paint all the fire safety system piping in red.

.6 Apply red enamel paint on switches of fire alarm system and emergency lighting system.

.7 Paint all piping of the natural gas network in yellow.

.8 Paint both sides and sides of electrical and telephone equipment connection panels before installing them.

.1 Leave the equipment in its original condition, with the exception of necessary alterations if necessary, and paint the conduits, mounting accessories and other unfinished elements.

.9 Do not paint the interior of mechanical equipment cabinets.

3.6 FINISH

.1 System 1 : Paint all walls and details in gypsum as follows :

.1 New surface :

.1 1 coat of interior latex sealer : zero VOC formula.

.2 2 coats of finished 100 % acrylic latex paint, zero VOC.

.2 Existing painted surface :

.1 Wash and lightly sand, apply 1 coat of interior based sealer primer (stain block and undercoat).

.2 2 coats of 100 % acrylic latex paint, water-based.

.2 System 2 : Paint all ceilings and ceiling details in gypsum as follows :
- .1 New surface :
  - .1 1 coat of interior latex sealer : zero VOC formula.
  - .2 2 coats of 100 % acrylic latex paint with mat finish, zero VOCs.
- .2 Existing painted surface:
  - .1 Wash and lightly sand, apply 1 coat of interior based sealer primer (stain block and undercoat).
  - .2 2 coats of dry film of 100 % acrylic matt latex paint, water-based product.

.3 System 3 : Paint the steel frames and doors as follows :
- .1 New surface :
  - .1 Step 1 (SSPC-SP1) : Clean, degrease and decontaminate with a cleaner recommended by the manufacturer and rinse well. Repeat the process as necessary, until a healthy, clean and contaminant-free surface is obtained.
  - .2 1 coat of primer paint: zero VOC primer compliant with GreenGuard Gold LEED V4.1.
  - .3 2 coats of urethane acrylic water-based paint semi-gloss finish applied with a gun.
- .2 Existing painted surface :
  - .1 Step 1 (SSPC-SP1) : Clean, degrease and decontaminate with a cleaner recommended by the manufacturer and rinse well. Repeat the process as necessary, until a healthy, clean and contaminant-free surface is obtained.
  - .2 Step 2 (SSPC-SP3) : Remove all traces of lamination, rust, paint, and other foreign matter using mechanical tools.
  - .3 1 coat of primer paint : zero VOC primer compliant with GreenGuard Gold LEED V4.1.
  - .4 2 coats of water-based acrylic urethane paint with semi-gloss finish applied with a gun.

.4 System 4 : Paint the walls of concrete blocks and / or poured concrete as follows :
- .1 New surface :
  - .1 Step 1 (SSPC-SP13) : Curing of concrete and / or mortar must be a minimum of 28 days before the application of the finish coating. Dry blasting by abrasive jet, wet abrasive jet, vacuum assisted abrasive jet, as described in standard ASTM D 4259-18, in order to remove contaminants, laitance and brittle concrete, expose voids below the surface and produce a healthy concrete surface with adequate profile and porosity. Fill bubbling, air pockets and other voids with cementitious patching compound. Rinse well to reach a final pH between 6.0 and 9.0. Allow to dry completely before painting.
  - .2 1 coat of pore primer paint, compliant with LEED V4.1.
  - .3 2 layers of dry film of 100 % acrylic latex paint, zero VOC formula.
- .2 Existing painted surface :
  - .1 Step 1 (SSPC-SP13) : Dry blasting with abrasive jet, wet abrasive jet, suction assisted abrasive jet, as described in ASTM D4259-18, in order to eliminate contaminants, laitance and brittle concrete, exposing voids below the surface and producing a healthy concrete surface with adequate profile and porosity. Clean surfaces contaminated with oils, greases, chemicals, etc. using a powerful detergent cleaner recommended by the manufacturer in accordance with ASTM D4258. Fill the bubbling, air pockets and other voids with cementitious patching compound.
  - .2 1 coat of interior based sealer primer (stain block and undercoat).
  - .3 2 coats of mono-component pre-catalyzed latex epoxy paint.

3.7 TOUCH-UP AND CLEANING

.1 Remove from the building, every evening, all impregnated linens and waste; it will be prohibited to let them accumulate.

.2 Once the work is done, remove stains on glass and on surfaces that do not have to be painted, floors, walls, hardware, equipment, accessories and others.

.3 Clean site and leave it in a perfectly clean state.

.4 Remove the cover papers.

3.8 EXISTING CONDITIONS

.1 Examine existing substrates to verify if their condition could compromise the preparation of surfaces to be painted. Before starting the work, report to the Consultant, if any, the damage, defects or unsatisfactory or unfavorable conditions detected.

.2 Control the humidity of the surfaces to be painted and communicate the results to the Consultant. Do not start work before the condition of the substrates is acceptable, according to the manufacturer's recommendations.

.3 Maximum permissible humidity level :
- .1 Plaster and plasterboard : 12 %.
- .2 Masonry / concrete : 12 %.
- .3 Concrete blocks / bricks : 12 %.

3.9 MIXING OF THE PAINT

.1 Mix ingredients in paint container before and during use, to break up lumps, ensure complete dispersion of pigments and obtain a uniform composition.

.2 Paints applied by spray gun must be diluted according to manufacturer's instructions. If there are no instructions on the container, obtain written instructions from the manufacturer and give a copy to the Consultant.

.3 Do not use kerosene or other organic solvents to dilute paints with water.

3.10 APPLICATION ON EXISTING SURFACES ALREADY PAINTED

.1 Unless otherwise specified, paint all walls, columns, doors, door and window frames, and all other elements already painted, as follows :
- .1 Wash and lightly sand, apply 1 coat of solvent-based interior sealer.
- .2 1 to 2 coats of finishing paint according to the systems described above.

3.11 EXISTING HEATING CABINETS

.1 Clean existing heating cabinets.

.2 Paint the heating cabinets and the plates of the fixed parts of them as follows :
- .1 Use a HVLT type gun.
- .2 Use system 3 described in this section.

3.12 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 and recycling in accordance with Section 01 74 21 – Construction/Renovation/Demolition (CRD) Waste Management and Disposal.
  .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

.4 Place paint and primer defined as hazardous or toxic waste, including tubes and containers, in containers or areas designated for hazardous waste.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 05 50 00 – Metal Fabrications.

.2 Section 07 92 00 – Joint Sealants.

.3 Section 08 71 00 – Door Hardware.

.4 Section 09 91 99 – Painting for Minor Works.

.5 Electrical hardware refers to electrical specifications.

1.2 REFERENCE STANDARDS

.1 American National Standards Institute (ANSI)
- .1 ANSI A208.1-09, Particleboard.

.2 American National Standards Institute (ANSI)/Business and International Furniture Manufacturers Association (BIFMA) International
- .1 ANSI/BIFMA X5.1-11, American National Standard for Office Furnishings, General Purpose Office Chairs - Tests.
- .2 ANSI/BIFMA X5.6-10, American National Standard for Office Furnishings - Panel Systems.
- .3 BIFMACMD-1-09, BIFMA Chair Measuring Device.

.3 ASTM International
- .1 ASTM C297/C297M-04(2010), Standard Test Method for Flatwise Tensile Strength of Sandwich Constructions.

.4 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-44.227-2008, Freestanding Office Desk Products and Components.
- .2 CAN/CGSB-44.232-2008, Task Chairs for Office Work Environments.

.5 CSA International
- .1 CSA C22.2 No.9.0-96(R2011), General Requirements for Luminaires.
- .2 CAN/CSA-C22.2 No.203-M91(R2010), Modular Wiring Systems for Office Furniture.
- .3 CAN/CSA-Z809-08, Sustainable Forest Management.

.6 Forest Stewardship Council (FSC)
- .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.

.7 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
- .1 Material Safety Data Sheets (MSDS).

.8 Public Works and Government Services Canada (PSPC) - Industrial and Commercial Products and Standardization Services Sector - Government Purchase Description (GPD)
- .1 PSPC-GPD-6-February 1999, Side Chairs with Metal Frame.

.9 Sustainable Forestry Initiative (SFI)
- .1 SFI-2010-2014 Standard.

.10 The Master Painters Institute (MPI)
- .1 Architectural Painting Specification Manual - current edition.

.11 Underwriters' Laboratories Canada (ULC)
.1 CAN/ULC-S102-2010, Standard Method of Test for Surfaces Burning Characteristics of Building Materials and Assemblies.

.12 Underwriters' Laboratories (UL)
.1 UL 1286-2008(R2011), Standard for Office Furnishings.

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 furniture and include product characteristics, performance criteria, physical size, finish and limitations.
.2 Submit two (2) copies of WHMIS MSDS in accordance with Section 01 35 29.06 – Health and Safety Requirements.
.3 Wood Certification : submit vendor's and manufacturer's Chain-of-Custody Certificate number for CAN/CSA-Z809 or FSC or SFI certified wood.

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 furniture for incorporation into manual.

.3 Supply part numbers of furniture to allow for replacement of worn or damaged furniture parts.

.4 Supply instructions detailing procedures for repairing or replacing worn furniture parts.

1.5 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, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Store and protect furniture from nicks, scratches, and blemishes.
.3 Replace defective or damaged materials with new.

1.6 WARRANTY

.1 Submit written assurance that replacement parts will be available for minimum of five (5) years following discontinuation of product manufacture.

.2 Ensure warranties provide for repair rather than replacement.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Wood : visible wood free from open knots.
- .1 Wood veneers : applied to furniture 0,7 minimum mm thick.

.2 Certified Wood to : CAN/CSA-Z809 or FSC or SFI.

.3 Adhesives used to apply plastic laminates and wood veneers capable of achieving tensile strength of 552 kPa minimum when tested to ASTM C 297.

2.2 CONTROL PANEL LOCAL S141

.1 Components : to CAN/CGSB-44.227.

.2 Type of finish : to CAN/CGSB-44.227, laminates and wood veneer.

.3 Provide cord and cable management capability with reusable covers for each grommet.

.4 Horizontal work surfaces : to CAN/CGSB-44.227.
- .1 Specular gloss : no more than 45 units.
- .2 Width and depth dimensions :
  - .1 Width : Variable, refer to drawings.
  - .2 Variable height : refer to drawings.
- .3 Type of support : complete with levelling for metal work.

.5 Recessed privacy screens : refer to plans for positions and details.

.6 Delivery preparation : to CAN/CGSB-44.227, compliant with current commercial practice.

.7 Sampling plans : to CAN/CGSB-44.227, as per Departmental Representative's instructions.

2.3 FABRICATION

.1 Manufacture furniture to allow for dismantling and replacing of worn or defective components and recycling options following first use.
- .1 Fabricate furniture to allow for remanufacturing or refurbishing of furniture following first use.
- .2 Seal exposed surfaces of particleboard constructed with urea formaldehyde adhesives to contain formaldehyde emissions.

PART 3 EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

PART 1 GENERAL

1.1 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 and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:
- .1 Indicate on drawings:
  - .1 Mounting arrangements.
  - .2 Operating and maintenance clearances.
- .2 Shop drawings and product data accompanied by:
  - .1 Detailed drawings of bases, supports, and anchor bolts.
  - .2 Acoustical sound power data, where applicable.
  - .3 Points of operation on performance curves.
  - .4 Manufacturer to certify current model production.
  - .5 Certification of compliance to applicable codes.

1.2 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.
- .1 Operation and maintenance manual approved by, and final copies deposited with, Departmental Representative before final inspection.
- .2 Operation data to include:
  - .1 Control schematics for systems including environmental controls.
  - .2 Description of systems and their controls.
  - .3 Description of operation of systems at various loads together with reset schedules and seasonal variances.
  - .4 Operation instruction for systems and component.
  - .5 Description of actions to be taken in event of equipment failure.
  - .6 Valves schedule and flow diagram.
  - .7 Colour coding chart.
- .3 Maintenance data to include:
  - .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
  - .2 Data to include schedules of tasks, frequency, tools required and task time.
- .4 Performance data to include:
  - .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
  - .2 Equipment performance verification test results.
  - .3 Special performance data as specified.
  - .4 Testing, adjusting and balancing reports as specified in Section [23 05 93 - Testing, Adjusting and Balancing for HVAC].
- .5 Approvals:
  - .1 Submit 2 copies of draft Operation and Maintenance Manual to Departmental Representative for approval. Submission of individual data will not be accepted unless directed by Departmental Representative.
  - .2 Make changes as required and re-submit as directed by Departmental Representative.

.6 Additional data:
- .1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.

.7 Site records:
- .1 Departmental Representative will provide 1 set of reproducible mechanical drawings. Provide sets of prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems and low voltage control wiring.
- .2 Transfer information to reproducibles, revising reproducibles to show work as actually installed.
- .3 Use different colour waterproof ink for each service.
- .4 Make available for reference purposes and inspection.

.8 As-Built drawings:
- .1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.
- .2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: “AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED” (Signature of Contractor) (Date).
- .3 Submit to Departmental Representative for approval and make corrections as directed.
- .4 Perform testing, adjusting and balancing for HVAC using as-built drawings.
- .5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.

.9 Submit copies of as-built drawings for inclusion in final TAB report.

1.3 MAINTENANCE MATERIAL SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Furnish spare parts as follows:
- .1 One set of packing for each pump.
- .2 One casing joint gasket for each size pump.
- .3 One glass for each gauge glass.

.3 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Section 01 78 00 - Closeout Submittals.

.4 Furnish one commercial quality grease gun, grease and adapters to suit different types of grease and grease fittings.

1.4 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 in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Store and protect from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 SYSTEM CLEANING

.1 Clean interior and exterior of all systems including strainers. Vacuum interior of ductwork and air handling units.

3.3 FIELD QUALITY CONTROL

.1 Site Tests: conduct following tests in accordance with Section 01 45 00 - Quality Control and submit report as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.

.2 Manufacturer's Field Services:
- .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - 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.

3.4 DEMONSTRATION

.1 Departmental Representative will use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.

.2 Trial usage to apply to following equipment and systems.

.3 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.

.4 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.

.5 Instruction duration time requirements as specified in appropriate sections.

.6 Departmental Representative will record these demonstrations on video tape for future reference.

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.

3.6 PROTECTION

.1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCE STANDARDS

.1 National Fire Prevention Association (NFPA)
- .1 NFPA 13, Standard for the Installation of Sprinkler Systems.
- .2 NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems.

.2 Underwriter's Laboratories of Canada (ULC)
- .1 CAN4 S543, Standard for Internal Lug Quick Connect Couplings for Fire Hose.

1.2 QUALITY ASSURANCE

.1 Qualifications:
- .1 Installer: company or person specializing in wet sprinkler systems.

.2 Supply grooved joint couplings, fittings, valves, grooving tools and specialties from a single manufacturer. Use date stamped castings for coupling housings, fittings, valve bodies, for quality assurance and traceability.

1.3 MAINTENANCE MATERIAL SUBMITTALS

.1 Extra Materials:
- .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide spare sprinklers and tools in accordance with NFPA 13.

PART 2 PRODUCTS

2.1 DESIGN REQUIREMENTS

.1 Design automatic wet pipe fire suppression sprinkler systems in accordance with required and advisory provisions of NFPA 13, by hydraulic calculations for uniform distribution of water over design area.

.2 Include with each system materials, accessories, and equipment inside and outside building to provide each system complete and ready for use.

.3 Design and provide each system to give full consideration to blind spaces, piping, electrical equipment, ducts, and other construction and equipment in accordance with detailed shop drawings.

.4 Locate sprinkler heads in consistent pattern with ceiling grid, lights, and air supply diffusers.

.5 Devices and equipment for fire protection service: ULC approved for use in wet pipe sprinkler systems.

.6 Design systems for earthquake protection for buildings in seismic zones.

2.2 ABOVE GROUND PIPING SYSTEMS

.1 Provide fittings for changes in direction of piping and for connections.
  .1 Make changes in piping sizes through tapered reducing pipe fittings, bushings will not be permitted.

.2 Perform welding in shop; field welding will not be permitted.

.3 Conceal piping in areas with suspended ceiling.

2.3 PIPE, FITTINGS AND VALVES

.1 Pipe:
  .1 Ferrous: to NFPA 13.

.2 Fittings and joints to NFPA 13:
  .1 Ferrous: screwed, welded, flanged or roll grooved.
    .1 Grooved joints designed with two ductile iron housing segments, pressure responsive gasket, and zinc-electroplated steel bolts and nuts. Cast with offsetting angle-pattern bolt pads for rigidity and visual pad-to-pad offset contact.
  .2 Provide threaded or grooved-end type fittings into which sprinkler heads, sprinkler head riser nipples, or drop nipples are threaded.
  .3 Plain-end fittings with mechanical couplings and fittings which use steel gripping devices to bite into pipe when pressure is applied will not be permitted.
  .4 Rubber gasketted grooved-end pipe and fittings with mechanical couplings are permitted in pipe sizes 40 mm and larger.
  .5 Fittings: ULC approved for use in wet pipe sprinkler systems.
  .6 Ensure fittings, mechanical couplings, and rubber gaskets are supplied by same manufacturer.
  .7 Side outlet tees using rubber gasketted fittings are not permitted.
  .8 Sprinkler pipe and fittings: metal.

.3 Pipe hangers:
  .1 ULC listed for fire protection services in accordance with NFPA.

2.4 SPRINKLER HEADS

.1 General: to NFPA 13 and ULC listed for fire services.

.2 Sprinkler Head Type:
  .1 Pendant institutional.

2.5 PIPE SLEEVES

.1 Provide pipe sleeves where piping passes through roofs, floors or walls,

.2 Secure sleeves in position and location during construction.

.3 Provide sleeves of sufficient length to pass through entire thickness of floors and walls,

.4 Provide 2.5 cm minimum clearance between exterior of piping and interior of sleeve or core-drilled hole.
  .1 Firmly pack space with mineral wool insulation.
  .2 Seal space at both ends of sleeve or core-drilled hole with plastic waterproof cement which will dry to firm but pliable mass.

.3 In fire walls and fire floors, seal both ends of pipe sleeves or core-drilled holes with ULC listed fill, void, or cavity material.

.5 Sleeves in Masonry and Concrete Walls, Floors, and Roofs:
.1 Provide ductile-iron.
.2 Core drilling of masonry and concrete may be provided in lieu of pipe sleeves when cavities in core-drilled hole are completely grouted smooth.

2.6 ESCUTCHEON PLATES

.1 Provide split hinge type metal plates for piping passing through floors, walls and ceilings in exposed spaces.

.2 Provide polished stainless steel plates in finished spaces.

.3 Provide paint finish on metal plates in unfinished spaces.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Install, inspect and test to acceptance in accordance with NFPA 13 and NFPA 25.

3.3 PIPE INSTALLATION

.1 Install piping straight and true to bear evenly on hangers and supports. Do not hang piping from plaster ceilings.

.2 Keep interior and ends of new piping and existing piping thoroughly cleaned of water and foreign matter.

.3 Keep piping systems clean during installation by means of plugs or other approved methods. When work is not in progress, securely close open ends of piping to prevent entry of water and foreign matter.

.4 Inspect piping before placing into position.

END OF SECTION

PART 1 GENERAL

1.1 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 and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:
- .1 Indicate on drawings:
  - .1 Mounting arrangements.
  - .2 Operating and maintenance clearances.
- .2 Shop drawings and product data accompanied by:
  - .1 Detailed drawings of bases, supports, and anchor bolts.
  - .2 Acoustical sound power data, where applicable.
  - .3 Points of operation on performance curves.
  - .4 Manufacturer to certify current model production.
  - .5 Certification of compliance to applicable codes.

1.2 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.
- .1 Operation and maintenance manual approved by, and final copies deposited with, Departmental Representative before final inspection.
- .2 Operation data to include:
  - .1 Control schematics for systems including environmental controls.
  - .2 Description of systems and their controls.
  - .3 Description of operation of systems at various loads together with reset schedules and seasonal variances.
  - .4 Operation instruction for systems and component.
  - .5 Description of actions to be taken in event of equipment failure.
  - .6 Valves schedule and flow diagram.
  - .7 Colour coding chart.
- .3 Maintenance data to include:
  - .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
  - .2 Data to include schedules of tasks, frequency, tools required and task time.
- .4 Performance data to include:
  - .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
  - .2 Equipment performance verification test results.
  - .3 Special performance data as specified.
  - .4 Testing, adjusting and balancing reports as specified in Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
- .5 Approvals:
  - .1 Submit 2 copies of draft Operation and Maintenance Manual to Departmental Representative for approval. Submission of individual data will not be accepted unless directed by Departmental Representative.

.2 Make changes as required and re-submit as directed by Departmental Representative.

.6 Additional data:

.1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.

.7 Site records:

.1 Departmental Representative will provide 1 set of reproducible mechanical drawings. Provide sets of prints as required for each phase of work. Mark changes as work progresses and as changes occur.

.2 Transfer information to reproducibles, revising reproducibles to show work as actually installed.

.3 Use different colour waterproof ink for each service.

.4 Make available for reference purposes and inspection.

.8 As-built drawings:

.1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.

.2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).

.3 Submit to Departmental Representative for approval and make corrections as directed.

.4 Perform testing, adjusting and balancing for HVAC using as-built drawings.

.5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.

.9 Submit copies of as-built drawings for inclusion in final TAB report.

1.3 MAINTENANCE MATERIAL SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Provide one set of special tools required to service equipment as recommended by manufacturers.

1.4 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 in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Install networks with seismic protection.

3.2 EXAMINATION

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

3.3 SYSTEM CLEANING

.1 Clean interior and exterior of all systems including strainers. Vacuum interior of ductwork and air handling units.

3.4 FIELD QUALITY CONTROL

.1 Site Tests: conduct following tests in accordance with Section 01 45 00 - Quality Control and submit report as described in PART 1 -ACTION AND INFORMATIONAL SUBMITTALS.

.2 Manufacturer's Field Services:
- .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - 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.

3.5 DEMONSTRATION

.1 Departmental Representative will use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.

.2 Trial usage to apply to following equipment and systems.

.3 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.

.4 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.

.5 Instruction duration time requirements as specified in appropriate sections.

.6 Departmental Representative will record these demonstrations on video tape for future reference.

3.6 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.

3.7 PROTECTION

.1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

END OF SECTION

PART 1 GENERAL

1.1 DEFINITIONS

.1 Demolish: Detach items from existing construction and legally dispose of items off site, unless indicated as removed and salvaged, or removed and reinstalled.

.2 Remove: Planned deconstruction and disassembly of electrical items from existing construction including removal of conduit, junction boxes, cabling and wiring from electrical component to panel taking care not to damage adjacent assemblies designated to remain; legally dispose of items off site, unless indicated as removed and salvaged, or removed and reinstalled.

.3 Remove and Salvage: Detach items from existing construction and deliver them to Departmental Representative ready for reuse.

.4 Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

.5 Existing to Remain: Existing items of construction that are not removed and that are not otherwise indicated as being removed and salvaged, or removed and reinstalled.

.6 Hazardous Substances: Dangerous substances, dangerous goods, hazardous commodities and hazardous products may include asbestos, mercury and lead, PCB's, poisons, corrosive agents, flammable substances, radioactive substances, or other material that can endanger human health or wellbeing or environment if handled improperly as defined by the Federal Hazardous Products Act (RSC 1985) including latest amendments.

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Coordination: Coordinate work of this Section to avoid interference with work by other Sections.

1.3 SITE CONDITIONS

.1 Existing Conditions: Condition of materials identified as being salvaged or demolished are based on their observed condition on date that tender is accepted.

.2 Discovery of Hazardous Substances: It is not expected that Hazardous Substances will be encountered in the Work; immediately notify Departmental Representative if materials suspected of containing hazardous substances are encountered and perform the following activities:

- .1 Refer to Section 01 41 00- Regulatory Requirements for directives associated with specific material types.
- .2 Hazardous substances will be as defined in the Hazardous Products Act.
- .3 Stop work in the area of the suspected hazardous substances.
- .4 Take preventative measures to limit users' and workers' exposure, provide barriers and other safety devices and do not disturb.
- .5 Proceed only after written instructions have been received from Departmental Representative.

1.4 SALVAGE AND DEBRIS MATERIALS

.1 Demolished items become Contractor 's property and will be removed from Project site; except for items indicated as being reused, salvaged, or otherwise indicated to remain Departmental Representative 's property.

.2 Carefully remove materials and items designated for salvage and store in a manner to prevent damage or devaluation of materials in accordance with Section 02 42 00- Removal and Salvage of Construction Materials.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Verification of Existing Conditions: Visit site, thoroughly examine and become familiar with conditions that may affect the work of this Section before tendering the Bid; Departmental Representative will not consider claims for extras for work or materials necessary for proper execution and completion of the contract that could have been determined by a site visit.

3.2 PREPARATION

.1 Protection of Existing Systems to Remain: Protect systems and components indicated to remain in place during selective demolition operations and as follows:
- .1 Prevent movement and install bracing to prevent settlement or damage of adjacent services and parts of existing buildings scheduled to remain.
- .2 Notify Departmental Representative and cease operations where safety of buildings being demolished, adjacent structures or services appears to be endangered and await additional instructions before resuming demolition work specified in this Section.
- .3 Prevent debris from blocking drainage inlets.
- .4 Protect mechanical systems that must remain in operation.

.2 Protection of Building Occupants: Sequence demolition work so that interference with the use of the building by the Departmental Representative and users is minimized and as follows:
- .1 Prevent debris from endangering the safe access to and egress from occupied buildings.
- .2 Notify Departmental Representative and cease operations where safety of occupants appears to be endangered and await additional instructions before resuming demolition work specified in this Section.
  - .1 Remove any tools or equipment after completion of work, and leave site clean and ready for subsequent renovation work.
  - .2 Repair and restore damages caused as a result of work of this Section to match existing materials and finishes.

3.3 CLOSEOUT ACTIVITIES

.1 Demolition Waste Disposal: Arrange for legal disposal and remove demolished materials to accredited provincial landfill site or alternative disposal site (recycle centre) except where explicitly noted otherwise for materials being salvaged for re use in new construction in accordance with Section 02 42 00 - Removal and Salvage of Construction Materials.

.2 Hazardous Substances Disposal: Arrange for disposal of hazardous substances.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCE STANDARDS

.1 ASTM International (ASTM)
- .1 ASTM A126, Standard Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
- .2 ASTM B62, Standard Specification for Composition Bronze or Ounce Metal Castings.

.2 CSA Group (CSA)
- .1 CSA-B64 Series, Backflow Preventers and Vacuum Breakers.
- .2 CSA B79, Commercial and Residential Drains and Cleanouts.

.3 National Research Council Canada (NRC)
- .1 National Plumbing Code of Canada (NPC).

PART 2 PRODUCTS

2.1 FLOOR DRAINS

.1 Floor Drains and Trench Drains: to CSA B79.

.2 Type C-1: 102 mm wide high density polyethylene drainage channels and 159 mm Class A stainless steel grid, anchoring flange.

2.2 PRIMER

.1 Diaphragm valve with 13 mm fittings, automatic activation on pressure drop. Operating range from 138 to 552 kPa. Can serve a maximum of four (4) floor drains.

2.3 CLEANOUTS

.1 Cleanout Plugs: heavy cast iron male ferrule with brass screws and threaded brass or bronze plug. Sealing-caulked lead seat or neoprene gasket.

.2 Access Covers:
- .1 Wall Access: face or wall type, stainless steel cover with flush head securing screws, bevelled edge frame complete with anchoring lugs.
- .2 Floor Access: cast iron body and frame with adjustable secured nickel bronze top and:
  - .1 Plugs: bolted bronze with neoprene gasket.
  - .2 Cover for Unfinished Concrete Floors: cast iron gasket, vandal-proof screws.
  - .3 Cover for Tile and Linoleum Floors: polished nickel bronze with recessed cover for linoleum or tile infill, complete with vandal-proof locking screws.
  - .4 Cover for Carpeted Floors: polished nickel bronze with deep flange cover for carpet infill, complete with carpet retainer vandal-proof locking screws.

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 sheet.

3.2 INSTALLATION

.1 Install in accordance with National Plumbing Code of Canada (NPC).

.2 Install in accordance with manufacturer's instructions and as specified.

3.3 CLEANOUTS

.1 Install cleanouts at base of soil and waste stacks, and rainwater leaders, at locations required code, and as indicated.

.2 Bring cleanouts to wall or finished floor unless serviceable from below floor.

.3 Building drain cleanout and stack base cleanouts: line size to maximum NPS 4.

3.4 START-UP

.1 General:
- .1 In accordance with Section 01 91 13 - General Commissioning Requirements: General Requirements, supplemented as specified herein.

.2 Timing: start-up only after:
- .1 Pressure tests have been completed.
- .2 Disinfection procedures have been completed.
- .3 Certificate of static completion has been issued.
- .4 Water treatment systems operational.

.3 Provide continuous supervision during start-up.

3.5 TESTING AND ADJUSTING

.1 General:
- .1 Test and adjust plumbing specialties and accessories in accordance with Section 01 91 13 - General Commissioning Requirements: General Requirements, supplemented as specified.

.2 Timing:
- .1 After start-up deficiencies rectified.
- .2 After certificate of completion has been issued by authority having jurisdiction.

.3 Application tolerances:
- .1 Pressure at fixtures: +/- 70 kPa.
- .2 Flow rate at fixtures: +/- 20 %.

.4 Adjustments:
- .1 Verify that flow rate and pressure meet design criteria.
- .2 Make adjustments while flow rate or withdrawal is (1) maximum and (2) 25 % of maximum and while pressure is (1) maximum and (2) minimum.

.5 Floor drains:
- .1 Verify operation of trap seal primer.
- .2 Prime, using trap primer. Adjust flow rate to suit site conditions.
- .3 Check operations of flushing features.
- .4 Check security, accessibility, removability of strainer.
- .5 Clean out baskets.

.6 Access doors:
- .1 Verify size and location relative to items to be accessed.

.7 Cleanouts:
- .1 Verify covers are gas-tight, secure, yet readily removable.

3.6 CLOSEOUT ACTIVITIES

.1 Commissioning Reports: in accordance with Section 01 91 13 - General Commissioning Requirements: reports, supplemented as specified.

.2 Training: provide training in accordance with Section 01 91 13 - General Commissioning Requirements: Training of O&M Personnel, supplemented as specified.

3.7 PROTECTION

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

.2 Repair damage to adjacent materials caused by plumbing specialties and accessories installation.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCE STANDARDS

.1 National Fire Protection Association (NFPA)
- .1 NFPA 13, Standard for the Installation of Sprinkler Systems.
- .2 NFPA 14, Standard for the Installation of Standpipe and Hose Systems.

.2 National Research Council Canada (NRC)
- .1 National Plumbing Code of Canada (NPC).

PART 2 PRODUCTS

2.1 MANUFACTURER'S EQUIPMENT NAMEPLATES

.1 Metal or plastic laminate nameplate mechanically fastened to each piece of equipment by manufacturer.

.2 Lettering and numbers raised or recessed.

.3 Information to include, as appropriate:
- .1 Equipment: manufacturer's name, model, size, serial number, capacity.
- .2 Motor: voltage, Hz, phase, power factor, duty, frame size.

2.2 EXISTING IDENTIFICATION SYSTEMS

.1 Apply existing identification system to new work.

.2 Where existing identification system does not cover for new work, use identification system specified this section.

.3 Before starting work, obtain written approval of identification system from Departmental Representative.

2.3 PIPES GOVERNED BY CODES

.1 Identification
- .1 Automatic fire extinguishers: according to NFPA 13 standard.

2.4 IDENTIFICATION OF PIPING SYSTEMS

.1 Identify contents by background colour marking, pictogram (as necessary), legend; direction of flow by arrows. To CAN/CGSB 24.3 except where specified otherwise.

.2 Pictograms:
- .1 Where required: Workplace Hazardous Materials Information System (WHMIS) regulations.

.3 Legend:
- .1 Block capitals to sizes and colours listed in CAN/CGSB 24.3.

.4 Arrows showing direction of flow:
- .1 Outside diameter of pipe or insulation less than 75 mm: 100 mm long x 50 mm high.
- .2 Outside diameter of pipe or insulation 75 mm and greater: 150 mm long x 50 mm high.
- .3 Use double-headed arrows where flow is reversible.

.5 Extent of background colour marking:
.1 To full circumference of pipe or insulation.
.2 Length to accommodate pictogram, full length of legend and arrows.

.6 Materials for background colour marking, legend, arrows:
.1 Pipes and tubing 20 mm and smaller: waterproof and heat-resistant pressure sensitive plastic marker tags.
.2 Other pipes: pressure sensitive vinyl with protective overcoating, waterproof contact adhesive undercoating, suitable for ambient of 100% RH and continuous operating temperature of 150 degrees C and intermittent temperature of 200 degrees C.

.7 Colours and Legends:
.1 Where not listed, obtain direction from Departmental Representative.
.2 Colours for legends, arrows: to following table:

Background colour:	Legend, arrows:
Yellow	BLACK
Green	WHITE
Red	WHITE

.3 Background colour marking and legends for piping systems:

Contents	Background colour marking	Legend
Domestic hot water supply	Green	DOM. HW SUPPLY
Dom. HWS recirculation	Green	DOM. HW CIRC
Domestic cold water supply	Green	DOM. CWS
Fire protection water	Red	FIRE PROT. WTR
Sprinklers	Red	SPRINKLERS

2.5 VALVES, CONTROLLERS

.1 Brass tags with 12 mm stamped identification data filled with black paint.

.2 Include flow diagrams for each system, of approved size, showing charts and schedules with identification of each tagged item, valve type, service, function, normal position, location of tagged item.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Identify systems, equipment to conform to PWGSC PMSS.

3.3 NAMEPLATES

.1 Locations:
.1 In conspicuous location to facilitate easy reading and identification from operating floor.

.2 Standoffs:
.1 Provide for nameplates on hot and/or insulated surfaces.

.3 Protection:
.1 Do not paint, insulate or cover.

3.4 LOCATION OF IDENTIFICATION ON PIPING

.1 On long straight runs in open areas in boiler rooms, equipment rooms, galleries, tunnels: at not more than 17 m intervals and more frequently if required to ensure that at least one is visible from any one viewpoint in operating areas and walking aisles.

.2 Adjacent to each change in direction.

.3 At least once in each small room through which piping or ductwork passes.

.4 On both sides of visual obstruction or where run is difficult to follow.

.5 On both sides of separations such as walls, floors, partitions.

.6 Where system is installed in pipe chases, ceiling spaces, galleries, confined spaces, at entry and exit points, and at access openings.

.7 At beginning and end points of each run and at each piece of equipment in run.

.8 At point immediately upstream of major manually operated or automatically controlled valves, and dampers. Where this is not possible, place identification as close as possible, preferably on upstream side.

.9 Identification easily and accurately readable from usual operating areas and from access points.
.1 Position of identification approximately at right angles to most convenient line of sight, considering operating positions, lighting conditions, risk of physical damage or injury and reduced visibility over time due to dust and dirt.

3.5 VALVES, CONTROLLERS

.1 Valves and operating controllers, except at plumbing fixtures, radiation, or where in plain sight of equipment they serve: Secure tags with non-ferrous chains or closed hooks.

.2 Install one copy of flow diagrams, valve schedules mounted in frame behind non-glare glass where directed by Departmental Representative. Provide one copy (reduced in size if required) in each operating and maintenance manual.

.3 Number valves in each system consecutively.

3.6 CLEANING

.1 Proceed in accordance with Section 01 74 00 - Cleaning.

.2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCE STANDARDS

.1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
- .1 ASHRAE Standard 90.1, Energy Standard for Buildings Except Low-Rise Residential Buildings (IESNA co-sponsored; ANSI approved; Continuous Maintenance Standard).

.2 ASTM International (ASTM)
- .1 ASTM B209M, Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate.
- .2 ASTM C335, Standard Test Method for Steady State Heat Transfer Properties of Horizontal Pipe Insulation.
- .3 ASTM C411, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
- .4 ASTM C449/C449M, Standard Specification for Mineral Fiber-Hydraulic-Setting Thermal Insulating and Finishing Cement.
- .5 ASTM C533, Calcium Silicate Block and Pipe Thermal Insulation.
- .6 ASTM C547, Mineral Fiber Pipe Insulation.
- .7 ASTM C795, Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.
- .8 ASTM C921, Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.

.3 Canadian General Standards Board (CGSB)
- .1 CGSB 51-GP-52Ma, Vapour Barrier, Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation.
- .2 CAN/CGSB-51.53, Poly (Vinyl Chloride) Jacketting Sheet, for Insulated Pipes, Vessels and Round Ducts

.4 Department of Justice Canada (Jus)
- .1 Canadian Environmental Assessment Act (CEAA), 1995, c. 37.
- .2 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
- .3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

.5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
- .1 Safety Data Sheets (SDS).

.6 Manufacturer's Trade Associations
- .1 Thermal Insulation Association of Canada (TIAC): National Insulation Standards (Revised 2004).

.7 Underwriters' Laboratories of Canada (ULC)
- .1 CAN/ULC-S102, Surface Burning Characteristics of Building Materials and Assemblies.
- .2 CAN/ULC-S701, Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .3 CAN/ULC-S702, Thermal Insulation, Mineral Fibre, for Buildings
- .4 CAN/ULC-S702.2, Thermal Insulation, Mineral Fibre, for Buildings, Part 2: Application Guidelines.

1.2 DEFINITIONS

.1 For purposes of this section:
- .1 “CONCEALED”; - insulated mechanical services in suspended ceilings and non-accessible chases and furred-in spaces.
- .2 “EXPOSED”; - will mean “not concealed” as specified.

.2 TIAC ss:
.1 CPF: Code Piping Finish.

PART 2 PRODUCTS

2.1 FIRE AND SMOKE RATING

.1 In accordance with CAN/ULC-S102.
.1 Maximum flame spread rating: 25.
.2 Maximum smoke developed rating: 50.

2.2 INSULATION

.1 Mineral fibre specified includes glass fibre, rock wool, slag wool.

.2 Thermal conductivity (“k” factor) not to exceed specified values at 24 degrees C mean temperature when tested in accordance with ASTM C335.

.3 TIAC Code A-3: rigid moulded mineral fibre with factory applied vapour retarder jacket.
.1 Mineral fibre: to CAN/ULC-S702 & ASTM C547.
.2 Jacket: to CGSB 51-GP-52Ma.
.3 Maximum “k” factor: to ASTM C547 & CAN/ULC-S702.

.4 TIAC Code C-2: mineral fibre blanket faced with factory applied vapour retarder jacket (as scheduled in PART 3 of this section).
.1 Mineral fibre: to CAN/ULC-S702 & ASTM C547.
.2 Jacket: to CGSB 51-GP-52Ma.
.3 Maximum “k” factor: to CAN/ULC-S702 & ASTM C547.

2.3 INSULATION SECUREMENT

.1 Tape: self-adhesive, aluminum, reinforced, 50 mm wide minimum.

.2 Contact adhesive: quick setting.

.3 Canvas adhesive: washable.

.4 Tie wire: 1.5 mm diameter stainless steel.

.5 Bands: stainless steel, 19 mm wide, 0.5 mm thick.

2.4 CEMENT

.1 Thermal insulating and finishing cement:
.1 Air drying on mineral wool, to ASTM C449/C449M.

2.5 VAPOUR RETARDER LAP ADHESIVE

.1 Water based, fire retardant type, compatible with insulation.

2.6 INDOOR VAPOUR RETARDER FINISH

.1 Vinyl emulsion type acrylic, compatible with insulation.

2.7 JACKETS

.1 Polyvinyl Chloride (PVC):
- .1 One-piece moulded type [and sheet] to CAN/CGSB-51.53 with pre-formed shapes as required.
- .2 Colours: by Departmental Representative.
- .3 Minimum service temperatures: -20 degrees C.
- .4 Maximum service temperature: 65 degrees C.
- .5 Moisture vapour transmission: 0.02 perm.
- .6 Fastenings:
  - .1 Use solvent weld adhesive compatible with insulation to seal laps and joints.
  - .2 Tacks.
  - .3 Pressure sensitive vinyl tape of matching colour.

.2 Canvas:
- .1 120 gm/m^2cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C921.
- .2 Lagging adhesive: compatible with 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 datasheet.

3.2 PRE-INSTALLATION REQUIREMENT

.1 Pressure testing of piping systems and adjacent equipment to be complete, witnessed and certified.

.2 Surfaces clean, dry, free from foreign material.

3.3 INSTALLATION

.1 Install in accordance with TIAC National Standards.

.2 Apply materials in accordance with manufacturers instructions and this specification.

.3 Use two layers with staggered joints when required nominal wall thickness exceeds 75 mm.

.4 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.
- .1 Install hangers, supports outside vapour retarder jacket.

.5 Supports, Hangers:
- .1 Apply high compressive strength insulation, suitable for service, at oversized saddles and shoes where insulation saddles have not been provided.

3.4 REMOVABLE, PRE-FABRICATED, INSULATION AND ENCLOSURES

.1 Application: at valves, flanges and unions at equipment.

.2 Design: to permit movement of expansion joint and to permit periodic removal and replacement without damage to adjacent insulation.

.3 Insulation:
.1 Insulation, fastenings and finishes: same as system.
.2 Jacket: PVC.

3.5 INSTALLATION OF ELASTOMERIC INSULATION

.1 Insulation to remain dry. Overlaps to manufacturers instructions. Ensure tight joints.

.2 Provide vapour retarder as recommended by manufacturer.

3.6 PIPING INSULATION SCHEDULES

.1 Includes valves, valve bonnets, strainers, flanges and fittings unless otherwise specified.

.2 TIAC Code: A-3.
.1 Securements: SS bands at 300 mm on centre.
.2 Seals: VR lap seal adhesive, VR lagging adhesive.
.3 Installation: TIAC Code: 1501-C.

.3 TIAC Code: C-2 with vapour retarder jacket.
.1 Seals: lap seal adhesive, lagging adhesive.
.2 Installation: TIAC Code: 1501-C.

.4 Thickness of insulation as listed in following table.
.1 Run-outs to individual units and equipment not exceeding 4000 mm long.
.2 Do not insulate exposed runouts to plumbing fixtures, chrome plated piping, valves, fittings.

Piping		Pipe sizes (NPS) and insulation thickness (mm)				
Supply	TIAC Code	to 1	1 1/4 to 2	2 1/2 to 4	5 and more	
Domestic HWS and recirc.	A-3	25	25	25	38	
Domestic CWS with vapour retarder	C-2	25	25	25	25	

.5 Finishes
.1 Exposed indoors: canvas or PVC.
.2 Exposed in mechanical rooms: canvas or PVC.
.3 Use vapour retarder jacket on TIAC code A-3 insulation compatible with insulation.
.4 Finish attachments: SS bands, at 150 mm on centre. Seals.
.5 Installation: to appropriate TIAC code CRF/1 through CPF/5.

3.7 FIELD QUALITY CONTROL

.1 Verification requirements in accordance with Section, including:
.1 Materials and resources.
.2 Storage and collection of recyclables.
.3 Construction waste management.
.4 Resource reuse.
.5 Recycled content.

.6 Local/regional materials.
.7 Certified wood.
.8 Low-emitting materials.

3.8 CLEANING

.1 Proceed in accordance with Section 01 74 00 - Cleaning.

.2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCE STANDARDS

.1 American Society of Mechanical Engineers International (ASME)
- .1 ANSI/ASME B16.15, Cast Cooper Alloy Threaded Fittings, Classes 125 and 250.
- .2 ANSI/ASME B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.
- .3 ANSI/ASME B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
- .4 ANSI/ASME B16.24, Cast Copper Alloy Pipe Flanges and Flanged Fittings: Class 150, 300, 400, 600, 900, 1500 and 2500.
- .5 ASME B16.26, Cast Copper Alloy Fittings for Flared Copper Tubes.
- .6 ASME B31.9, Building Services Piping.
- .7 ASME B36.19M, Stainless Steel Pipe.

.2 ASTM International (ASTM)
- .1 ASTM A182/A 182M, Standard Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service.
- .2 ASTM A269, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- .3 ASTM A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .4 ASTM A312/A312M, Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.
- .5 ASTM A351/A351M, Castings, Austenitic, for Pressure Containing Parts.
- .6 ASTM A403/A403M, Wrought Austenitic Stainless Steel Piping Fittings.
- .7 ASTM A536, Standard Specification for Ductile Iron Castings.
- .8 ASTM B32, Standard Specification for Solder Metal.
- .9 ASTM B42, Seamless Copper Tube, Standard Sizes.
- .10 ASTM B88M, Standard Specification for Seamless Copper Water Tube (Metric).

.3 American National Standards Institute/American Water Works Association (ANSI)/(AWWA)
- .1 ANSI/AWWA C111/A21.11, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- .2 ANSI/AWWA C151/A21.51, Ductile Iron Pipe, Centrifugally Cast, for Water.

.4 CSA Group (CSA)
- .1 CSA B242, Groove and Shoulder Type Mechanical Pipe Couplings.

.5 Underwriters Laboratories of Canada (ULC)
- .1 CAN/ULC S101, Fire Endurance Tests of Buildings Construction and Materials.
- .2 CAN/ULC S102.2, Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings and Miscellaneous Materials and Assemblies.
- .3 CAN/ULC S115, Standard Method of Fire Tests of Firestop.

.6 National Research Council (NRC)
- .1 National Plumbing Code of Canada (NPC).

PART 2 PRODUCTS

2.1 PIPING

.1 Domestic hot, cold and recirculation systems, within building.
- .1 Above ground:
  - .1 Copper tube, hard drawn, type L: to ASTM B88M.

2.2 FITTINGS

.1 Bronze pipe flanges and flanged fittings, Class 150: to ANSI/ASME B16.24.

.2 Cast bronze threaded fittings, Class 250: to ANSI/ASME B16.15.

.3 Cast copper, solder type: to ANSI/ASME B16.18.

.4 Wrought copper and copper alloy, solder type: to ANSI/ASME B16.22.

.5 NPS 2 and larger:
- .1 ANSI/ASME B16.18 or ANSI/ASME B16.22 roll grooved to CSA B242.

.6 NPS 1 ½ and smaller:
- .1 Cast copper to ANSI/ASME B16.18 or wrought copper to ANSI/ASME B16.22; with stainless steel internal components and EPDM seals. Suitable for operating pressure to 1380 kPa.

2.3 JOINTS

.1 Rubber gaskets, 1.6 mm latex-free thick: to AWWA C111.

.2 Bolts, nuts, hex head and washers: to ASTM A307, heavy series.

.3 Solder: tin copper alloy.

.4 Teflon tape: for threaded joints.

.5 Grooved couplings: designed with angle bolt pads to provide rigid joint, complete with EPDM gasket.

.6 Dielectric connections between dissimilar metals: dielectric fitting, complete with thermoplastic liner.

2.4 BALL VALVES

.1 NPS 2 and under, screwed:
- .1 Class 150.
- .2 Bronze body, stainless steel ball, PTFE adjustable packing, brass gland and Bunan seat, steel lever handle as specified.

.2 NPS 2 and under, soldered:
- .1 To ANSI/ASME B16.18, Class 150.
- .2 Bronze body, stainless steel ball, PTFE adjustable packing, brass gland and Bunan seat, steel lever handle, with NPT to copper adaptors as specified.

PART 3 EXECUTION

3.1 APPLICATION

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

3.2 INSTALLATION

.1 Install in accordance with NPC.

.2 Assemble piping using fittings manufactured to ANSI and Standard Council of Canada (SCC) standards.

.3 Install CWS piping below and away from HWS and HWC and other hot piping so as to maintain temperature of cold water as low as possible.

.4 Connect to fixtures and equipment in accordance with manufacturer's written instructions unless otherwise indicated.

.5 Valves
- .1 Isolate equipment, fixtures and branches with ball valves.
- .2 Balance recirculation system using lockshield globe valves. Mark settings and record on as-built drawings on completion.

3.3 PRESSURE TESTS

.1 Test pressure: greater of 1 times maximum system operating pressure or 860 kPa.

3.4 FLUSHING AND CLEANING

.1 Flush entire system for 8 h. Ensure outlets flushed for 2 hours. Let stand for 24 hours, then draw one sample off longest run. Submit to testing laboratory to verify that system is clean copper to autority potable water guidelines. Let system flush for additional 2 hours, then draw off another sample for testing.

3.5 PRE-START-UP INSPECTIONS

.1 Systems to be complete, prior to flushing, testing and start-up.

.2 Verify that system can be completely drained.

.3 Ensure that pressure booster systems are operating properly.

.4 Ensure that air chambers, expansion compensators are installed properly.

3.6 DISINFECTION

.1 Flush out, disinfect and rinse system to requirements of authority having jurisdiction approval of Departmental Representative.

.2 Upon completion, provide laboratory test reports on water quality for Departmental Representative approval.

3.7 START-UP

.1 Timing: start up after:
- .1 Pressure tests have been completed.
- .2 Disinfection procedures have been completed.
- .3 Certificate of static completion has been issued.

.2 Provide continuous supervision during start-up.

.3 Start-up procedures:
- .1 Establish circulation and ensure that air is eliminated.
- .2 Check pressurization to ensure proper operation and to prevent water hammer, flashing and/or cavitation.
- .3 Monitor piping HWS and HWC piping systems for freedom of movement, pipe expansion as designed.
- .4 Check control, limit, safety devices for normal and safe operation.

.4 Rectify start-up deficiencies.

3.8 PERFORMANCE VERIFICATION

.1 Scheduling:
- .1 Verify system performance after pressure and leakage tests and disinfection are completed, and Certificate of Completion has been issued by authority having jurisdiction.

.2 Procedures:
- .1 Verify that flow rate and pressure meet Design Criteria.
- .2 Adjust pressure regulating valves while withdrawal is maximum and inlet pressure is minimum.
- .3 Sterilize HWS and HWC systems for Legionella control.
- .4 Verify performance of temperature controls.
- .5 Verify compliance with safety and health requirements.
- .6 Check for proper operation of water hammer arrestors. Run one outlet for 10 seconds, then shut of water immediately. If water hammer occurs, replace water hammer arrestor or re-charge air chambers. Repeat for outlets and flush valves.
- .7 Confirm water quality consistent with supply standards, and ensure no residuals remain as result of flushing or cleaning.

.3 Reports:
- .1 Reports, using report forms.
- .2 Include certificate of water flow and pressure tests conducted on incoming water service, demonstrating adequacy of flow and pressure.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCE STANDARDS

.1 ASTM International (ASTM)
- .1 ASTM B32, Standard Specification for Solder Metal.
- .2 ASTM B306, Standard Specification for Copper Drainage Tube (DWV).
- .3 ASTM C564, Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.

.2 CSA Group (CSA)
- .1 CAN/CSA-B70, Cast Iron Soil Pipe, Fittings and Means of Joining.
- .2 CAN/CSA-B125.3, Plumbing Fittings.

.3 National Research Council Canada (NRC)
- .1 National Plumbing Code of Canada (NPC).

PART 2 PRODUCTS

2.1 SUSTAINABLE MATERIAL

.1 Adhesives and Sealants:
- .1 Maximum VOC limit 70 g/L to SCAQMD Rule 1168.

2.2 COPPER TUBE AND FITTINGS

.1 Above ground sanitary and vent Type DWV to: ASTM B306.
- .1 Fittings.
  - .1 Cast brass: to CAN/CSA-B125.3.
  - .2 Wrought copper: to CAN/CSA-B125.3.
- .2 Solder: lead free.

2.3 CAST IRON PIPING AND FITTINGS

.1 Buried sanitary and vent minimum NPS 3, to: CAN/CSA-B70, with one layer of protective coating.
- .1 Joints:
  - .1 Mechanical joints:
    - .1 Neoprene or butyl rubber compression gaskets: to CAN/CSA-B70.ASTM C564 or
    - .2 Stainless steel clamps.
  - .2 Hub and spigot:
    - .1 Caulking lead: to CSA B67.
    - .2 Cold caulking compounds.

.2 Above ground sanitary and vent: to CAN/CSA-B70.
- .1 Joints:
  - .1 Hub and spigot:
    - .1 Caulking lead: to CSA B67.
  - .2 Mechanical joints:
    - .1 Neoprene or butyl rubber compression gaskets with stainless steel clamps.

PART 3 EXECUTION

3.1 APPLICATION

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

3.2 TESTING

.1 Pressure test buried systems before backfilling.

.2 Hydraulically test to verify grades and freedom from obstructions.

3.3 PERFORMANCE VERIFICATION

.1 Cleanouts:
- .1 Ensure accessible and that access doors are correctly located.
- .2 Open, cover with linseed oil and re-seal.
- .3 Verify that cleanout rods can probe as far as the next cleanout, at least.

.2 Ensure that fixtures are properly anchored, connected to system and effectively vented.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCE STANDARDS

.1 ASTM International (ASTM)
- .1 ASTM D2235, Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
- .2 ASTM D2564, Standard Specification for Solvent Cements for Poly (Vinyl-Chloride) (PVC) Plastic Piping Systems.

.2 CSA Group (CSA)
- .1 CAN/CSA-Series B1800, Thermoplastic Nonpressure Pipe Compendium - B1800 Series.

.3 National Research Council Canada (NRC)
- .1 National Plumbing Code of Canada (NPC).

PART 2 PRODUCTS

2.1 MATERIAL

.1 Adhesives and Sealants:
- .1 Maximum VOC limit 70 g/L GSES GS-36.

2.2 PIPING AND FITTINGS

.1 For above ground DWV piping to:
- .1 CAN/CSA B1800.

2.3 JOINTS

.1 Solvent weld for PVC: to ASTM D2564.

.2 Solvent weld for ABS: to ASTM D2235.

PART 3 EXECUTION

3.1 APPLICATION

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

3.2 TESTING

.1 Pressure test buried systems before backfilling.

.2 Hydraulically test to verify grades and freedom from obstructions.

3.3 PERFORMANCE VERIFICATION

.1 Cleanouts:
- .1 Ensure accessible and that access doors are correctly located.
- .2 Open, cover with linseed oil and re-seal.
- .3 Verify cleanout rods can probe as far as the next cleanout, at least.

.2 Test to ensure traps are fully and permanently primed.

.3 Storm water drainage:
- .1 Verify domes are secure.
- .2 Ensure weirs are correctly sized and installed correctly.
- .3 Verify provisions for movement of roof system.

.4 Ensure fixtures are properly anchored, connected to system and effectively vented.

.5 Affix applicable label (storm, sanitary, vent, pump discharge) c/w directional arrows every floor or 4.5 m (whichever is less).

END OF SECTION

PART 1 GENERAL

1.1 REFERENCE STANDARDS

.1 CSA Group
- .1 CSA C22.1, Canadian Electrical Code, Part 1 (22nd Edition), Safety Standard for Electrical Installations.
- .2 CAN3-C235, Preferred Voltage Levels for AC Systems, 0 to 50,000 V.

.2 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)
- .1 IEEE SP1122, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

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 SP1122.

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 and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop drawings:
- .1 Submit drawings stamped and signed by professional engineer registered or licensed in Quebec, Canada.
- .2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure co-ordinated 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.

.4 Certificates:
- .1 Provide CSA certified material.
- .2 Submit test results of installed electrical systems and instrumentation.
- .3 Permits and fees: in accordance with General Conditions of contract.
- .4 Submit, upon completion of Work, load balance report as described in PART 3 - LOAD BALANCE.
- .5 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Departmental Representative.
- .6 Manufacturer's Field Reports: submit to Departmental Representative manufacturer's written report, within 3 days of review, verifying compliance of Work, as described in PART 3 - FIELD QUALITY CONTROL.

.5 Sustainable Design Submittals:
- .1 Construction Waste Management:
  - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.

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 incorporation into manual.
- .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.
- .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 and are secured to prevent easy removal or peeling.

1.5 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 in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .1 Store and protect from nicks, scratches, and blemishes.
- .2 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section.

.5 Packaging Waste Management: remove for reuse as specified in Construction Waste Management Plan 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.
- .2 Language operating requirements: provide identification nameplates for control items in French and English.
- .3 Use one nameplate for both languages.

2.2 MATERIALS AND EQUIPMENT

.1 Provide material in accordance with Section 01 61 00 - Common Product Requirements.

.2 Material to be CSA certified. Where CSA certified material or equipment are 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 assemble 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.

.2 Control wiring and conduit: in accordance with Sections 26 05 21 – WIRES AND CABLES (0-1000 V) and 26 05 34 – CONDUITS, CONDUIT FASTENINGS AND CONDUIT FITTINGS.

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 The nameplates for terminal boxes and pull boxes shall indicate the network and voltage.

.2 Outlets and switches
- .1 Identify each outlet, by circuit and panel numbers, with a sticker on the outside of the plate.
- .2 The sticker will be made with a similar device to the model P-Touch 2000 of Brother. It will be with black characters on white adhesive, 16-point format and normal style.

.3 Lighting fixtures
- .1 Using a large indelible ink marker, identify the nominal lumens delivered from all light emitting diodes on a visible face through the air gap of the unit.
- .2 Apply a red sticker ½ inch in diameter to the fixtures connected to the emergency room.

2.7 WIRING IDENTIFICATION

.1 Identify wiring with permanent indelible identifying markings, numbered plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.

.2 Maintain phase sequence and colour coding throughout.

.3 Colour coding: to CSA C22.1.

.4 Use colour coded wires in communication cables, matched throughout system.

2.8 CONDUIT AND CABLE IDENTIFICATION

.1 Colour 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 CIRCUITS IDENTIFICATION

.1 Secondary panels at 120/208 V and 347/600 V:

.1 Identify in a printable way (non-handwritten) each circuit of all secondary panels on a card protected by a transparent plastic and inserted inside the door. Use the same circuit number as shown on the plans. Briefly describe the powered load.

2.10 FINISHES

.1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.

.1 Paint indoor switchgear and distribution enclosures light gray.

2.11 TENSIONS NOMINALES

.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.

2.12 TRAVERSÉES DE PLANCHERS ET DE MURS

.1 Install sleeves before pouring concrete. Sleeves passing through the concrete shall be 40 gauge steel pipe, of a size that allows free passage of the conduit and extends beyond the floor or wall by 51 mm (2").

.2 When cables or ducts pass through floors and firewalls, fill and seal space between cables or conduits and sleeve with ULC and FM approved caulking compound. Sealing sleeves will be done by the contractor of each specialty except for the sleeves where there is wiring or ducts installed by another specialty. In the latter case, the sleeves will be blocked by this or these specialties. In no case the planned sleeves will be left without sealing at the end of the project, if it is the case the contractor who installed the sleeves will have to seal them. The fire resistance of the installation must be equivalent to the fire resistance of the wall or floor crossed.

2.13 LOAD BALANCING

.1 Distribute branch circuit connections so as to obtain the best balance of current between phases, if changes are to be made to the drawings, inform the Departmental Representative and confirm in writing. Measure the phase current of distribution, lighting and service panels operating under normal loads at the time of acceptance.

.2 Measure phase voltages under loads and adjust transformer taps to ensure voltage is within two (2) percent of rated equipment voltage.

.3 In the case of panels or loads to be connected to an existing panel or distribution, take a current reading on the supply route of the existing panel or distribution when all existing installations are in normal service. Make sure that the required free capacity is available for the loads to be connected. Inform the engineer in writing in case the free capacity is insufficient and obtain his instructions before carrying out the work.

.4 Upon completion of work, provide a report showing all normal load currents, phase and neutral readings from panelboards, dry transformers and motor control centers. Specify the time and date at which each load was measured, as well as the circuit voltage at the time of the check.

2.14 DISMANTLING

.1 Remove all existing electrical equipment from demolished walls, partitions, columns or ceilings even if these are not shown on the drawings. Existing electrical equipment to be deposited is not all shown on the drawings and when they are, it is for information only.

.2 For all existing electrical or mechanical equipment to be deposited, it will be necessary:
- .1 Unplug the equipment
- .2 Remove existing conductors, conduits and cables to the source supplying power or to the last active output. Close all openings in boxes and cabinets with approved devices.
- .3 Remove electrical equipment.

.3 Provide the Owner with the following equipment: circuit breakers, safety switches, fuses. Arrange off-site and any other equipment or equipment not required in the new layout.

.4 Carefully remove and handle existing electrical equipment to be relocated, store in a safe location protected from mechanical damage, moisture and dust and reinstall properly.

.5 Upon Engineer's approval, it is permitted to reuse existing conduits that should be removed during dismantling provided they are:
- .1 minimum size required;
- .2 of the type appropriate for the use described in this specification;
- .3 not obstructed;
- .4 undamaged;
- .5 not rusted or corroded;
- .6 used with appropriate fittings for new conduits or boxes;
- .7 left at their current position.

.6 Existing cables and conductors may not be reused except as specifically indicated on the drawings.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

.1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.

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: schedule 40 steel pipe, 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 3000 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 MOUNTING HEIGHTS

.1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.

.2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

3.7 CO-ORDINATION OF PROTECTIVE DEVICES

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

3.8 FIELD QUALITY CONTROL

.1 Load Balance:
- .1 Measure phase current to panelboards 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 Provide upon completion of work, load balance report as directed in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS, phase and neutral currents on panelboards, dry-core transformers and motor control centres, operating under normal load, as well as hour and date on which each load was measured, and voltage at time of test.

.2 Conduct following tests in accordance with Section 01 45 00 - Quality Control.
- .1 Circuits originating from branch distribution panels.
- .2 Lighting.
- .3 Motors, heaters and associated control equipment including sequenced operation of systems where applicable.
- .4 Systems: fire alarm.
- .5 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 1000 V instrument.
  - .3 Check resistance to ground before energizing.

.3 Carry out tests in presence of Departmental Representative.

.4 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

.5 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.

3.9 SYSTEM STARTUP

.1 Instruct operating personnel in operation, care and maintenance of systems, system equipment and components.

.2 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with aspects of its care and operation.

3.10 CROSSINGS OF FLOORS AND WALLS

.1 When cables or ducts pass through floors and firewalls, fill and seal space between cables or conduits and sleeve with ULC and FM approved caulking compound. Sealing sleeves will be done by the contractor of each specialty except for the sleeves where there is wiring or ducts installed by another specialty. In the latter case, the sleeves will be blocked by this or these specialties. In no case the planned sleeves will be left without sealing at the end of the project, if it is the case the contractor who installed the sleeves will have to seal them. The fire resistance of the installation must be equivalent to the fire resistance of the wall or floor crossed.

3.11 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 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.

3.12 SEISMIC PROTECTION

.1 General
  .1 The Contractor is responsible for calculating, supplying and installing the seismic protection devices for all technical components installed under his responsibility.
  .2 Retain the services of an engineer, a member in rules of the Ordre des ingénieurs du Québec, to assess seismic risk and calculate mitigation measures. The successful engineer will have to demonstrate recognized expertise in earthquake protection. The Contractor shall provide his / her contact information to the Engineer no later than two (2) weeks after the signing of the contract.
  .3 During an earthquake, earthquake-resistant devices must prevent permanent movement as well as damage due to vertical, horizontal and overturning movements.

.2 Design Criteria
  .1 The category of location of the building is E.
  .2 Building height
    .1 See architectural plans to determine heights.

.3 Assessment and mitigation of seismic risk.
  .1 The seismic risk assessment must be carried out in accordance with the requirements of subsection 4.1.8 of the 2010 Québec Building Code, Chapter I - Building and National Building Code of Canada 2010 (as amended).
  .2 The seismic risk mitigation measures shall be evaluated according to the following standards:
    .1 NFPA 13 and 20;
    .2 SMACNA - Seismic Restraint Manual Guidelines for Mechanical System;
    .3 ASHRAE - Seismic and Wind Design;
    .4 FEMA;
    .5 Engineering documents of seismic device manufacturers.

.4 Seismic Risk Assessment and Mitigation Report (SARA)

.1 Provide the Engineer with the seismic risk assessment and mitigation report prior to the start of the installation of the technical components.

.2 The report must include, as a minimum, the following information:

.1 General project data:

.1 location of the building;

.2 a brief description of the building including the height of the building (hn);

.3 the category of location of the building;

.4 the risk category of the building;

.5 Sa value (0.2) applicable;

.6 the applicable Fa value;

.7 the applicable value.

.2 The list of all the technical components that are part of the Contractor's contract and that must be subjected to a seismic risk assessment.

.3 The list of technical components exempted from the evaluation with supporting documents.

.4 For each technical component (TC), the seismic risk assessment and the applied mitigation measure. Include the following:

.1 TC identification according to plans and specifications;

.2 the location of the TC including height hx;

.3 TC description including:

.1 type of equipment;

.2 make and model;

.3 dimensions;

.4 weight;

.5 category and value of Cp, Ar and Rp.

.4 the calculation of the lateral load Vp and the loads on the structure of the building;

.5 the description of the applied mitigation measure including:

.1 the make and model of the material chosen;

.2 sketch of the installation applicable to the project;

.3 plan showing the location of seismic devices;

.5 For each TC installed on the ground, on a slab or on a base, the calculation of the reversal force and the description of the attenuation measure. Include the following:

.1 TC identification according to plans and specifications;

.2 the location of the TC including height hx;

.3 TC description including:

.1 make and model;

.2 dimensions;

.3 weight;

.4 position of the center of gravity.

.4 the calculation of the overturning force;

.5 the description of the applied mitigation measure including:

.1 make and model of the chosen material;

.2 sketch of the installation applicable to the project;

.3 plan showing the location of the installation.

.5 Installation

.1 Install seismic devices as indicated in seismic risk assessment and mitigation report.

.2 Any modification to the seismic installation, whatever the cause, must be recalculated by the earthquake protection engineer, issued as an amendment to the report.

.3 The following requirements apply to the installation of mechanical and electrical equipment:

.1 cartridge fasteners and simply removed anchors are not permitted to counteract tensile loads;

.2 friction brackets are prohibited to support TCs unless they are equipped with a restraint mechanism;
.3 Friction supports are prohibited for seismic devices;
.4 any anti-vibration spring must be earthquake resistant;
.5 Oblong holes for fitting bolts are prohibited.

.6 Approval of the work
.1 Have the seismic risk mitigation works inspected by the engineer who prepared the seismic risk assessment and mitigation report.
.2 Obtain a written and signed attestation from the earthquake protection engineer stating that the seismic risk mitigation works were carried out in accordance with the report by ÉARS or amendments to the report. Submit this certificate before submitting the certificate of conformity of work.
.3 Include in the Operations and Maintenance Manual all documents produced by the Engineer earthquake protection.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCE STANDARDS

.1 CSA Group (CSA)
- .1 CAN/CSA-C22.2 No.18, Outlet Boxes, Conduit Boxes and Fittings.
- .2 CAN/CSA-C22.2 No.65, Wire Connectors (Tri-National Standard with UL 486A-486B and NMX-J-543-ANCE-03).

.2 National Electrical Manufacturers Association (NEMA)

1.2 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 wire and box connectors and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for wire and box connectors for incorporation into manual.

1.4 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 in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Store and protect wire and box connectors from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Pressure type wire connectors to: CAN/CSA-C22.2 No.65, with current carrying parts of copper alloy and copper sized to fit copper conductors as required.

.2 Fixture type splicing connectors to: CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.

.3 Clamps or connectors aluminum sheathed cable, armoured cable as required to: CAN/CSA-C22.2 No.18.

2.2 JOINTS OF THE CONDUCTORS

.1 Weldness connectors.

2.3 CONNECTING BLOCKS

.1 All joints of conductors in boxes and panels for fire alarm, low voltage lighting controls, other low voltage systems, etc., will be made on terminal blocks with terminals in sufficient quantity for each driver.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

.1 Remove insulation carefully from ends of conductors [cables] and:
- .1 Apply coat of zinc joint compound on aluminum conductors prior to installation of connectors.
- .2 Install mechanical pressure type connectors and tighten screws [with appropriate compression tool recommended by manufacturer]. Installation shall meet secureness tests in accordance with CAN/CSA-C22.2 No.65.
- .3 Install fixture type connectors and tighten to [CAN/CSA-C22.2 No.65]. Replace insulating cap.

3.3 JOINTS

.1 Enrubanner les connecteurs, ne comportant pas leur propre enveloppe isolante, d’au moins deux rangs de ruban approuvé pour cette application- chevauchés.

.2 Les caractéristiques diélectriques de l’enrubannage de joints ne doivent jamais être inférieures à celles de l’isolant des conducteurs.

.3 Les joints et les connecteurs ne présentant pas une surface régulière

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 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.

END OF SECTION

PART 1 GENERAL

1.1 PRODUCT DATA

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

1.2 DELIVERY, STORAGE AND HANDLING

.1 Packaging Waste Management: remove for reuse of packaging materials in accordance with Section 01 74 19 - Waste Management and Disposal.

PART 2 PRODUCTS

2.1 BUILDING WIRES

.1 Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.

.2 Copper conductors: size as indicated, with 600 V insulation of cross-linked thermosetting polyethylene material rated RWU90 XLPE and RW90 XLPE.

.3 Wires for the fire alarm. For additional features, refer to the article "Wiring"of Section 28 31 00.01 "Multiplex Fire Alarm Systems"..

2.2 CONTROL CABLES

.1 Meet standard CAN/CSA-C22.2 No. 14-18.

.2 Type: LVT: soft annealed copper conductors, sized N° 16 with 300 V insulation of cross-linked thermosetting polyethylene material rated type RW90 XLPE.

.3 Overall covering: thermoplastic jacket.

PART 3 EXECUTION

3.1 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.

.2 Perform tests using method appropriate to site conditions and to approval of Departmental Representative and local authority having jurisdiction over installation.

.3 Perform tests before energizing electrical system.

3.2 GENERAL CABLE INSTALLATION

.1 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors - (0-1000 V).

.2 Cable Colour Coding: to Section 26 05 00 - Common Work Results for Electrical.

.3 Conductor length for parallel feeders to be identical.

.4 Lace or clip groups of feeder cables at distribution centres, pull boxes, and termination points.

.5 Wiring in walls: typically drop or loop vertically from above to better facilitate future renovations. Generally wiring from below and horizontal wiring in walls to be avoided unless indicated.

.6 Branch circuit wiring for surge suppression receptacles and permanently wired computer and electronic equipment to be 2-wire circuits only, i.e. common neutrals not permitted.

.7 Provide numbered wire collars for control wiring. Numbers to correspond to control shop drawing legend. Obtain wiring diagram for control wiring.

.8 Use only lubricants approved by the manufacturer for pulling the cables .

.9 Install cables or wires continuously, without joints, from their point of origin to the powered component. If required, make the joints in the approved junction boxes .

3.3 INSTALLATION OF BUILDING WIRES

.1 Install wiring as follows:

.1 In conduit systems in accordance with Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

END OF SECTION

PART 1 GENERAL

1.1 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 hangers and supports and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Sustainable Design Submittals:
- .1 Construction Waste Management:
  - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.

1.2 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 in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Store and protect hangers and supports from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section.

.5 Packaging Waste Management: remove for reuse of packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction Waste Management Plan.

PART 2 PRODUCTS

2.1 SUPPORT CHANNELS

.1 U shape, size 41 x 41 mm, 2.5 mm thick, suspended or set in poured concrete walls and ceilings or surface mounted.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for hangers and supports installation in accordance with manufacturer's written instructions.
- .1 Visually inspect substrate in presence of Departmental Representative.
- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION

.1 Secure equipment to solid masonry, tile and plaster surfaces with [lead anchors] [nylon shields].

.2 Secure equipment to poured concrete with expandable inserts.

.3 Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.

.4 Secure surface mounted equipment with twist clip fasteners to inverted T bar ceilings. Ensure that T bars are adequately supported to carry weight of equipment specified before installation.

.5 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.

.6 Fasten exposed conduit or cables to building construction or support system using straps.
- .1 One-hole malleable iron straps to secure surface conduits and cables 50 mm and smaller.
- .2 Two-hole steel straps for conduits and cables larger than 50 mm.
- .3 Beam clamps to secure conduit to exposed steel work.

.7 Suspended support systems.
- .1 Support individual cable or conduit runs with 6 mm diameter threaded rods and spring clips.
- .2 Support 2 or more cables or conduits on channels supported by 6 mm diameter threaded rod hangers where direct fastening to building construction is impractical.

.8 For surface mounting of two or more conduits use channels centre spacing.

.9 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.

.10 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.

.11 Do not use wire lashing or perforated strap to support or secure raceways or cables.

.12 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Departmental Representative.

.13 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

3.3 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.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCE STANDARDS

.1 CSA C22.2 N° 40-17 Junction And Pull Boxes.

1.2 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, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:

.1 Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

PART 2 PRODUCTS

2.1 SPLITTERS

.1 Construction: sheet metal enclosure, welded corners and formed hinged cover suitable for locking in closed position.

.2 Terminations: main and branch lugs or connection blocks to match required size and number of incoming and outgoing conductors as indicated.

.3 Spare Terminals: minimum three spare terminals or lugs on each connection or lug block sized less than 400 A.

2.2 JUNCTION AND PULL BOXES

.1 Construction:welded steel enclosure.

.2 Covers Flush Mounted: 25 mm minimum extension all around.

.3 Covers Surface Mounted: screw-on flat covers.

PART 3 EXECUTION

3.1 SPLITTER INSTALLATION

.1 Mount plumb, true and square to building lines.

.2 Extend splitters full length of equipment arrangement except where indicated otherwise.

3.2 JUNCTION, PULL BOXES AND CABINETS INSTALLATION

.1 Install pull boxes in inconspicuous but accessible locations.

.2 Only main junction and pull boxes are indicated. Install additional pull boxes as required by CSA C22.1.

3.3 IDENTIFICATION

.1 Equipment Identification: to Section 26 05 00 - Common Work Results for Electrical.

.2 Identification Labels: size 2 indicating[voltage and phase, system name or as indicated.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCE STANDARDS

.1 CSA C22.2 N° 18.1-F04(C2009) Metallic Outlet Boxes.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

1.3 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 recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

PART 2 PRODUCTS

2.1 OUTLET AND CONDUIT BOXES GENERAL

.1 Size boxes in accordance with CSA C22.1.

.2 102 mm square or larger outlet boxes as required.

.3 Gang boxes where wiring devices are grouped.

.4 Blank cover plates for boxes without wiring devices.

.5 347 V outlet boxes for 347 V switching devices.

.6 Combination boxes with barriers where outlets for more than one system are grouped.

2.2 GALVANIZED STEEL OUTLET BOXES

.1 One-piece electro-galvanized construction.

.2 Single or multi gang flush device boxes for flush installation, minimum size 76 x 50 x 38 mm or as indicated. 102 mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.

.3 Utility boxes for outlets connected to surface-mounted EMT conduit, minimum size 102 x 54 x 48 mm.

.4 102 mm square or octagonal outlet boxes for lighting fixture outlets.

.5 Extension and plaster rings for flush mounting devices in finished tile or plaster walls.

2.3 MASONRY BOXES

.1 Galvanized steel masonry single or multi gang boxes for devices flush mounted in exposed block walls.

.2 Recessed outlet box, 102 mm square, plaster cover 12.5 mm or larger.

2.4 CONCRETE BOXES

.1 Galvanized sheet steel concrete type boxes, 102 mm square, for flush mount in concrete with matching extension and plaster rings as required.

2.5 CONDUIT BOXES

.1 Cast FS aluminum boxes with factory-threaded hubs and mounting feet for surface wiring of devices.

2.6 FITTINGS - GENERAL

.1 Bushing and connectors with nylon insulated throats.

.2 Knock-out fillers to prevent entry of debris.

.3 Conduit outlet bodies for conduit up to 35 mm and pull boxes for larger conduits.

.4 Double locknuts and insulated bushings on sheet metal boxes.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Support boxes independently of connecting conduits.

.2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.

.3 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.

.4 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Do not install reducing washers.

.5 Vacuum clean interior of outlet boxes before installation of wiring devices.

.6 Identify systems for outlet boxes as required.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCE STANDARDS

.1 CSA Group (CSA)
- .1 CAN/CSA C22.2 No. 18.3-13(R2017), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
- .2 CSA C22.2 No. 56-17, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
- .3 CSA C22.2 No. 83-M1985 (R2017), Electrical Metallic Tubing.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product data: submit manufacturer's printed product literature, specifications and datasheets.
- .1 Submit cable manufacturing data.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

PART 2 PRODUCTS

2.1 CABLES AND REELS

.1 Provide cables on reels or coils.
- .1 Mark or tag each cable and outside of each reel or coil, to indicate cable length, voltage rating, conductor size, and manufacturer's lot number and reel number.

.2 Each coil or reel of cable to contain only one continuous cable without splices.

.3 Identify cables for exclusively dc applications.

2.2 CONDUITS

.1 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.

.2 Flexible metal conduit: to CSA C22.2 No. 56, liquid-tight flexible metal.

2.3 CONDUIT SYSTEMS FOR TELECOMMUNICATION, ACCESS CONTROL, DATA AND FIBER OPTICS

.1 Conduits shall be electric metallic tubing (EMT) as described in article "Conduits". Conduits shall have plastic grummets at both ends. Use of "LB, LL or LR" types elbow is prohibited.

.2 Conduit diameter for telecommunication (data and telephone (Cat6 FT6 cable) shall not be smaller than the requirements of the following table:

Conduit size	Maximum quantity of cable
27 mm	6
35 mm	10
41 mm	14

Conduit size	Maximum quantity of cable
53 mm	20
63 mm	30
78 mm	40

.3 Except otherwise specified, for telecommunication (data and telephone) install one conduit between the outlet and the telecommunication cable tray.

.4 Outlet boxes for telecommunication shall be single gang for a maximum of four (4) cables and double gang for five (5) to eight (8) cables. When boxes are used, they shall have a minimum depth of 64 mm (2½"), two (2) gangs.

.5 Filling factor for other systems shall be as per tables of applicable Electrical Code for power conductor.

.6 Verify bending radius of cable and install conduits in respect to the cable manufacturer requirement. For fiber optic networks, use long radius elbows and pull boxes having an appropriate size to avoid damage on cables.

2.4 CONDUIT FASTENINGS

.1 One hole steel straps to secure surface conduits 50 mm and smaller.
.1 Two hole steel straps for conduits larger than 50 mm.

.2 Beam clamps to secure conduits to exposed steel work.

.3 Channel type supports for two or more conduits on centre.

.4 Threaded rods, 6 mm diameter, to support suspended channels.

2.5 CONDUIT FITTINGS

.1 Fittings: to CAN/CSA C22.2 No. 18, manufactured for use with conduit specified. Coating: same as conduit.

.2 Ensure factory "ells" where 90 degrees bends for 25 mm and larger conduits.

.3 Watertight connectors and couplings for EMT.
.1 Set-screws are not acceptable.

2.6 FISH CORD

.1 Polypropylene.

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

.1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

.2 Conceal conduits except in mechanical and electrical service rooms.

.3 Use electrical metallic tubing (EMT) except in cast concrete.

.4 Use liquid tight flexible metal conduit for connection to motors or vibrating equipment in damp, wet or corrosive locations.

.5 Minimum conduit size for lighting and power circuits: 21 mm.

.6 Use flexible metal conduit for work in movable metal partitions, connection to motors in dry areas, connection to surface or recessed fluorescent fixtures or connection to recessed incandescent fixtures without prewired outlet box.

.7 Install EMT conduit from branch circuit panel to outlet boxes located in sub floor.

.8 Bend conduit cold:
- .1 Replace conduit if kinked or flattened more than 1/10th of its original diameter.

.9 Mechanically bend steel conduit over [19 mm] diameter.

.10 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.

.11 Install fish cord in empty conduits.

.12 Run 2-25 mm spare conduits up to ceiling space and 2-25 mm spare conduits down to ceiling space from each flush panel.
- .1 Terminate these conduits in 152 x 152 x 102 mm junction boxes in ceiling space or in case of an exposed concrete slab, terminate each conduit in surface type box.

.13 Remove and replace blocked conduit sections.
- .1 Do not use liquids to clean out conduits.

.14 Dry conduits out before installing wire.

3.3 SURFACE CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.

.3 Run conduits in flanged portion of structural steel.

.4 Group conduits wherever possible on suspended channels.

.5 Do not pass conduits through structural members except as indicated.

.6 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

3.4 CONCEALED CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Do not install horizontal runs in masonry walls.

.3 Do not install conduits in terrazzo or concrete toppings.

3.5 CLEANING

.1 Proceed in accordance with Section 01 74 00 - Cleaning.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCE STANDARDS

.1 CSA C22.2 no 106-M92 (R2001) High Rated Capacity Fuses.

.2 CSA C22.2 no 248.1-11 (R2016) Low voltage Fuses.

.3 CSA C22.2 no 248.8-11 (R2016) Low voltage Fuses – Part 8: Class J Fuses.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:
- .1 Provide fuse performance data characteristics for each fuse type and size above. Performance data to include: average melting time-current characteristics.

.3 Shop Drawings:
- .1 Provide shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit drawings stamped and signed by professional engineer registered or licensed in Quebec, Canada.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Ship fuses in original containers.

.2 Do not ship fuses installed in switchboard.

.3 Store fuses in original containers in moisture free location.

.4 Waste Management and Disposal:
- .1 Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

PART 2 PRODUCTS

2.1 FUSES - GENERAL

.1 Fuses: product of one manufacturer.

2.2 FUSE TYPES

.1 Class CC fuses.
- .1 Type CC, time delay, capable of carrying 500% of its rated current for 10 s minimum.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Install fuses in mounting devices of doors control panel immediately before energizing circuit.

.2 Ensure correct fuses fitted to physically matched mounting devices.

.3 Ensure correct fuses fitted to assigned electrical circuit.

.4 Fuses type
- .1 Motors and transformers circuits :
  - .1 Type CC, time delay.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCE STANDARDS

.1 CSA International
- .1 CSA C22.2 No. 5, Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (norme trinationale avec UL 489 et NMX-J-266-ANCE-2010).

1.2 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 circuit breakers and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Certificates:
- .1 Prior to installation of circuit breakers in either new or existing installation, Contractor must submit 3 copies of a production certificate of origin from the manufacturer. Production certificate of origin must be duly signed by factory and local manufacturer's representative certifying that circuit breakers come from this manufacturer and are new and meet standards and regulations.
  - .1 Production certificate of origin must be submitted to Departmental Representative for approval.
- .2 Delay in submitting production of certificate of origin will not justify any extension of contract and additional compensation.
- .3 Any work of manufacturing, assembly or installation to begin only after acceptance of production certificate of origin by Departmental Representative. Unless complying with this requirement, Departmental Representative reserves the right to mandate manufacturer listed on circuit breakers to authenticate new circuit breakers under the contract, and to Contractor's expense.
- .4 Production certificate of origin must contain:
  - .1 Manufacturer's name and address and person responsible for authentication. Person responsible must sign and date certificate.
  - .2 Licensed dealer's name and address and person of distributor responsible for Contractor's account.
  - .3 Contractor's name and address and person responsible for project.
  - .4 Local manufacturer's representative name and address. Local manufacturer's representative must sign and date certificate.
  - .5 Name and address of building where circuit breakers will be installed:
    - .1 Project title.
    - .2 End user's reference number.
    - .3 List of circuit breakers.
- .5 Sustainable Design Submittals:
  - .1 Construction Waste Management:
    - .1 Submit project Construction Waste Management Plan highlighting recycling and salvage requirements.

1.3 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 circuit breakers in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Store and protect circuit breakers from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section.

.5 Packaging Waste Management: remove for reuse of packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction Waste Management Plan.

PART 2 PRODUCTS

2.1 BREAKERS GENERAL

.1 Moulded-case circuit breakers, ground-fault circuit-interrupters: to CSA C22.2 No. 5

.2 Bolt-on moulded case circuit breaker: quick- make, quick-break type, for manual and automatic operation.

.3 Common-trip breakers: with single handle for multi-pole applications.

.4 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting.

.5 The circuit breakers must have breaking capacity according to the following indications:
- .1 For 120 V or 208 V circuits, use unless otherwise indicated in the diagram. distribution or description of panels, monopolar, bipolar circuit breakers, 3-pole and of gauge according to the indications having a capacity of rupture of 10 kA effective minimum sysmetric.

2.2 THERMAL MAGNETIC BREAKERS

.1 Moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short circuit protection.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

.1 Install circuit breakers as indicated.

3.3 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
- .1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Waste Management and Disposal.
- .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCE

.1 Section 26 28 13.01 - Low voltage fuse

1.2 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 hangers and supports and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Workshop drawing:
- .1 Workshop drawing must be sealed by a Quebec Engineer.

1.3 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Include maintenance manuels

.3 Include description of the system.

.4 Include list of materiel.

1.4 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 in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Store and protect materials from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 74 21 - Construction Waste Management Plan.

1.5 QUALIFICATIONS

.1 The bidder, an authorised representative, or a service provider certified by the manufacturer, must be able to answer service calls, and to get to the Port-Cartier institution within three (3) hours of the emergency service call, in the event of a breakdown or failure of one or more systems.

PART 2 PRODUCTS

2.1 DESCRIPTION

.1 Physical characteristic
- .1 Supply voltage of 120V.
- .2 Equipped with a static uninterruptible power supply system to compensate for power interruptions of 5 minutes.
- .3 Control panel located in room S203.
- .4 Manual control panel located in room S141
- .1 A manual control panel is required for even-numbered doors.
- .2 A manual control panel is required for odd-numbered doors.
- .5 System with a console with three touch screens in room S141
- .6 System to provide its status and events to the existing Entiliweb server and Enteliviz HTML 5 graphics.
- .7 All boxes must have locks compatible with Best M series keys.
- .8 The system must be of robust and waterproof construction, particularly to equipment accessible by operators.
- .9 The system must be constructed in such a way that the replacement of a component is quick and easy.

.2 Control panel
- .1 Non-volatile memory.
- .2 Each door control and command must be protected by a fuse,
- .3 All control equipment must have an indicator light indicating their status.
- .4 All equipment must be supervised.
- .1 Any change of state must be dated, with the time, to the nearest second.
- .5 The system must know the status of all doors, whether in open, closed or moving position.
- .6 The system must be able to keep records of the events of the last seven (7) days, consulted on a screen in room 203.
- .7 The system must know the state of all the boxes that are part of its assembly.
- .8 The panel must be independent, it cannot receive a command from a server or another control panel.
- .9 Must not require keyboard or mouse to operate.
- .10 Instant response. No delay in ordering.
- .11 No action can be queued for execution.

.3 Console
- .1 Audible warning on each action.
- .2 Presence of a physical button to confirm the door opening command.
- .3 Audible alarms on system failure or improper operation.
- .4 Sound level can be adjust by a admnistrator only.

.4 Console touch screens
- .1 The control screens must be connected directly to the controllers
- .2 Each screen must make a dedicated row and it must not be possible to control another row with another screen.
- .3 No possibility of putting the screen to sleep.
- .4 The touch screen must be accessible at all times, without having to enter a username and password.
- .5 Screen size :minimum size 380 mm and maximum 550 mm.

.5 Graphic
- .1 Simple and clear graphic including building name, row name and cell number.
- .2 Two physical buttons on the screen
- .1 Red = open the door

.2 Green = close the door
.3 An emergency button to activate "emergency" mode. Allows the opening or closing of all doors at the same time in a single action.
.4 On the graphical user interface: The center of the button corresponding to the door indicates in red and green the state of the lock contact. The frame of this same button indicates in red or green the status of the door contact.

.6 Manual control panel
.1 Allows operation of mechanical elements even if the controller and / or screen is. Out of office.
.2 The manual control panels are electronically supervised.

.7 Report
.1 The system must be able to display on the screen all events that have occurred during the archiving period.
.2 The report must group the events according to the sequence of operation and identify the malfunction in the sequence.

2.2 WIRING

.1 16 AWG RWG90 minimum, and in accordance with 26 05 00 - Common work results for electrical requirements.

2.3 SEQUENCE OF OPERATION

.1 General

.2 The screen displays the system status and each door status.

.3 Normal mode
.1 Correctional officer selects the doors to operate.
.2 Correctional officer must confirm his actions.
.3 Door status is display when :
.1 Door is closed;
.2 Door is in operation;
.3 Door is open.
.4 Automatic function is prohibited.

.4 Emergency or evacuation operation
.1 Same operation as in normal mode, exept.

2.4 MANUFACTURER

.1 Compatible with other door control system of the building,

.2 From Honeywell.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for fire alarm installation in accordance with manufacturer's written instructions.
.1 Visually inspect substrate in presence of Departmental Representative.
.2 Inform Departmental Representative of unacceptable conditions immediately upon

discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION

.1 Install systems in accordance with manufacturer.

.2 Plug system on emergency source.

3.3 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.

.2 Provide on-site lectures and demonstration by doors control system manufacturer to train operational personnel trainer in use and maintenance of door control system.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
- .1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Waste Management and Disposal.
- .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .2 Place materials defined as hazardous or toxic waste in designated containers.

3.5 PROTECTION

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

.2 Repair damage to adjacent materials caused by doors control system installation.

3.6 CLOSEOUT ACTIVITIES

.1 Provide on-site lectures and demonstration by doors control system manufacturer to train operational personnel in use and maintenance of door control system.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCE STANDARDS

.1 National Research Council Canada (NRC)
  .1 National Building Code of Canada (NBC).

.2 Occupational Safety and Health (OSH)
  .1 Fire Protection Standard.

.3 Underwriter's Laboratories of Canada (ULC)
  .1 CAN/ULC-S524-2014, Standard for the Installation of Fire Alarm Systems.
  .2 CAN/ULC-S537-2004, Standard for the Verification of Fire Alarm Systems.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Not Used.

1.3 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

1.4 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 in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  .2 Store and protect materials from nicks, scratches, and blemishes.
  .3 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 74 21 - Construction Waste Management Plan.

PART 2 PRODUCTS

2.1 DESCRIPTION

.1 Chubb Edward brand EST fully microprocessor-based, fully monitored microprocessor-based fire alarm system with digital data control, digital control and multiplexing technology for data transmission Zoned, two stage.

2.2 WIRING

.1 To initiating circuits: 16 AWG minimum, and in accordance with manufacturer's requirements.

.2 To signal circuits: 16 AWG minimum, and in accordance with manufacturer's requirements.

.3 To control circuits: 14 AWG minimum, and in accordance with manufacturer's requirements.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

.1 Install systems in accordance with CAN/ULC-S524.

.2 Locate and install detectors and connect to alarm circuit wiring. Mount detectors more than 1 m from air outlets. Maintain at least 600 mm radius clear space on ceiling, below and around detectors. Locate duct type detectors in straight portions of ducts.

.3 Connect alarm circuits to main control panel.

.4 Install visual signaling devices in accordance with CAN / ULC-S526 at the indicated locations and connect to signaling circuits.

.5 Connect signalling circuits to main control panel.

.6 Splices are not permitted.

.7 Ensure that wiring is free of opens, shorts or grounds, before system testing and handing over.

.8 Identify circuits and other related wiring at central control unit, annunciators, and terminal boxes.

.9 Do not wire 120 V a.c. on same low voltage signaling or alarm circuit conduit.

3.3 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical and CAN/ULC-S537.

.2 Fire alarm system:
- .1 Test such device and alarm circuit to ensure manual stations, detectors transmit alarm to control panel and actuate general alarm and first stage alarm.
- .2 Check annunciator panels to ensure zones are shown correctly.
- .3 Simulate grounds and breaks on alarm and signalling circuits to ensure proper operation of systems.

.3 Provide final PROM program re-burn for system Consultant incorporating program changes made during construction.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
- .1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Waste Management and Disposal.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
.2 Place materials defined as hazardous or toxic waste in designated containers.

3.5 PROTECTION

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

.2 Repair damage to adjacent materials caused by fire alarm system installation.

3.6 CLOSEOUT ACTIVITIES

.1 Provide on-site lectures and demonstration by fire alarm equipment manufacturer to train operational personnel in use and maintenance of fire alarm system.

END OF SECTION

PART 1 - GENERAL

1.1 General clauses

1. General Clauses and Complementary General Clauses apply to works described in this section.

1.2 Related work

N/A

1.3 Definitions

1. Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation including dense tills, hardpan, frozen materials and partially cemented materials which can be ripped and excavated with heavy construction equipment.

2. Rock excavation: excavation of material from solid masses of igneous, sedimentary or metamorphic rock which, prior to its removal, was integral with its parent mass, and boulders or rock fragments having individual volume in excess of 1 cubic meter. If the individual volume exceeds 1 cubic meter, immediately notify Ministry representative and follow his instructions.

3. Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

1.4 Samples

1. Contractor shall submit to soil laboratory chosen by Ministry representative the source of backfill materials and for testing and approval, a sample of all granular material to be used as fill at least 10 days before beginning backfilling operations.

1.5 Protection of existing features

1. Existing buried utilities and structures:

   - Prior to commencing any excavation work, notify Ministry representative or applicable authorities, establish location and state of use of buried utilities and structures. Clearly mark such locations to prevent disturbance during work.

   - If indicated on drawings, details relative to location, dimension and depth of utilities are only given for general information and are not to be considered complete or accurate. Confirm locations of buried utilities by careful test excavations.

   - Confirm locations of buried utilities by careful test excavations.

   - Maintain and protect from damage water, sewer, gas, electric, telephone and other utilities and structures encountered. Obtain directions before moving or otherwise disturbing utilities or structures.

   - Note position of all buried utilities whether they be kept as is, relocated or abandoned.

2. Existing buildings and surfaces features:

   - Conduct condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks and paving, survey bench marks and monuments which may be affected by work.

   - Protect existing buildings and surface features which may be affected by work from damage while work is in progress and repair damage resulting from work.

1.6 Shoring, retaining structures and underpinning

1. Hire a qualified professional Ministry representative registered in the province where the works are to be performed for the design and inspection of shoring and underpinning where required.

2. At least two weeks prior to start work, submit design drawings and technical data for examination by the Ministry representative.

3. Documents submitted must be stamped and signed by qualified Ministry representative.

4. Ministry representative hired to design shoring to submit proof of professional responsibility insurance except if member of general contractor in which case contractor to provide proof that his insurance covers shoring and underpinning design.

5. Protect and keep intact, prevent displacement and/or movement of existing work, earth, buried utilities, sidewalks, roads, trees and benchmarks in the immediate area.

6. Shore excavations to avoid slides as per Quebec security code in construction and local by laws.

7. Contractor to repair any and all damages and pay for costs. Contractor to assume responsibility for accidents caused by faulty underpinning and/or shoring.

1.7 Work surveillance

1. Ministry representative may delegate laboratory to represent Ministry representative on site for all matters concerning soil quality, examination of bottom of excavation and execution of compacted backfill; laboratory is entitled to issue directives to contractor who must conform to them.

2. Contractor to cooperate with laboratory personnel and to lend equipment on site so that work can be executed rapidly and efficiently.

3. Laboratory is authorized to stop backfilling operations in order to verify the compaction of backfill material already in place.

4. Contractor may not ask for an extra caused by interruptions of his work because of laboratory operations.

5. Compaction tests to be performed for every 100 m^3 of backfill.

PART 2 - PRODUCTS

2.1 Materials

1. Type 1 fill: clean, hard, durable crushed gravel or stone, free from shale, clay, friable materials, organic matter and other deleterious substances and graded within the following limits when tested to Ministère des Transports du Québec standards and giving a smooth curve without sharp breaks when plotted on a semi-log chart. Material to be DB certified.

Sieve designation	% passing
31.5 mm	100
20 mm	90 - 100
14 mm	68 - 93
5 mm	35 - 60
1.25 mm	19 - 38
0.315 mm	9 - 17
0.080 mm	2 - 7

2. Class B material: excavated material characterized by a contamination level under the criteria of class “A” by a soil laboratory according to the classification of MDDEFP. If the contamination level of the soil on site is in another range, it may be used only if it is compatible with the usage of the property. In no circumstances the level of contamination of a site can be increased. Material to be compactable, free of shale or other expansive material, clay, friable material, organic matter or other deleterious substances. Material to be mineral. Use of material depends on condition height of backfill to be done and climatic condition. Material must be approved by a soil laboratory.

PART 3 - EXECUTION

3.1 Soils report

1. Remove all obstructions, ice and snow from surfaces to be excavated within limits indicated.

2. Strip topsoil from within limits of excavation and stockpile as directed by Ministry representative for respreading after backfilling.

3. Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

3.2 Stockpiling

1. Stockpile fill materials in areas designated by Ministry representative. Stockpile granular materials in manner to prevent segregation.

2. Protect fill materials from contamination.

3.3 Dewatering

1. Keep excavations free of water while work is in progress.

2. Protect open excavations against flooding and damage due to surface run-off.

3. Dispose of water in a manner not detrimental to public and private property, or any portion of work completed or under construction.

3.4 Protection against frost action

1. Protect bottom of excavations against frost action with a protective blanket approved by Ministry representative.

3.5 Excavation

1. Excavate to lines, grades, elevations and dimensions indicated for the installation, the construction and inspection of the prescribed work.

2. Remove paving, walks and other obstructions encountered during excavation.

3. Excavation must not interfere with normal 45^{o} splay of bearing excavation.

4. Dispose of surplus and unsuitable excavated material off site.

5. Do not obstruct flow of surface drainage.

6. Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

7. Notify Ministry representative when soil at bottom of excavation appears unsuitable and proceed as directed by Ministry representative.

8. Obtain Ministry representative's approval of completed excavation.

9. Remove unsuitable material from trench bottom to extent and depth directed by Ministry representative.

10. Where required due to unauthorized over-excavation, correct as follows:

    - Fill under bearing surfaces and footings with concrete specified for footings.

    - Fill under other areas with Type 2 fill compacted to a minimum of 95% modified Proctor.

11. Hand trim, make firm and remove loose material and debris from excavations. Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil, subjected to soils laboratory's approval.

12. Remove all existing fill material (down to undisturbed natural soil) under slabs on grade to be constructed.

3.6 Fill types and compaction

1. Use fill of types as indicated or specified below. Unless otherwise specified, compact to following densities:

    - Type 1: 95% modified Proctor.
    - Class B: 90% modified Proctor.

2. Exterior side of perimeter walls: fill to subgrade level with type fill specified on Ministry representative's drawings.

3. Within building area: use MG112 materials to underside of base course for floor slabs and compact to 98% modified Proctor unless otherwise indicated on drawings.

4. Under concrete slabs on grade: as per indicated on Ministry representative’s drawings.

    The use of shale or other deleterious material for compacted fill under slabs on grade or footings is strictly forbidden.

3.7 Backfilling

1. Do not proceed with backfilling operations until Ministry representative has inspected and approved installations.

2. Areas to be backfilled to be free from debris, snow, ice, water or frozen ground.

3. Do not use backfill material which is frozen or contains ice, snow or debris.

4. Backfilling around installations.

   - Place bedding and surround material as specified elsewhere.

   - Place layers simultaneously on both sides of installed work to equalize loading. Difference not to exceed 150 mm.

   - Place material by hand under, around and over installations until 600 mm of cover is provided. Dumping material directly on installations will not be permitted.

5. Place backfill material in uniform layers not exceeding 200 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

6. If specified on drawings, install drainage as per Ministry representative's instructions.

7. Ministry representative will pay costs of tests.

3.8 Inspection and testing

1. Compaction and material testing to be performed by laboratory chosen by owner. Rate of testing to be determined by Ministry representative.

3.9 Restoration

1. Upon completion of work, remove surplus materials and debris, trim slopes, and correct defects noted by Ministry representative.

2. Replace topsoil.

3. Reinstate pavement and sidewalks to condition and elevation which existed before excavation.

4. Clean and reinstate areas affected by work as directed by Ministry representative.

3.10 Special conditions

1. Contractor to hire surveyor to locate building lines. Survey to be verified by Ministry representative's surveyor.

End of section

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